

Moral reasoning and ego identity status in academically gifted adolescents

Author:

Yeh, Linda

Publication Date:

2011

DOI:

<https://doi.org/10.26190/unsworks/15298>

License:

<https://creativecommons.org/licenses/by-nc-nd/3.0/au/>

Link to license to see what you are allowed to do with this resource.

Downloaded from <http://hdl.handle.net/1959.4/51678> in <https://unsworks.unsw.edu.au> on 2024-05-01

**Moral Reasoning and Ego Identity Status in Academically Gifted
Adolescents**

Linda Yeh

A thesis submitted in fulfillment of the requirements for the degree of Doctor of
Philosophy, School of Education, University of New South Wales.

2011

THE UNIVERSITY OF NEW SOUTH WALES

Thesis/Dissertation Sheet

Surname or Family name: YEH

First name: LINDA

Other name/s:

Abbreviation for degree as given in the University calendar: PHD

School: EDUCATION

Faculty: EDUCATION

Title: MORAL REASONING AND EGO IDENTITY STATUS IN ACADEMICALLY GIFTED ADOLESCENTS

Abstract

This study aimed to enhance understanding of the moral reasoning and identity status of academically gifted adolescents in comparison with those of age-peers not identified as gifted. It examined the influence of levels of mathematical giftedness and levels of verbal giftedness on moral reasoning and identity development. The relationship between moral reasoning and identity status was also explored.

This research used a non-experimental comparative design employing a survey questionnaire. The academically gifted students ($n = 402$) were recruited from students who participated in either the Australian Primary Talent Search (APTS) or the Australian Secondary School Educational Talent Search (ASSETS) conducted by the Gifted Education Research, Resource and Information Centre (GERRIC) at the University of New South Wales in Sydney, Australia. The comparison group of students not identified as gifted ($n = 32$) was recruited from independent secondary schools (Years 9 to 12) in New South Wales, through nomination by their teachers who were trained in gifted education. Student samples from both groups were administered the Defining Issues Test (DIT) and the Extended Objective Measure of Ego Identity Status-2 (EOM-EIS-2).

Results showed that gifted adolescents scored significantly higher in the DIT postconventional index than their age peers not identified as gifted. Highly mathematically gifted students were more advanced in moral reasoning than moderately mathematically gifted students. Female adolescents who were highly verbally gifted had significantly higher scores on the postconventional index than did those who were moderately verbally gifted.

In terms of ego identity status, gifted and non-identified groups did not differ in the development of ideological identity. However, students not identified as gifted scored significantly higher in interpersonal identity than did their gifted counterparts. Levels of mathematical giftedness were not significantly related to either ideological or interpersonal identity development. Nonetheless, levels of verbal giftedness were significantly related to ideological identity. Highly verbally gifted students were more advanced in the religion and politics identities than moderately verbally gifted students. Small and positive associations between moral reasoning and identity status were observed. Theoretical and methodological contributions and practical implications of the study were addressed.

Declaration relating to disposition of project thesis/dissertation

I hereby grant to the University of New South Wales or its agents the right to archive and to make available my thesis or dissertation in whole or in part in the University libraries in all forms of media, now or here after known, subject to the provisions of the Copyright Act 1968. I retain all property rights, such as patent rights. I also retain the right to use in future works (such as articles or books) all or part of this thesis or dissertation.

I also authorise University Microfilms to use the 350 word abstract of my thesis in Dissertation Abstracts International (this is applicable to doctoral theses only).

Linda Yeh

Signature

Witness

5/3/2012

Date

The University recognises that there may be exceptional circumstances requiring restrictions on copying or conditions on use. Requests for restriction for a period of up to 2 years must be made in writing. Requests for a longer period of restriction may be considered in exceptional circumstances and require the approval of the Dean of Graduate Research.

FOR OFFICE USE ONLY

Date of completion of requirements for Award:

COPYRIGHT STATEMENT

'I hereby grant the University of New South Wales or its agents the right to archive and to make available my thesis or dissertation in whole or part in the University libraries in all forms of media, now or here after known, subject to the provisions of the Copyright Act 1968. I retain all proprietary rights, such as patent rights. I also retain the right to use in future works (such as articles or books) all or part of this thesis or dissertation.

I also authorise University Microfilms to use the 350 word abstract of my thesis in Dissertation Abstract International (this is applicable to doctoral theses only).

I have either used no substantial portions of copyright material in my thesis or I have obtained permission to use copyright material; where permission has not been granted I have applied/will apply for a partial restriction of the digital copy of my thesis or dissertation.'

Signed *Linda Yeh*

Date *5/3/2012*

AUTHENTICITY STATEMENT

'I certify that the Library deposit digital copy is a direct equivalent of the final officially approved version of my thesis. No emendation of content has occurred and if there are any minor variations in formatting, they are the result of the conversion to digital format.'

Signed *Linda Yeh*

Date *5/3/2012*

ORIGINALITY STATEMENT

'I hereby declare that this submission is my own work and to the best of my knowledge it contains no materials previously published or written by another person, or substantial proportions of material which have been accepted for the award of any other degree or diploma at UNSW or any other educational institution, except where due acknowledgement is made in the thesis. Any contribution made to the research by others, with whom I have worked at UNSW or elsewhere, is explicitly acknowledged in the thesis. I also declare that the intellectual content of this thesis is the product of my own work, except to the extent that assistance from others in the project's design and conception or in style, presentation and linguistic expression is acknowledged.'

Signed *Linda Yoh*

Date *5/3/2012*

Abstract

This study aimed to enhance understanding of the moral reasoning and ego identity status of academically gifted adolescents in comparison with those of age peers not identified as gifted. It examined the influence of levels of mathematical giftedness and levels of verbal giftedness on moral reasoning and ego identity development. The relationship between moral reasoning and identity status was also explored.

This research used a non-experimental comparative design employing a survey questionnaire. The academically gifted students ($n = 402$) were recruited from students who participated in either the Australian Primary Talent Search (APTS) or the Australian Secondary School Educational Talent Search (ASSETS) conducted by the Gifted Education Research, Resource and Information Centre (GERRIC) at the University of New South Wales in Sydney, Australia. The comparison group of students not identified as gifted ($n = 32$) was recruited from independent secondary schools (Year 9 to 12) in New South Wales, through nomination by their teachers who were trained in gifted education. Student samples from both groups were administered the Defining Issues Test (DIT) and the Extended Objective Measure of Ego Identity Status-2 (EOM-EIS-2).

Results showed that gifted adolescents scored significantly higher in the DIT postconventional index than their age peers not identified as gifted. Highly mathematically gifted students were more advanced in moral reasoning than moderately mathematically gifted students. Female adolescents who were highly verbally gifted had significantly higher scores on the postconventional index than did those who were moderately verbally gifted.

In terms of ego identity status, gifted and non-identified groups did not differ in the development of ideological identity. However, students not identified as gifted scored significantly higher in interpersonal identity than did their gifted counterparts. Levels of mathematical giftedness were not significantly related to either ideological or interpersonal identity development. Nonetheless, levels of verbal giftedness were significantly related to ideological identity. Highly verbally gifted students were more advanced in the religion and politics identities than moderately verbally gifted students. Small and positive associations between moral reasoning and identity status were observed. Theoretical and methodological contributions and practical implications of the study were addressed.

Acknowledgements

I would like to express my sincere gratitude my supervisor, Professor Miraca Gross, for her guidance, insights, and friendship throughout my degree. I am grateful of my co-supervisor, Dr. Putai Jin, for academic and emotional support. I feel privileged to have been working with both of you.

This project would not have been possible without help from the student participants and teachers who were involved in the data collection phase. Each returned questionnaire gave me a boost of encouragement.

I would like to thank my friends and colleagues who put a smile on my face when I felt heavy and low. Your friendship is very dear to my heart. I thank Rob for his help in the editing process. I am also appreciative of Tom for his unconditional support, optimism, and encouragements.

My admiration is expressed to the Graduate Research School, UNSW, for their commitments in providing assistance for research students such as myself. I would also like to acknowledge staff from the School of Education for their generous support over the course of my degree.

Lastly, I would like to dedicate this work to my family. Thank you for believing in me and what I believe in.

Table of Contents

Abstract.....	1
Acknowledgements	3
Table of Contents	4
List of Tables.....	12
List of Figures	18
Chapter One	19
Introduction	19
1.1 Context	19
1.2 Significance of the Study	23
1.3 Aims of the Study.....	26
1.4 Chapter Summary.....	27
Chapter Two	28
Literature Review	28
2.1 Introduction.....	28
2.2 The Concepts and Structures of Intelligence.....	29
2.3 Definitions and Concepts of Giftedness	34
2.3.1 Intelligence in relation to domains of giftedness.	37

2.3.2 Talent search as an identification model.....	42
2.4 The Concepts and Theories of Morality	46
2.4.1 Piaget's theory of moral development.....	48
2.4.2 Kohlberg's theory of moral reasoning.	50
2.4.3 The neo-Kohlbergian approach to moral judgment development.....	57
2.4.4 Moral development of academically gifted adolescents.	62
2.4.5 Moral reasoning of academically gifted adolescents.	65
2.4.6 Relationships between moral judgment and intelligence.....	68
2.4.7 Relationships between moral judgment and domains of intelligence.	71
2.4.8 Gender differences in moral reasoning of gifted adolescents. ...	75
2.5 The Development of Identity Formation	77
2.5.1 Erikson's theory of identity formation.	78
2.5.2 Marcia's ego identity status paradigm.....	80
2.5.3 Gender differences in ego identity status development.....	87
2.5.4 Relationships between ego identity status and moral reasoning.....	89
2.5.5 Identity development of academically gifted adolescents.....	91
2.5.6 Relationship between ego identity status and cognitive ability...	95
2.6 Definitions and Conceptions of Key Terms	100
2.6.1 Moral reasoning.....	100

2.6.2 Ego identity status.....	101
2.6.3 Giftedness.....	102
2.6.4 Mathematical giftedness.....	103
2.6.5 Verbal giftedness.....	104
2.7 Theoretical Framework	105
2.8 Research Questions	110
2.9 Hypotheses.....	111
Chapter Three	112
Methodology	112
3.1 Introduction.....	112
3.2 Research Design	112
3.3 Research Instruments.....	113
3.3.1 The Defining Issues Test.....	113
3.3.2 The Extended Objective Measure of Ego Identity Status-2.....	125
3.4 Sample	145
3.4.1 Academically gifted sample.	145
3.4.2 Sample of students who were not identified as gifted.	149
3.5 Data Collection Procedures	149
3.6 Preparation for Data Analysis	153

3.6.1 Data preparation.....	153
3.6.2 Exclusion of data.....	153
3.7 Characteristics of the Sample	156
3.8 Statistical Analysis Methods.....	160
3.9 Chapter Summary.....	162
Chapter Four	163
Results	163
4.1 Introduction.....	163
4.2 Defining Issues Test Analysis	163
4.2.1 The effect of ability on the DIT postconventional scores.	164
4.2.2 The effect of levels of mathematical giftedness and levels of verbal giftedness on the DIT postconventional scores.....	168
4.3 Ego Identity Status Analysis.....	178
4.3.1 The effect of ability on ideological, interpersonal, and total identity.	179
4.3.2 Additional analyses on the effect of ability on interpersonal identity using domain-specific identity issues.	191
4.3.3 Effects of levels of mathematical and levels of verbal giftedness on ideological, interpersonal, and total identity.....	195
4.3.4 Additional analyses on the effect of levels of verbal giftedness, gender, and year in school on ideological and interpersonal identity.....	223
4.4 Relationships between Moral Reasoning and Identity Status	237

4.4.1 Additional analyses on the relationships between moral reasoning and identity statuses.....	241
4.5 Chapter Summary.....	250
Chapter Five	256
Discussion.....	256
5.1 Introduction.....	256
5.2 Discussion of Results of Hypothesis One.....	256
5.3 Discussion of Results of Hypothesis Two.....	260
5.4 Discussion of Results of Hypothesis Three	262
5.5 Discussion of Results of Hypothesis Four	266
5.6 Discussion of Results of Hypothesis Five.....	277
5.7 Discussion of Results of Hypothesis Six	280
5.8 Discussion of Results of Hypothesis Seven	285
5.9 Discussion of Year in School Variable in Relation to Moral Reasoning	289
5.10 Discussion of Year in School Variable in Relation to Identity Status.....	291
5.11 Discussion of Gender Variable in Relation to Identity Status.....	297
5.12 Chapter Summary.....	307
Chapter Six	308

Conclusion	308
6.1 Introduction.....	308
6.2 Key Findings.....	310
6.3 Methodological Contributions.....	313
6.4 Theoretical Contributions	313
6.5 Practical Implications	315
6.6 Limitations	319
6.7 Recommendations for Future Research	323
6.8 Chapter Summary.....	325
Reference List	326
Appendices	387
Appendix A.....	388
UNSW Ethics Approval	388
Appendix B.....	389
Parental consent form for gifted participants	389
Appendix C	391
Participant consent form for gifted participants	391
Appendix D	393

Instruments	393
Appendix E.....	406
First reminder letter for gifted participants	406
Appendix F	407
Reminder letter for Highly Mathematically-Moderately Verbally gifted participants	407
Appendix G	408
Second reminder letter for gifted participants	408
Appendix H	409
Letter of support.....	409
Appendix I	410
Email to participating teachers	410
Appendix J	411
Parental consent form for participants not identified as gifted	411
Appendix K.....	413
Participant consent form for students not identified as gifted	413
Appendix L	415
Cut-off points of the EOM-EIS-2 ideological, interpersonal, and total identity domains.....	415

Appendix M	416
Histograms of the EOM-EIS-2 sub-scores.....	416
Appendix N	422
Means and standard deviations of each group on the EOM-EIS-2	422

List of Tables

Table 1: Reliability of the DIT's Postconventional Index	124
Table 2: Cronbach's Alphas of the EOM-EIS-2 (N = 106)	133
Table 3: Cronbach's Alphas of the EOM-EIS-2 from the Present Study (N = 434)	135
Table 4: Rotated Factor Loadings for the EOM-EIS-2 (Berzonsky & Adams, 1999)	139
Table 5: A Pearson Correlation Matrix of Identity Status Subscales in the EOM-EIS-2 (N = 106)	141
Table 6: A Pearson Correlation Matrix of Identity Status Subscales in the EOM-EIS-2 from the Present Study (N = 434)	144
Table 7: Sample Sizes of the Academically Gifted Sample Based on Subgroups	148
Table 8: Numbers of Returned Questionnaires by Subgroups	152
Table 9: Number of Protocols Excluded and Number of Valid Questionnaires by Subgroups	155
Table 10: Characteristics of Sample Based on Ability and Gender	157
Table 11: Characteristics of Sample Based on Ability and Age	158
Table 12: Characteristics of Sample Based on Ability and Year in School	159

Table 13: Factorial ANOVA Conducted on the DIT Postconventional Scores	166
Table 14: Postconventional Scores of Gifted and Non-Identified Groups	167
Table 15: Effects of Level of Mathematical Giftedness, Level of Verbal Giftedness, Gender, and Year in School on DIT Postconventional Scores	171
Table 16: Postconventional Scores for the Level of Mathematical Giftedness, Level of Verbal Giftedness, Gender, and Year in School Variables	173
Table 17: Postconventional Scores for the Interaction Effect between Level of Verbal Giftedness and Gender	175
Table 18: Postconventional Scores for the Interaction Effect between Year in School and Gender	176
Table 19: Normality of Distribution of the EOM-EIS-2 Ideological, Interpersonal, and Total Ego Identity Status Subscales	181
Table 20: Effect of Ability, Gender, and Year in School on the Ideological Identity Subscale	182
Table 21: Percentages of Identity Status Classification of Gifted and Non-Identified Groups in the Ideological Identity Domain	184
Table 22: Effects of Ability, Gender, and Year in School on the Interpersonal Identity Subscale	185

Table 23: Interpersonal Achievement Status Scores of Gifted and Non-Identified Groups	186
Table 24: Percentages of Ego Identity Status Classification of the Gifted and Non-Identified Groups in the Interpersonal Identity Domain.....	187
Table 25: Effects of Ability, Gender, and Year in School on the Total Identity Subscale	189
Table 26: Percentages of Ego Identity Status Classification of the Gifted and Non-Identified Groups in the Total Identity Domain	190
Table 27: The Effect of Ability on the Interpersonal Identity Issues	193
Table 28: Interpersonal Identity Issue Status Scores for the Ability Variable	194
Table 29: Effects of Level of Mathematical Giftedness, Level of Verbal Giftedness, Gender, and Year in School on the Ideological Identity Subscale	198
Table 30: Ideological Identity Status Scores for the Level of Verbal Giftedness, Gender, and Year in School Variables.....	200
Table 31: Percentages of Ego Identity Status Classification for the Level of Mathematical Giftedness Variable in the Ideological Identity Domain	201
Table 32: Percentages of Ego Identity Status Classification for the Level of Verbal Giftedness Variable in the Ideological Identity Domain	202

Table 33: Percentages of Ego Identity Status Classification of the Gender Variable in the Ideological Identity Domain	203
Table 34: Percentages of Ego Identity Status Classification of the Year in School Variable in the Ideological Identity Domain	204
Table 35: Effects of Level of Mathematical Giftedness, Level of Verbal Giftedness, Gender, and Year in School on the Interpersonal Identity Subscale	206
Table 36: Simple Main Effect ANOVA on the Interpersonal Foreclosure Status Scores for the Year in School Variable	207
Table 37: Percentages of Ego Identity Status Classification for the Level of Mathematical Giftedness Variable in the Interpersonal Identity Domain	208
Table 38: Percentages of Ego Identity Status Classification for the Level of Verbal Giftedness Variable in the Interpersonal Identity Domain	209
Table 39: Percentages of Ego Identity Status Classification of the Gender Variable in the Interpersonal Identity Domain	210
Table 40: Percentages of Ego Identity Status Classification for the Year in School Variable in the Interpersonal Identity Domain	211
Table 41: Effects of Level of Mathematical Giftedness, Level of verbal Giftedness, gender, and Year in School on the Total Identity Subscale	213

Table 42: Total Identity Status Scores for the Level of Verbal Giftedness, Gender, and Year in School Variables.....	215
Table 43: Percentages of Ego Identity Status Classification for the Level of Mathematical Giftedness Variable in the Total Identity Domain	216
Table 44: Percentages of Ego Identity Status Classification for the Level of Verbal Giftedness Variable in the Total Identity Domain	217
Table 45: Percentages of Ego Identity Status Classification of Gender in the Total Identity Domain	218
Table 46: Percentages of Ego Identity Status Classification of the Year in School Variable in the Total Identity Domain	219
Table 47: The Effect of Level of Verbal Giftedness on the Ideological Identity Issues ...	225
Table 48: Ideological Identity Issue Status Scores for the Level of Verbal Giftedness Variable	226
Table 49: The Effect of Gender on the Ideological Identity Issues.....	227
Table 50: Ideological Identity Issue Status Scores for the Gender Variable	229
Table 51: The Effect of Year in School on the Ideological and Interpersonal Identity Issues	231
Table 52: Ideological Identity Issue Status Scores for the Year in School Variable	234

Table 53: Interpersonal Issue Status Scores for the Year in School Variable	236
Table 54: Pearson's Correlation Coefficients between Postconventional Score and Ego Identity Statuses (N = 434)	240
Table 55: Means and Standard Deviations of the Postconventional Scores for the Ideological Identity Statuses	244
Table 56: Means and Standard Deviations of the Postconventional Scores for the Interpersonal Identity Statuses.....	246
Table 57: Means and Standard Deviations of the Postconventional Scores for the Total Identity Statuses	248

List of Figures

Figure 1: Carroll's Three-Stratum Theory of Cognitive Abilities	32
Figure 2: Gagné's Differentiated Model of Giftedness and Talent	36
Figure 3: Normal Curve Illustrating the Distribution of Scores of Above-Level Aptitude Tests of Gifted Students	45
Figure 4: Marcia's Taxonomy of Adolescent Ego Identity Development	83
Figure 5: The Moral Reasoning and Ego Identity Status Theoretical Framework	109
Figure 6: A Diagram of Grouping Procedures Based on Levels of Verbal Giftedness and Levels of Mathematical Giftedness.	161

Chapter One

Introduction

1.1 Context

Empirical research has indicated that gifted individuals possess distinctive characteristics that differentiate them both intellectually and affectively from peers not identified as gifted (Gross, 1989; VanTassel-Baska, 1998). In spite of the predominant assumption among educators that gifted students differ from non-identified students in intellectual characteristics alone, studies have shown that intellectually gifted students often differ from their age peers in social and emotional development as much as they do in the intellectual and academic sphere. As argued by Silverman (1993b), gifted children may “not only *think* differently from their peers, they also *feel* differently” (p. 3).

In the past, educators and researchers in the field of gifted education tended to put a strong emphasis on the intellectual development of gifted students, focusing on cognitive characteristics and how to increase their intellectual potential. However, until recently, it has not been acknowledged that affective development is as significant as intellectual development. Thus, further empirical studies in this realm are warranted (Neihart, Reis, Robinson & Moon, 2002; Pfeiffer, 2003; Silverman, 1993a). Although cognitive and affective characteristics are often considered as two separate domains usually investigated separately, they are interrelated (Clark, 1983). Healthy affective

development is believed to contribute to both academic and professional achievement (Clark, 1983).

The moral development of gifted students is an important area of research to better understand the socio-emotional development of high potential individuals. Early studies by Terman (1925) and Hollingworth (1942) had indicated that gifted children possess characteristics related to mature moral development. For example, they have strong abstract and analytical reasoning (Sisk, 1982), are more receptive to emotional cues (Michaelson, 2001), show greater interest in ethical values and philosophical principles (Lovecky, 1997), understand the views and perspectives of other people (Hollingworth, 1942), have well-developed moral sensitivity and empathy (Lovecky, 1994b; Silverman, 1994), make mature moral judgments (Gross, 2004), and have a strong sense of justice and idealism (VanTassel-Baska, 1998). In addition, substantial evidence has indicated that gifted children and adolescents are more fully aware of moral, social, and environmental issues that occur in our society (von Karolyi, 2006) and are active in their desire to help, for instance, by establishing or participating in social work groups to address such issues (Davis & Rimm, 1994; Lovecky, 1994a). Gifted children are likely to develop their sense of morality earlier than their age peers and their experience with moral issues is found to be deeper and more intense than their same age peers or older children of lower mental age (Piechowski, 2003; Silverman, 1994). This is because social and emotional development of gifted individuals is more highly correlated with mental age rather than with chronological age (Gross, 1997b).

There are several approaches to conceptualize morality. These include the cognitive, the affective, and the behavioral approaches (Andean & Pagnin, 1993a). For the cognitive

approach, the theory of moral judgment developed by Kohlberg (1976), which links cognitive development to moral development, is the most widely recognized construct. It puts an emphasis on the cognitive processes that individuals utilize when considering moral conflicts (Rest, 1983). According to Kohlberg (1976, 1984), moral reasoning can be conceptualized as an invariant hierarchical structure, ranging from the lowest level of pre-conventional thought through conventional to the highest level of postconventional thought, where each level signifies a qualitatively different cognitive organization from the others (Rest, 1986). Among the gifted population moral reasoning development has been viewed as an affective characteristic and has been investigated continuously since the early 1980s. All of these studies have revealed that gifted students are more advanced in their moral thinking than their age peers not identified as gifted (e.g., Janos & Robinson, 1985; Karnes & Brown, 1981; Tan-Willman & Gutteridge, 1981) and older individuals who are not identified as gifted (e.g., Derryberry, Wilson, Snyder, Norman & Barger, 2005; Janos & Robinson, 1985; Lewis, 2007). In general, it has been found that gifted children and adolescents as a group are able to reach the highest level of moral judgment, the postconventional level, which is attained by only a small percentage of adults, at an earlier age than the normative population (Kohlberg, 1964).

Identity formation is another significant socio-affective development experienced by every adolescent including the gifted. Research on identity development of gifted individuals has substantiated that, identical to typical adolescents, gifted adolescents strive toward defining their sense of identity (Coleman & Cross, 2001). According to Erik Erikson (1968), the identity development task is regarded as the most significant challenge that adolescents are required to fulfill. Adolescence is the period of transition from childhood to adulthood and involves profound physical, psychological, and cognitive changes.

These changes stimulate most adolescents to develop well-defined life goals, values, and beliefs in such areas as occupation, ideological beliefs, and interpersonal relationships. The process of identity formation is achieved by exploring alternatives and making commitments to the chosen life choices (Waterman, 1985). Erikson (1968) posited that adolescents who are successful in establishing a sense of identity are likely to move forward to further developmental stages. In contrast, those who postpone or are unable to solve their identity formation task tend to face an identity crisis, lack in life goals, confront role confusion, and be inhibited from moving to the subsequent psychosocial stage of intimacy.

The ego identity status paradigm devised by James Marcia (1966), which derives from Erikson's theory of identity development, depicts four identity categories that adolescents encounter during the process of identity formation. The typology is based on identity exploration and commitment in two major identity domains, which are the ideological and the interpersonal domains (Marcia, 1994). Even though there are few research studies which directly investigated the identity development of gifted high school students using Marcia's ego identity status model, these studies have shed some light on the fact that gifted adolescents were found to be more advanced in their identity formation than their age peers. As a group, gifted adolescents were active in exploring life alternatives in both ideological and interpersonal domains (Carn-Watkins, 1991; Shoffner, 1996; Zuo, 2005) whereas their age peers were found to be categorized as identity diffused and inattentive in the process of identity formation (Waterman, 1985). In fact, the status of exploration found to be prevalent among gifted high school students is the same as that of university undergraduate students (Adam & Fitch, 1982; Waterman, Geary & Waterman, 1974).

1.2 Significance of the Study

Studies in the realm of psychosocial development of gifted individuals generally aim to analyze their social adjustment, popularity, social coping, and peer interactions (Pagnin & Andean, 2000). Only a small number of studies were specifically dedicated to investigating moral judgment and identity development of gifted individuals. Although existing studies have shed some light on the development of moral reasoning in gifted children and adolescents (e.g., Chovan & Freeman, 1993; Gross, 2004; Karnes & Brown, 1981; Lee & Olszewski-Kubilius, 2006; Tan-Willman & Gutteridge, 1981), some aspects of moral reasoning development await in-depth investigations.

One of the aspects not yet explored by the existing literature is the role of specific domains of giftedness in relation to moral judgment development. It is generally accepted that the gifted population is not a homogenous group. Rather, it is comprised of a variety of sub-groups including those varying in domains of aptitude (Lubinski, 2004). Given that empirical research has confirmed distinctive cognitive and socio-affective developmental patterns between gifted individuals who differ in domains of giftedness (e.g., Achter, Lubinski, Benbow & Eftekhari-Sanjini, 1999; Benbow & Minor, 1992; Dark & Benbow, 1991; Gross, 2004; Lubinski, 2004), it is of great importance to take such variables into consideration when conducting a study with the gifted. Even though the development of moral reasoning of gifted adolescents has long been investigated (e.g., Karnes & Brown, 1981, Tan-Willman & Gutteridge, 1981) and existing research has confirmed the superior moral reasoning development of academically gifted adolescents as a group (e.g., Derryberry & Barger, 2008; Howard-Hamilton, 1994; Lee & Olszewski-Kubilius, 2006), none of the previous studies have directly compared and/or contrasted the development of moral reasoning of gifted adolescent students who differed in

domains of giftedness. Therefore, this study aims to contribute to the previous research by systematically investigating the effect of two areas academic giftedness, namely verbal and mathematical giftedness, on moral judgment development.

Research in the realm of ego identity development has been extensively investigated among high school and university students who were not identified as gifted. However, Marcia's ego identity status typology has not been extensively employed to examine the identity development of the gifted adolescent population (Hébert & Kelly, 2006). The use of Marcia's ego identity status framework has been encouraged by gifted researchers as a theory to conceptualize the development of identity formation of gifted adolescents (Hébert & Kelly, 2006; Mönk & Ferguson, 1983). This is because it provides a comprehensive theoretical framework to capture the complexity of the identity formation process and allows for assessing gifted adolescents' progress through the continuum of the identity formation task (Hébert & Kelly, 2006; Mönk & Ferguson, 1983).

Given that the task of identity formation is crucial for adolescents and that existing research on identity formation of gifted adolescents is limited in number and lacking in vigor, it is important to explore this area in a greater depth. More importantly, the available studies that employed Marcia's typology have been conducted with gifted samples in North America and none has been conducted on Australian gifted adolescents. Thus, the present study will add to the body of research in reference to the Australian context. Furthermore, within the studies that examined the ego identity development of gifted adolescents using Marcia's identity status framework, domains of giftedness have not been included as variables in their investigation. To substantiate the findings of previous studies and expand understandings on gifted individuals'

psychosocial development, this study examines the possible influence of domains of ability with respect to ego identity status. As argued by Hébert and Kelly (2006), the merit of such a study is that it provides empirical understanding on the developmental task of identity formation among gifted adolescents, which in turn contributes to the development of educational and counseling programs for the gifted.

Another possible contribution of this study is that it will enhance our understanding of possible differences in the psychosocial development of students whose domains of giftedness differ. A number of studies have investigated cognitive profiles of verbally and mathematically gifted students (e.g., Benbow & Minor, 1992; Dark & Benbow, 1991; Lubinski, 2004). However, research examining the non-cognitive profiles between these two groups is still scarce. This study will tighten this gap by providing insights into psychosocial development of students whose levels of mathematical giftedness and verbal giftedness differ.

In conclusion, it is expected that this study will contribute to understandings of moral reasoning and ego identity status in relation to domains of aptitude in gifted adolescents, which has yet to be investigated in a systematic empirical way. Furthermore, given that identity formation and moral reasoning make significant contributions to gifted adolescents' personal development, research in these areas is warranted. The gifted population holds the promise of being future leaders who may bring about productive changes to society (Tannenbaum, 2000). As such, research into the moral reasoning and ego identity status of the gifted may serve as an important source for the development and refinement of educational programs, vocational planning, and

counseling to be more responsive to the cognitive and affective development of the gifted.

1.3 Aims of the Study

This study aims to examine the development of moral reasoning and ego identity development of academically gifted students. Its primary objective is to explore the influence of domains of giftedness on both moral reasoning and ego identity status. Specifically, it will compare and contrast the development of moral reasoning and identity status of gifted adolescents who differ in levels of verbal giftedness and levels of mathematical giftedness. This line of research has not been conducted in the past and therefore needs to be examined empirically.

In addition, it will explore possible differences on the measure of moral reasoning and identity development between academically gifted students and their age peers who have not been identified as gifted. Finally, the present study intends to substantiate existing research on the relationships between moral reasoning and ego identity status in the ideological, interpersonal, and total identity domains. Only a limited number of studies have investigated the associations between the two constructs and findings from previous studies were often conflicting and inconclusive (e.g., Cauble, 1976; Hult, 1979; Rowe & Marcia, 1980).

Results from the present study will contribute to the theoretical understanding of two themes of gifted adolescents' psychosocial development, namely moral reasoning and identity status. In addition, findings from this study may yield practical implications in light of educational planning, character education, and talent development for the gifted.

1.4 Chapter Summary

This chapter presented the theoretical context of the study undertaken in this thesis. Significance and aims of the study were also discussed. Reviews of relevant literature, the theoretical framework, and research questions of the current work will be discussed in depth in Chapter Two. Chapter Three explains research methodology. In particular, the study's research design, instruments, sample selection, data collection procedures, and statistical analysis methods are described. Results from analyses of the obtained data will be reported in Chapter Four and discussions of results in light of proposed hypotheses and additional findings will be addressed in details in Chapter Five. Finally, Chapter Six will discuss methodological and theoretical contributions, practical implications, and limitations of the current study. Recommendations for future research will also be addressed.

Chapter Two

Literature Review

2.1 Introduction

The first section of this chapter provides a brief review of the concepts and structures associated with the study of intelligence. The second section describes definitions and concepts of giftedness, especially those which correspond to contemporary views about intelligence. Literature pertaining to talent search, which is widely employed as an identification procedure for gifted students using above-level tests, will also be discussed.

The third section of this chapter presents a brief historical background of the moral reasoning theories by Piaget (1965), Kohlberg (1976), and Rest (1979). Literature concerning moral development and moral reasoning of gifted children and adolescents will also be discussed. Furthermore, reviews of research studies that examined relationships between moral judgment and specific domains of intelligence will be presented. Finally, the third section of the chapter discusses previous research on gender differences in moral reasoning development.

The fourth section discusses the theory of ego identity development by Erikson (1968) and the ego identity status paradigm by Marcia (1980). It focuses on literature pertaining to the ego identity formation of gifted adolescents. Studies that examined relationships between ego identity status and domains of intelligence are also explored.

The fifth section of this chapter is dedicated to defining the key terms and theoretical constructs used in the present study. The sixth section presents the theoretical framework of this study which derives from a synthesis of research findings. In the final sections of the chapter the study's research questions and hypotheses are presented.

2.2 The Concepts and Structures of Intelligence

Intelligence is defined as a general mental ability to "...reason, plan, solve problems, think abstractly, comprehend complex ideas, learn quickly and learn from experience" (Arvey et al., 1994, p. 379). It is the composite of numerous mental skills such as abstract reasoning, understanding relationships, gaining a deep insight into ideas, speed of learning, complex problems solving, the ability to learn from experiences, retrieval of information, and memorization (Gottfredson, 1998, 2003; Scarr, 1986; Terman, 1921). Intelligence is not only significant in activities that require cognitive functioning, such as schooling or vocational performance, but also those that involve prosocial behaviors (Arvey et al., 1994; Carroll, 1993; Gottfredson, 1998; Jensen, 1986, 1998; Lubinski, 2004; Neisser et al., 1996).

Intelligence can be assessed objectively and at different levels of generality, depending on the purpose of the assessment (Arvey et al., 1994; Anastasi, 1986). At a higher degree of generality, intelligence can be measured by traditional intelligence tests, or IQ tests, which typically assess such skills as verbal, logical, and figural reasoning, memory, and conceptual perception (Robinson & Chamrad, 1986). Although intelligence tests often include subtests, which measure specific aspects of cognitive ability, there is a

tendency for individuals who score high on one subtest also to perform at above average levels on other subtests (Gottfredson, 2003; Jensen, 1998; Neisser et al., 1996). This is because tests of mental ability tend to measure the same general intelligence, which is a global factor that permeates all aspects of cognition (Gottfredson, 1998, 2003; Jensen, 1992). This factor is known as the general intelligence factor.

The general intelligence factor was first suggested by Charles Spearman, who asked if there was a single, universal factor that governs mental abilities. Spearman (1904, 1927) employed a statistical method called factor analysis, which allows for extracting a common factor from scores of mental ability tests and observing patterns of correlations among psychometric tests of intelligence. Results from his analysis showed positive intercorrelations between different facets of cognitive performance in cognitive tests in a varying degree. This confirmed his speculation that there is a general, universal factor that all tests assess. Such factor is called the general intelligence factor, or the *g* factor (Assouline, 2003; Carroll, 1993, 1996; Gottfredson, 2003; Jensen, 1986a, 1998).

While Spearman concentrated on developing the concept of *g*, other researchers argued that one single factor of intelligence was not adequate in explaining human intelligence (e.g., Carroll, 1993, 1996, 2003; Cattell, 1945; Cattell & Horn, 1978; Jensen, 1998; Thurstone, 1938). For instance, Cattell (1945, 1963) proposed that two broad classes of the general intelligence factor, namely crystallized intelligence (G_c) and fluid intelligence (G_f), are influential for the differentiation of human mental ability. Crystallized intelligence is related to the ability to use accumulated knowledge, acquired skills, and experience. It is closely related to accessing information from long-term memory (Cattell & Horn, 1978). Language skills such as vocabulary and verbal reasoning are also considered aspects of

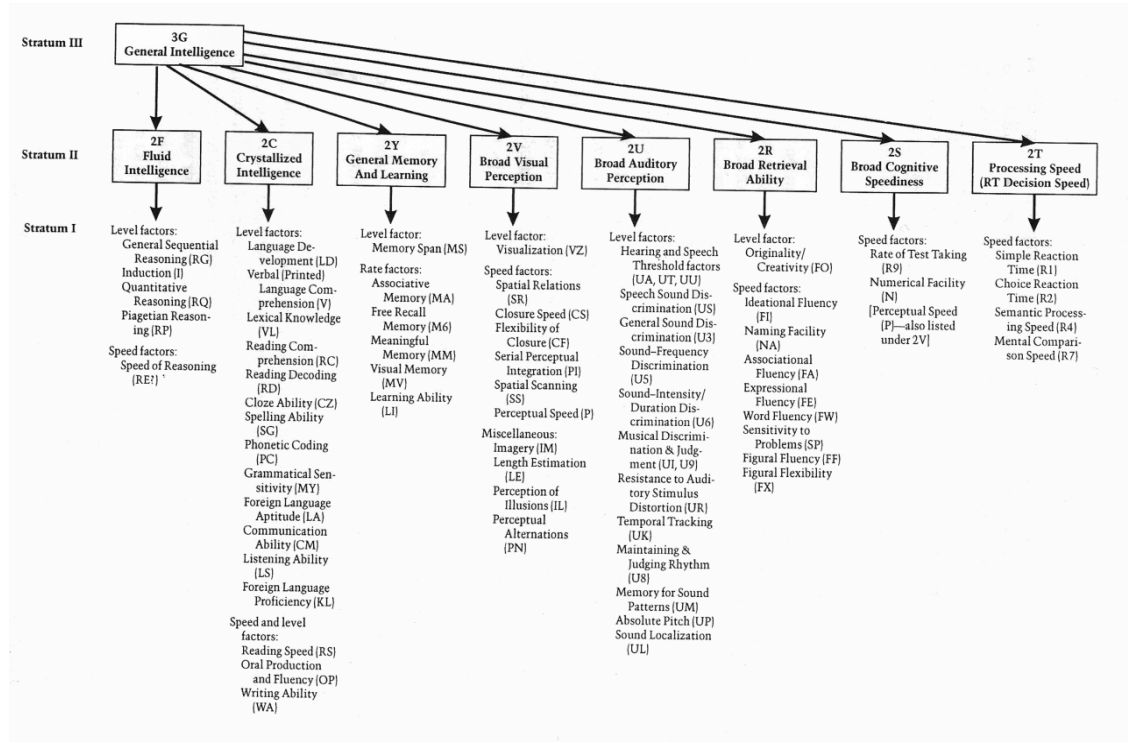
crystallized intelligence (Cattell, 1963). Fluid intelligence, on the other hand, relates to the ability to manipulate abstract ideas using inductive and deductive reasoning and is prominent in tasks that require analytical ability (Cattell & Horn, 1978). It is generally used in most problem solving tasks especially those that entail mathematical reasoning and logical thinking (Carroll, 1996; Cattell, 1963; Schoenfeld, 1992).

Contemporary researchers such as Carroll (1993, 1996, 2003) and Jensen (1998) endorsed the view that there exists a single general factor of cognitive ability, or the *g* factor, that is common to all mental batteries as well as other more specialized dimensions of ability. Carroll (1993) proposed a structural model of human intellectual ability, which was derived from an extensive analysis of more than 460 psychometric datasets of mental ability tests. This model, which is named *the Three-Stratum Theory of Cognitive Abilities*, is currently regarded as the most widely accepted view of the structure of cognitive abilities (Jensen, 1998; Lohman, 2005; Lubinski, 2004; Neisser et al., 1996).

As seen in Figure 1, the overall organization of the model is arranged hierarchically in three major levels or strata with a general intelligence factor at the apex of the hierarchy and various more specialized abilities arrayed at successive lower levels (Carroll, 1993, 1996). At the lowest level, *Stratum I*, which is placed in the bottom layer of the model, is comprised of approximately 65 specific abilities (e.g., reading decoding, reading comprehension, sequential reasoning, spatial relations, and quantitative reasoning) that are linearly independent from one another. *Stratum II* consists of approximately eight broad abilities, for examples, crystallized intelligence (verbal reasoning), fluid intelligence (mathematical or nonverbal reasoning), and memory (Carroll, 1996). They derive from a combination of the first-order factors and are relatively independent of each other.

Stratum III, at the vertex of the hierarchy, contains only a single, general intellectual ability commonly termed *g* (Carroll, 1986, 1993, 1996; 2003).

Figure 1: Carroll's Three-Stratum Theory of Cognitive Abilities



Note. Adapted from "Mathematical abilities: Some results from factor analysis", by J. B. Carroll, 1996. In R. J. Sternberg & T. Ben-Zeev (Eds.), *The nature of mathematical thinking*, p. 8. Copyright 1996 by Lawrence Erlbaum Associates.

The organization of Carroll's model is based on the degrees of generality in covering the possible domain of cognitive abilities: the higher stratum is associated with the higher degree of generality. Therefore, the general intelligence factor, which is found to have a high level of generality over the total domain of cognitive abilities, is placed at the highest stratum. In contrast, highly specific factors which have lower degrees of generality are placed at the lowest stratum (Carroll, 1993, 1996). In this light, human cognitive ability can be distinguished into broad and narrow scopes and that more general intellectual abilities form the foundation of more specific ones (Carroll, 1993).

Models of cognitive structure developed by Cattell, Jensen, and Carroll acknowledge the coexistence of the *g* factor and specific cognitive abilities such as verbal, numerical, spatial, or mechanical. This suggests that the general intelligence factor alone does not account for all the correlations between tests and that there are other factors besides *g* which contribute to the correlations (Jensen, 1998; Lubinski, 2004). Results from factor analysis demonstrate that the general intelligence factor accounts for approximately 50% of the common variance of scores in any broad battery of mental tests (Jensen, 1998). Specific abilities account for approximately eight to ten per cent of the remaining common variance (Lubinski, 2004). In this light, specific abilities are correlated positively with general intelligence. However, each of the specific abilities is distinctively different from the others and is relatively independent from the general intelligence factor (Carroll, 1986, 1993).

2.3 Definitions and Concepts of Giftedness

Definitions of giftedness have been closely linked to intelligence. Contemporary theories of giftedness (e.g., Gagné, 1985, 1995, 2003, 2004b, 2008; Renzulli, 1978, 2003; Tannenbaum, 1983, 2003) take superior intelligence as one of the components of giftedness. Gagné's *Differentiated Model of Giftedness and Talent* (DMGT) defines giftedness as "the possession and use of untrained and spontaneously expressed mental abilities (called aptitudes or gifts), in at least one ability domain, to a degree that places an individual at least among the top 10 per cent of age peers" (Gagné, 2004b, p. 120). Unlike some models of giftedness that omit the term talent from their operational frameworks (e.g., Renzulli, 1978), Gagné (2004a, 2004b, 2008) used the terms giftedness and talent to refer to two different constructs. The DMGT describes that the terms giftedness and talent are neither synonymous (e.g., Marland, 1972) nor is talent a subcategory of giftedness (e.g., Feldhusen, 1986). According to Gagné (2004b), talent stands for "the outstanding mastery of systematically developed abilities (or skills) and knowledge in at least one field of human activity to a degree that places an individual at least among the top 10 per cent of age peers who are or have been active in that field or fields" (p. 120).

The DMGT model also specifies the developmental relationship between the two types of abilities. As illustrated in Figure 2, in order to translate giftedness (or natural ability) into talent (competencies or systematically developed skills), the process of talent development is essential (Gagné, 1985, 2003, 2004b). The talent development process involves "identification or selection, a systematic, talent-oriented and long-term program of activities" (Gagné, 2008, p.3). The development process, therefore, acts as a moderator for transforming high ability to high achievement. In addition, the most recent

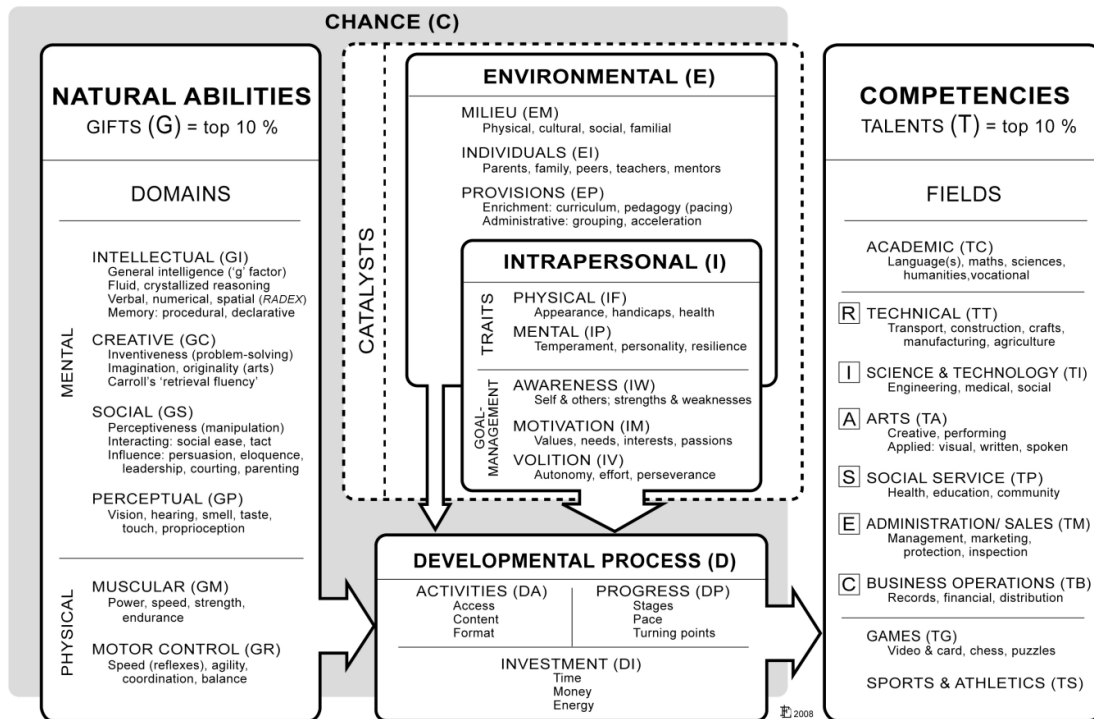
version of the DMGT describes that the developmental process from giftedness (high natural abilities or potential) to talent (high performance) is dependent upon two clusters of catalysts: these are intrapersonal and environmental (Gagné, 2008).

Intrapersonal catalysts have been sub-categorized into (a) physical and mental characteristics, and (b) goal-oriented processes such as motivation, awareness of strengths and weaknesses, and volition (Gagné, 2008). Environmental catalysts include milieu (i.e., physical, social/ cultural, or financial influences), significant others in individuals' social environment, and provisions of talent development programs or services (Gagné, 2008). The most recent version of DMGT describes that the intrapersonal component and the environmental component are overlapped. That is, in the talent development process the majority of the environmental catalysts have to be filtered through the intrapersonal catalysts and only a minority has a direct influence. This suggests that the extent to which the environmental stimuli have on talent development is largely determined by individuals' motivation, interests, or personality traits (Gagné, 2008).

Apart from the intrapersonal and the environmental catalysts, Gagné (2003, 2004b, 2008) maintained that chance is an important component of the DMGT. Chance refers to uncontrollable factors, such as socio-economic status, quality of parenting received, and other hereditary characteristics. These clusters of components can be examined in terms of direction and magnitude. The impact of intrapersonal, environmental, and chance factors can be either positive (facilitating) or negative (hindering), and either weak or strong (Gagné, 2004b).

The presence of above average abilities is a necessary prerequisite for the development of talent. That is, one cannot be talented without initially being gifted (Gagné, 1995). However, in Gagné's view the opposite progression is impossible. It is not possible for talent (i.e., above average achievement) to develop without the foundation of above average ability (Gagné, 2003).

Figure 2: Gagné's Differentiated Model of Giftedness and Talent



Note. Adapted from "Building gifts into talents: Overview of the DMGT", by F. Gagné, 2008. Copyright 2008 by the author.

The definition and conception of giftedness and talent proposed by Gagné (2003) has been adapted in many countries due to its practicality, educator-friendliness, and research support (Gross, 2005). The DMGT provides a framework for the process of talent development that can be used in research and policy development (Moon & Dixon, 2006). In Australia, although each state or territory has published its own policy statement concerning the education for gifted and talented students, in most cases, these policies are congruent with the Gagné's DMGT model (Gross, 2005). Indeed, the Department of Education and Training of New South Wales (2004), the Department of Education of Western Australia (2011), the Department of Education and Early Childhood Development of Victoria (2006), the Department of Education and Children's Services of South Australia (2010), and the Department of Education and Training of Northern Territory (2006) have fully adopted the DMGT model's definitions and conception of giftedness and talent in their official policies for gifted and talented students. In addition, the Department of Education and Training of the Australian Capital Territory (2008) has endorsed the DGMT model in the identification of giftedness. Given that the definition of giftedness and talent by Gagné has gained acceptance in Australia and worldwide, it will be employed for the purpose of this study.

2.3.1 Intelligence in relation to domains of giftedness.

Concepts of intelligence are closely related to those of giftedness as evident from the definitions of giftedness in literature (Simonton, 2003; Tannenbaum, 2003). Giftedness is commonly associated with the possession of superior general intelligence as measured by psychometric procedures (Benbow & Minor, 1990). Even though the traditional view

of giftedness has identified gifted children based primarily on intelligence test scores (e.g., Terman, 1921, 1925), contemporary theorists have incorporated both general intelligence and specific domains of giftedness in their constructs (e.g., Cohn, 1981; Gagné, 1985; Tannenbaum, 1983). For example, Tannenbaum's *Star Model* (1983, 2003) identified five significant elements that translate high ability (promise) into high achievement (fulfillment). These include (1) superior general intellect; (2) distinctive special aptitudes; (3) supportive non-intellectual traits; (4) a challenging and facilitative environment where giftedness is valued and nurtured; and (5) chance factors which may support or hinder development (Tannenbaum, 1983, 2003).

Congruent with Tannenbaum, Gagné (1995, 1998) categorized the gifted population into subgroups based on different domains of giftedness and fields of talent in his DMGT model. In the most recent revision of the DMGT, Gagné (2008) has differentiated giftedness into six domains and talent into nine fields. Within the four domains of giftedness, Gagné divided each domain into a number of specific abilities. The domain of intellectual giftedness contains specific abilities such as crystallized (verbal) and fluid (nonverbal reasoning) intelligence. These can be transformed to academic talent in fields such as language, humanities, mathematics, or science through developmental processes (Gagné, 2004b, 2008). Gagné (1995) believed that the delineation of specific natural abilities and talent fields facilitates a detailed investigation of a specific subgroup of the overall gifted population.

Conceptions of giftedness proposed by Gagné and Tannenbaum are compatible with the concepts of intelligence as conceptualized by Jensen and Carroll. Gagné (2003, 2004b) and Tannenbaum (2003) argued that both general cognitive ability, or the *g* factor, and

specific aptitudes are crucial for the identification and development of giftedness. Especially, Gagné's DMGT proposed that general intelligence is a crucial component of all forms of academic giftedness and it is at Carroll's stratum II where distinctively different talents are observed (Gottfredson, 2003).

Several studies have confirmed that at the higher end of the IQ spectrum, the role of general intelligence in completing specific cognitive tasks is minimized. In other words, among individuals with superior intelligence, general intelligence is less likely to be utilized and aptitudes in a specific domain tend to be developed (Brand, Constaes & Kane, 2003; Detterman & Daniel, 1989; Kane & Brand, 2006; Legree, Pifer & Grafton, 1996; Tannenbaum, 1983). Kane, Oakland, and Brand (2006) compared cognitive profiles of low- and high- IQ subjects over a wide range of ages in their performance on the Woodcock-Johnson Psychoeducational Battery Revised. Data revealed an influence of different levels of cognitive ability on the correlations among the subtests of intelligence tests. For low-IQ subjects, the general intelligence factor accounted for 52% of the variance in cognitive performance whereas only 29% of the variance in cognitive performance was accounted for by the general intelligence among high-IQ subjects. As such, individuals with higher levels of intelligence displayed greater differentiation between specific and broad mental abilities than individuals with lower levels of intelligence (Spearman, 1927). Research among the gifted population has also demonstrated that general intelligence becomes less important and domain specific aptitudes become increasingly influential in talent development especially during the period of adolescence (Moon & Dixon, 2006). This is because individuals with higher levels of intellectual ability "...have more intellectual capital to invest [in specialized

activities] than the less able; so in them cognitive differentiation is more pronounced” (Brand et al., 2003, p. 524).

Research conducted within the Study of Mathematically Precocious Youth (SMPY) has indicated that mathematically and verbally gifted students tend to have different cognitive patterns and distinctive vocational choices partly because of different domains of giftedness (e.g., Achter et al., 1999; Ferriman, Smeets, Lubinski & Benbow, 2010; Lubinski, 2004, 2009; Lubinski & Benbow, 2006; Lubinski, Webb, Morelock & Benbow, 2001; Park, Lubinski & Benbow, 2007; Shea, Lubinski & Benbow, 2001). In terms of cognitive profiles, mathematically gifted students scored significantly higher than the verbally gifted group on nonverbal tests, such as spatial, nonverbal reasoning, speed, memory, and mechanical comprehension. The verbally gifted, on the other hand, outperformed the mathematically gifted on tests that are based on verbal ability, such as general information test and the test of English expression (Benbow & Minor, 1990). Furthermore, mathematically talented individuals showed greater strengths in using information from working memory, especially numeric/spatial stimuli, whereas verbally talented students excelled in retrieving information from long-term memory and in tasks that use word stimuli (Dark & Benbow, 1994).

Apart from differences in the cognitive profile, the mathematically and verbally gifted also displayed differences in educational and vocational choices, extracurricular activities, and personal interests (Achter et al., 1999; Lubinski et al., 2001; Lubinski, 2004). The mathematically gifted students were interested in activities that involve engineering, mathematics, computer science, and technology. They enjoyed science and mathematics subjects during high school years and chose quantitatively demanding

disciplines as their major in the undergraduate degrees. In contrast, verbally gifted high school students participated in social sciences and humanities clubs and pursued arts or social science majors in their undergraduate degrees (Achter et al., 1999; Lubinski et al., 2001; Lubinski, 2004; Shea et al., 2001). A 25-year longitudinal study from SMPY not only revealed that gifted individuals who performed in the top one per cent in the SAT-M or SAT-V were successful in their chosen career paths but their accomplishments were related to specific domains of their giftedness (Park et al., 2007). Highly gifted individuals in quantitative reasoning were likely to secure a patent or obtain tenure-track faculty position on the areas of science, technology, engineering, or mathematics. In contrast, those who were highly gifted in verbal ability reported to have secured a tenure-track position in humanities or published literary work either fictional or nonfictional (Park et al., 2007).

Consistent with data from the SMPY research, Ackerman and Beier (2003) found distinctively different cognitive and personality profiles of individuals whose strength is in science and mathematics and those whose strength is in verbal ability. The former group had significantly higher mathematical, spatial, and science self-concept than the latter group. They also performed better in tasks that involve fluid ability. On the other hand, the high verbal group (or as called intellectual/ cultural group) excelled in the measures of verbal self-concept, intellectual engagement, and artistic and social interests (Ackerman & Beier, 2003).

The result of these studies confirms that giftedness and intelligence should not be viewed as unidimensional. Rather, it contains multiple domains of superior abilities. Although general intelligence is essential in assessing an individual's overall mental ability, it is

specific aptitudes that are largely responsible for individual differences (Tannenbaum, 1983). As evident from the SMPY research, verbally and mathematically gifted students differed in their areas of cognitive strengths, making them qualitatively different in terms of skills, interests, and vocational preferences (Achter et al., 1999; Lubinski, 2004). Consequently, domain specific abilities are to be considered in identification and program provision in order to avoid overgeneralization among the gifted population (Robinson & Chamrad, 1986).

2.3.2 Talent search as an identification model.

The identification of giftedness using intelligence tests has been one of the most prevalent methods. Nonetheless, one of the concerns voiced by researchers who work with highly, exceptionally, or profoundly gifted individuals is the ceiling effect prevalent in modern intelligence tests (e.g., Gross, 1998a; Silverman & Kearney, 1992a, 1992b; Silverman, 1998b). This results in intelligence tests not being a reliable measure to estimate intellectually gifted students' levels of giftedness especially for those at the high end of the spectrum (Feldhusen, 1998; VanTassel-Baska, 1986). Scores on such tests are all limited by and tightly clustered around the maximum score. There have been several attempts to develop alternative identification processes to better identify gifted students. One attempt is talent search, which "offers a standardized approach, on a national basis, that systematically addresses the procedures of screening, verification, and placement" (Foster, 1979, cited in VanTassel-Baska, 1984, p. 172).

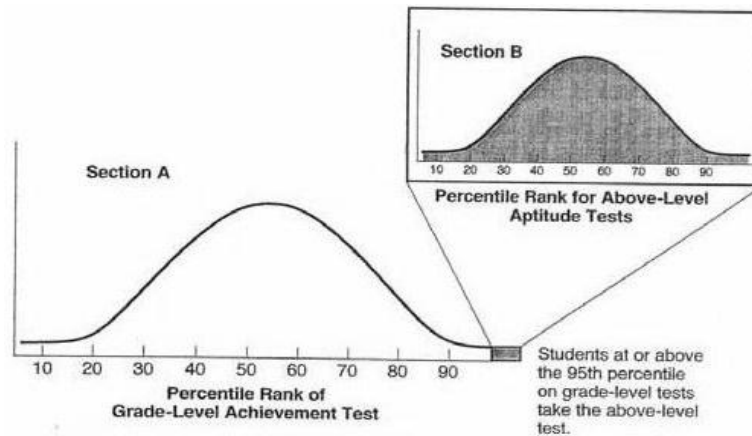
The talent search identification model is based on the off-level or above-level testing procedure. This is called off-level (or above-level) because it administers a standardized achievement test designed for older students to qualified younger students (Assouline & Lupkowski-Shoplik, 1991; Lupkowski-Shoplik, Benbow, Assouline & Brody, 2003; VanTassel-Baska, 1984, 1986). The standardized aptitude tests used by talent searches include the Scholastic Aptitude Test (SAT) and the American College Testing (ACT). These tests are traditionally taken by 11th or 12th graders as a criterion for university entrance and a prediction of performance in the tertiary education (Olszewski-Kubilius, 1998). Given that these tests used are typically administered to high school seniors, who are approximately four or five years older than talent search participants, the talent search identification model minimizes the ceiling effect prevalent in many in-grade achievement tests and intelligence tests (Gross, 1998a; Olszewski-Kubilius, 1994, 1998; Swiatek, 2007). By taking tests that are designed for and standardized on older students, the actual aptitudes of highly students who have reached the ceiling on an in-grade achievement test can be determined more accurately (Assouline & Lupkowski-Shoplik, 1991; Feldhusen, 1998; Lupkowski-Shoplik et al., 2003; Olszewski-Kubilius, 1994, 1998; Swiatek, 2007).

The use of off-level tests, such as the SAT and the ACT, on the gifted population is considered as a measure of cognitive functioning and reasoning ability rather than knowledge retention (Assouline & Lupkowski-Shoplik, 1991; Swiatek, 2007; VanTassel-Baska, 1984). When talent search students take the SAT or the ACT, they are presented with unfamiliar and advanced content to which students have not yet been exposed in school curricula (VanTassel-Baska, 1986). With knowledge of simple mathematical facts, students are required to apply their analytical reasoning abilities to solve complex

problems drawn from unfamiliar mathematical concepts (Assouline & Lupkowski-Shoplik, 1991; Lupkowski-Shoplik et al., 2003). The same principle applies to the use of SAT-Verbal for identifying verbally talented youth (Assouline & Lupkowski-Shoplik, 1991). As such, scores from off-level tests represent gifted students' levels of analytical reasoning ability rather than achievement (Cohn, 1991; VanTassel-Baska, 1986).

Another merit of the talent search identification model is that it corresponds to the current view of giftedness as a multidimensional construct. Through the use of the SAT and ACT, talent search seeks to identify degrees of giftedness and domains of academic strength within the gifted population (Olszewski-Kubilius, 1994; Swiatek, 2007; VanTassel-Baska, 1986). Figure 3, section A, presents a normal distribution of scores from a grade-level test. Section B demonstrates that another normal distribution of scores appears when students who are at the upper end of the normal curve take an above-level test (Assouline & Lupkowski-Shoplik, 2005; Swiatek, 2007). This signifies that the score distribution of students who took off-level tests spreads across the full range of possible scores. As such, it allows for a more precise discrimination of degrees of academic giftedness among the gifted population (Assouline & Lupkowski-Shoplik, 2005; Lupkowski-Shoplik et al., 2003; VanTassel-Baska, 1984).

Figure 3: Normal Curve Illustrating the Distribution of Scores of Above-Level Aptitude Tests of Gifted Students



Note: Adapted from "Talent search: Meeting the needs of academically talented youth", by A. Lupkowski-Shoplik, C. P. Benbow, S. G. Assouline & L. E. Brody, 2003. In N. Colangelo & G. A. Davis (Eds.), *Handbook of gifted education*, p. 205. Copyright 2003 by Allyn and Bacon.

Apart from the ability to differentiate levels of giftedness, the talent search identification model also discriminates between gifted students in terms of domains of giftedness. Off-level tests employed by talent searches are made up of subtests, which yield information on different domains of academic giftedness. For SAT, there are mathematic (SAT-M) and verbal (SAT-V) subtests (Lupkowski-Shoplik et al., 2003). Similarly, ACT contains science reasoning, mathematics, reading, and English subtests (Assouline & Lupkowski-Shoplik, 1991; Gross, 1998a). By using aptitude tests which contain subtests of specific intellectual abilities, information on the degrees of giftedness in particular domains, such as verbal and quantitative abilities, can be obtained.

Talent search is an alternative method of the identification of giftedness. Information from talent search can be used for curriculum and program planning to suit levels of giftedness and specific academic areas in which students demonstrate aptitude (Assouline & Lupkowski-Shoplik, 2005; Olszewski-Kubilius, 1994; VanTassel-Baska, 1984). Talent search has been used as an identification process of academically advanced students throughout the United States and in several countries around the world (Cohn, 1991; Olszewski-Kubilius, 1994, 1998; Swiatek, 2007). In Australia, Australian talent search programs, namely the Australian Primary Talent Search (APTS) and the Australian Secondary School Educational Talent Search (ASSETS), had served as alternative identification models for Australian gifted primary and secondary school students (Gifted Education Research, Resource and Information Centre, 2008).

2.4 The Concepts and Theories of Morality

Morality is a highly abstract and complex concept where such questions as “what defines morality?” have caught much attention among the public (Frankena, 1966, 1988).

Ongoing studies have investigated the influence of morality on social interaction and character development (Turiel, 1998). Of particular interest was to define the concept of morality and delineate processes involved in the development of morality more comprehensively (Turiel, 1998). Currently, literature regarding conceptions of morality is diverse and varying. Interpretations have come from religious, philosophical/ ethical, and psychological perspectives.

It has been proposed that morality is comprised of different but related components. Three broad components of morality include behavioral, affective-motivational, and cognitive-developmental elements (Bebeau, Rest & Narvaez, 1999; Derryberry & Thoma, 2005; Kohlberg, 1964; Rest, 1983). The behavioral component puts a strong emphasis on outward, observable behaviors in a real life situation (Rest, 1983). Behavioral psychologists and social learning theorists investigate the role of conditioning, role models, self-efficacy, and self-regulation in relation to resistance of temptation and prosocial behaviors (Mischel & Mischel, 1976). The affective-motivational aspect examines moral development in light of personality characteristics and emotions, such as guilt, empathy, and benevolence. It also describes the role of motivation and ego strength in transcending moral emotion to moral action (Hoffman, 1979). The cognitive dimension of morality, on the other hand, focuses on mental processes used to make judgments on moral dilemmas (Bebeau et al., 1999). Specifically, it seeks to explain cognitive mechanisms used in making rational judgments on actions in response to a moral problem (Kohlberg, 1964).

The existence of three distinct elements denotes that different psychological processes govern morality. As such, morality is best conceptualized as being multidimensional, depending on many variables (Derryberry & Thoma, 2005). It is interactions between cognition, affect, and behavior that are involved in the process of moral development (Rest, 1983). With the focus on the cognitive facet of morality in the present study, this section presents a review of literature on three major cognitive-developmental theories of morality. These are Piaget's theory of moral development, Kohlberg's stages of moral development, and Rest's neo-Kohlbergian approach to moral development.

2.4.1 Piaget's theory of moral development.

One of the most groundbreaking and influential bodies of work on the moral development of children was conducted by the Swiss cognitive-developmental psychologist, Jean Piaget. Upon the publication of *The Moral Judgment of the Child* in 1932, Piaget presented his theory of moral development based on findings from his interviews with children. Through interviews of children age between six to twelve years old, two successive stages of moral development were identified. These stages are heteronomous morality and autonomous morality (Piaget, 1932, 1965; Piaget & Inhelder, 1966).

Heteronomous morality, or, as called, the morality of constraint, is generally applied to young children up to the age of seven. Children in this stage perceive moral values and rules as imposed by adults. Rightness is associated with compliance with commands and wrongness is associated with failure to do so (Piaget, 1965). This unilateral moral orientation leads children to view rules as rigid and absolute, deriving from omnipotent figures (Berkowitz, 1964; Boehm, 1966). Rules are perceived as external to the self and punishment is a justified retribution when rules are violated (Boehm, 1962, 1966). It is the retributive justice that causes the ambivalent feelings of obligation, fear of power, or compliance for affection (Piaget, 1965). Another significant characteristic of children in the heteronomous morality is the tendency to evaluate wrongdoings solely by material consequences, such as on the basis of size of damage, rather than the intention of action (Boehm, 1966; Piaget, 1965; Wadsworth, 1971).

As children reach middle childhood (i.e., around the age of eight to ten years), the interaction with age peers who are of equal status and power has increased.

Participation in social groups allows them to see that rules and regulations foster social cooperation among members of social groups to which they belong (Piaget, 1965).

Therefore, unilateral respect for adults is substituted by the awareness that rules are no longer absolute but changeable and are derived from a free decision through democracy and consensual agreement (Boehm, 1966). It is this stage where heteronomous morality is substituted by autonomous morality, or, as called, the morality of cooperation (Piaget & Inhelder, 1966). Moral conduct is neither a product of fear of punishment nor to satisfy authorities but is carried out for its legitimate purposes (Piaget, 1965).

According to Piaget (1965), children in the autonomous morality stage use “distributive justice” in making moral judgment, where intentions behind actions rather than concrete consequences, serve as the basis for evaluating behaviors. The ability to use subjective responsibility in moral judgment is considered developmentally advanced and is influenced by the acquisition of the concept of cooperation. Given that children have developed social and intellectual maturity, egocentric points of view are gradually replaced by the ability to take perspective of other people or moral sensitivity (Boehm, 1966). A more mature understanding of the concept of fairness (i.e., punishment in relation to the degree of offence) is achieved, allowing for sensitivity towards unfair treatments to be exhibited. This stage marks more mature moral judgment (Pagnin & Andreani, 2000; Williams & Williams, 1970).

2.4.2 Kohlberg's theory of moral reasoning.

Being inspired by Piaget's research on moral development of children, an American psychologist, Lawrence Kohlberg, conducted a study of moral development as a doctoral dissertation in 1958 (Gibbs, Basinger, Grime & Snarey, 2007). The initial aim was to expand Piaget's theory of moral development in an American adolescent sample aged between 10 and 16 years old and to incorporate it with a political-philosophical theory of justice by John Rawls¹ (Rest, 1983, Rest, Narvaez, Bebeau & Thoma, 1999a; Rest, Narvaez, Thoma & Bebeau, 2000). Kohlberg maintained the theme of justice as central to his theory and it is Rawls's theory of justice that was used to define the highest level of moral reasoning in Kohlberg's theory (Rest et al., 1999a; Turiel, 1983). According to Kohlberg (1976), justice is a fundamental moral principle because it creates social equilibrium. Unlike rules, which are subject to changes and exceptions, justice is universal across cultures and societies (Kohlberg, 1976).

In order to establish and validate the stages of moral judgment, Kohlberg developed an interview procedure called the *Moral Judgment Interview (MJI)* (Colby & Kohlberg, 1987a, 1987b). It involves presenting subjects with hypothetical moral dilemmas involving issues

¹ John Rawls's theory of justice views justice as an integral "virtue of social institutions" and is regarded as a basic principle for a cooperating, democratic society (Rawls, 1985, p. 164). According to Rawls (1985), justice functions as a social contract, which defines basic rights and responsibilities of each member in the society. The primary focus of Rawls's theory of justice is liberty, equality, and contribution of individuals in a society. With these standards, citizens are regarded as free and equal and the society is a "fair system of cooperation" (Rawls, 1985, p. 232). In a cooperating society, individuals are rational and reasonable. They are capable of internalizing the concept of justice and fairness as their own value and applying the value when interacting with other members of the society regardless of their personal interests (Rawls, 1988). A society that maintains the principle of justice and fairness provides its members with an opportunity to discuss and propose adjustments to rules as mutually agreed among its members (Rawls, 1985).

such as rights, rules, justice, law, authority, and retribution. A series of open-ended questions were asked to observe subjects' moral frame of reference about right and wrong, their decision on the right course of action, and justification of the chosen action in response to moral dilemmas (Colby & Kohlberg, 1987a). Their responses to dilemmas, which were regarded as moral judgments, were analyzed and then categorized into stages of moral reasoning (Colby, Kohlberg, Gibbs, Liberman, Fischer & Saltzstein, 1983; Kohlberg, 1976).

2.4.2.1 Stages of moral reasoning and theoretical assumptions.

Following the initial investigation in the late 1950s, Kohlberg and his colleagues endeavored to validate and expand the theory to depict the development of moral reasoning of individuals through the life span. Unlike Piaget, whose theory proposed two stages of moral reasoning, Kohlberg outlined the development of moral reasoning into six stages which are grouped into three major levels, each of which contains two stages (Kohlberg, 1964, 1969, 1975, 1976, 1984, 1985; Kohlberg & Hersh, 1977).

The first level, *Pre-conventional*, refers to the reasoning based on heteronomous morality and personal needs (Kohlberg, 1976). Rules and social values are viewed as external to the self and egocentricity is the primary concern. Individuals in Stage 1, *the punishment and obedience orientation*, approach moral reasoning from an egocentric point of view (Kohlberg, 1976). They conform to rules simply to avoid physical consequences, such as being punished by authorities (Kohlberg & Hersh, 1977). In Stage 2, *the instrumental-relativist orientation*, individuals follow rules in order to satisfy their own needs or interests

and occasionally those of others (Kohlberg & Hersh, 1977). The prevalent perception on their relationship with other people is based on rewards, equal sharing, and reciprocal assistance (Kohlberg, 1964, 1976). This level is predominantly manifested by children aged nine to eleven years old, some early adolescents (Colby & Kohlberg, 1984; Gibbs et al., 2007), and adult and adolescent delinquents (Nelson, Smith & Dodd, 1990).

At the second level, *Conventional level*, morality is defined as maintaining social conventions and conforming to socially acceptable roles (Kohlberg, 1984). Stage 3, *the good boy-nice girl orientation*, describes individuals who conform to significant others' expectations in order to sustain or gain social acceptance (Kohlberg, 1976). Individuals in Stage 4, *the authority and social order maintaining orientation*, endorse authority, fixed rules, and laws as a means to reconcile conflicts and promote the common good for all (Kohlberg, 1964). Moral values of individuals functioning at the conventional level are likely to be influenced by family or social group of which they are member (Kohlberg, 1976). In general, most early and some late adolescents perform at Stage 3 and the majority of late adolescents and adults perform at Stage 4 (Colby & Kohlberg, 1984; Gibbs et al., 2007).

The third level, *Postconventional*, is considered the highest level of moral judgment. Individuals in Stage 5, *the social contract, legalistic orientation*, value the concept of individual rights (Kohlberg & Hersh, 1977). Laws are regarded as an element of a social contract and serve as an instrument to protect individuals' rights and social justice (Kohlberg, 1976). Unlike Stage 4, laws in Stage 5 are viewed as changeable by means of "rational considerations of social utility" rather than being absolute and unchangeable (Kohlberg & Hersh, 1977, p. 55). At the highest stage of moral reasoning, Stage 6, *the*

universal-ethical principle orientation, moral judgments are derived from autonomous views of the universal ethical principles such as human equality, justice, and individual rights (Kohlberg, 1976; Kohlberg & Hersh, 1977). Individuals pursue their self-chosen universal moral principles and disregard laws or social conventions that do not correspond to the self-selected principles (Kohlberg, 1976). This level is reached only by approximately 10% of adult population (Colby & Kohlberg, 1984) and moral philosophers (Gibbs et al., 2007).

Each stage of the moral reasoning describes a unique consideration to moral conflicts. The six stages represent a hierarchical sequence, in which higher stages signify more complex thinking in moral decision making than the lower stages (Kohlberg, 1969, 1984). According to Kohlberg (1975, 1976), individuals' developmental changes of moral reasoning are always upward yet their development may stop at any stage. Stages are hierarchically invariant, meaning that individuals must progress through each stage so as to reach the next more advanced stage in a fixed sequence without reversal or stage skipping (Boom, Brugman & van der Heijden, 2001; Kohlberg & Hersh, 1977). However, individuals' rates of progress through a given stage may vary. Stages are "structural wholes", in which an individual's thinking will be at a single dominant stage across varying content and each succeeding stage logically presupposes the understanding gained at preceding stages (Colby & Kohlberg, 1984; Kohlberg, 1975, 1984). Individuals are likely to produce lines of reasoning based on the highest, most advanced stage of moral judgment they are capable of when making a decision on moral problems (Kohlberg, 1975; Kohlberg & Hersh, 1977; Rest, 1983). This is because higher stages of moral reasoning are perceived as more conceptually adequate views to rationalize one's moral decisions (Rest, 1983).

2.4.2.2 Prerequisites of moral reasoning.

Moral judgment, similar to other forms of judgment, relates to the ability to reason in response to moral dilemmas. Kohlberg's cognitive developmental theory (1975, 1976) proposed that stages of moral judgment correspond to Piaget's stages of logical reasoning. Advanced development in moral reasoning depends on advanced development in logical reasoning, yet the reverse is untrue. Piaget's concrete operational stage, which involves the ability to make simple logical inferences about concrete objects, is instrumental to Kohlberg's Preconventional moral reasoning. Piaget's lower level of formal operation, which describes the ability to form simple hypotheses, parallels Conventional moral reasoning (Kohlberg, 1975). According to Kohlberg (1976), an advanced level of cognitive ability assists the process of interpreting situations, thinking abstractly, applying previous experiences, and evaluating lines of reasoning. All of these qualities contribute to making mature moral judgments.

Apart from cognitive ability, social cognition is another prerequisite for mature moral judgment development (Gibbs et al., 2007; Kohlberg, 1984; Lickona, 1976; Walker, 1980). Social cognition refers to perspective taking or role taking which involves the ability to interpret other people's thoughts, feelings, and roles by stepping into their shoes and viewing the world through their eyes (Selman, 1976; Selman & Byrne, 1974). The theoretical assumption that cognitive ability and social perspective taking are crucial prerequisites for the development of moral judgment was supported by empirical studies (e.g., Enright, Lapsley & Olson, 1985; Gibbs et al., 2007; Kohlberg, 1976; Kohlberg & Hersh, 1977; Myyrya, Juujärvi & Pessa, 2010; Selman, 1971, 1976; Selman & Bryne, 1974). Walker (1980) found that children who achieved Kohlberg's Conventional moral reasoning Stage 3 were those who attained both the formal operation stage of cognitive

development and mutual perspective taking stage. Likewise, Selman (1971) found that children whose cognitive ability was less advanced had low scores on both role taking and moral judgment measures. In contrast, those who had a higher level of cognitive ability developed role taking and moral reasoning ability earlier than did those with a lower level of cognitive ability. Even though Kohlberg (1976, 1984) acknowledged the existence of other prerequisites for moral reasoning development, role taking and cognitive ability are primary requirements that have been found to contribute to moral reasoning as measured empirically.

2.4.2.3 Gender differences on moral reasoning.

Much has been written about Kohlberg's theory of moral reasoning both for its strengths and limitations (see Rest, Narveaz, Bebeau & Thoma, 1999c, for discussion). One of the most intense criticisms was the issue of gender bias. Carol Gilligan (1982) argued that Kohlberg's justice-based morality was rigid, overly abstract, and biased against females. Gilligan (1982) claimed that morality has two different "voices:" one for males and the other for females. Men are likely to construct their relationship with other people based on the principle of justice, individuation, and equality whereas women tend to be more oriented toward sensitivity, care, and interpersonal connectedness. She further argued that because Kohlberg's stages of moral reasoning involve a reflective understanding of human rights and justice, it ignores female's orientation towards interpersonal relationships. Gilligan (1982) stated, "Prominent among those who thus appear to be deficient in moral development when measured by Kohlberg's scale are women, whose judgments seem to exemplify the third stage of his six-stage sequence" (p. 18).

Investigations regarding the issues of gender difference on moral development focused on two claims made by Gilligan. In particular, they probed (a) whether females were less advanced in the justice-based moral judgment paradigm, and (b) whether females exclusively used care-based moral orientation and males exclusively used justice-based moral orientation in making a moral judgment. Regarding the first claim, which assumed that females are less advanced in justice-based moral reasoning, empirical findings did not support Gilligan's argument (e.g., Armon & Dawson, 1997; Garmon, Basinger, Gregg & Gibbs, 1996; Greeno & Mccoby, 1986; Jaffee & Hyde, 2000; Rest, 1975, 1983; Walker, 1989). A meta-analysis of 80 studies involving gender differences in moral reasoning at different ages demonstrated no significant gender differences (Walker, 1984).

Interestingly, although some studies showed that females were less advanced in the justice-based moral reasoning paradigm than their male counterparts (e.g., Baumrind, 1986; Haan, Langer & Kohlberg, 1976), in-depth analyses revealed that such findings were likely to be the artifact of educational opportunity (Rest, 1983). Therefore, the argument that moral reasoning stages are biased against women was not well supported by empirical evidence.

In regards to the second claim, the majority of empirical findings did not find gender differences in moral orientation preferences. Among male and female adolescents, neither gender differences nor effects of stereotypical gender roles were evident (Walker, 1989). Both male and female adolescents referred to both justice-based and care-based moral judgments across all dilemmas (Gilligan & Attanucci, 1988; Lyons, 1983; Wark & Krebs 1996). In fact, there was a trend toward late adolescent females showing an increased use of justice-based reasoning while maintaining care-based reasoning in resolving moral conflicts (Jaffee & Hyde, 2000; Lyons, 1983). By interviewing male and

female adolescents, adults, and seniors who were matched for socioeconomic status, educational background, and occupational status, Gilligan and Attanucci (1988) found that the majority of males and females used both care-based and justice-based moral reasoning in their responses to moral dilemmas. Overall, analyses from previous studies pointed toward the coexistence of care-based and justice-based orientations (Walker, 1989). Therefore, care and justice perspectives are best seen as emphasizing different aspects of moral development rather than as opposing theories (Boss, 1994).

2.4.3 The neo-Kohlbergian approach to moral judgment development.

In the mid-1970s, a group of researchers led by James Rest took a different path to investigate moral judgment development (Thoma, 2002). This is known as the neo-Kohlbergian approach. According to Rest and his colleagues, moral judgment is defined as a cognitive process in solving a moral problem. It involves such processes as identifying elements of a moral problem, analyzing needs and interests of different parties, reflecting on various lines of action, deciding on the most morally justified choice of action, and giving judgments to the chosen action (Crawson, DeBacker & Thoma, 2007). The neo-Kohlbergian approach is in alliance with the Kohlbergian tradition because it assumes a cognitive developmental construct. Despite this similarity, the neo-Kohlbergian approach is different from the Kohlbergian tradition in some aspects, such as the data collection procedures and the stage concept (Rest et al., 1999c; Thoma, 2002). This will be discussed in detail in the following sections.

2.4.3.1 The development of the Defining Issues Test.

During the 1970's clinical interviews were recognized as the most thoroughly validated method in data collection; however, Rest acknowledged complications in Kohlberg's semi-structured interviews as a means to assess individuals' moral reasoning (Thoma, 2002). First, the administration of Kohlberg's interview and scoring of the interview scripts are complicated (Elm & Weber, 1994). It requires well-trained interviewers to code subjects' responses based on a 17-step process (Colby & Kohlberg, 1987a). Second, given that the administration and scoring of the Moral Judgment Interview is labor intensive and time consuming, it is not accommodating for studies with larger sample sizes (Rest, 1974, 1986; Rest et al., 1999b). Finally, through a free-flow interview, unclear or incomplete oration of ideas and haphazard responses may cause misinterpretations and increase scoring errors (Arnold, 2000; Rest, 1974; Rest et al., 1999c; Straughan, 1985).

In an attempt to surmount these shortcomings, Rest, Cooper, Coder, Masanz, and Anderson (1974) developed an objective instrument to measure moral reasoning based on Kohlberg's stage theory without interviews. This instrument was named the Defining Issues Test. It is a paper-and-pencil assessment for moral judgment, in which subjects are presented with six moral dilemmas; each of which is followed by 12 statement items. Each statement item represents a line of reasoning based on different moral consideration. Subjects are asked to rate and rank the items in order of importance. By rating and ranking statement items based on degrees of importance, it is possible to observe the magnitude of each moral stage manifested by a subject. It is also possible to identify the subject's most preferred moral schema across six dilemmas (Rest, 1976, 1983).

2.4.3.2 Moral schemas in the neo-Kohlbergian approach.

Another aspect that distinguishes the neo-Kohlbergian approach from the classical Kohlbergian approach is the terms used to describe the progress of moral judgment. While Kohlberg used the term “stage” to identify levels of moral judgment, Rest preferred the term “schema” (Rest et al., 1999a, 1999c). A schema refers to knowledge, hypotheses, or concepts that are stored in long-term memory. Schemas are structured and activated when an occurring stimulus has some resemblances to previous stimuli or prior knowledge (Bartlett, 1932). Schemas are generally used to interpret and evaluate information, transfer newly acquired information to the prior knowledge, and retrieve information when necessary (Narvaez & Bock, 2002; Rest et al., 1999a).

The neo-Kohlbergian approach describes three schemas that are used to identify the progress of moral judgment. These schemas are Personal Interests, Maintaining Norms, and Postconventional Thinking (Rest et al., 1999a, 1999c). The *Personal Interests* schema describes moral reasoning derived from concerns for personal benefits and is predominant among young children (Rest et al., 2000). It is equivalent to Kohlberg’s moral judgment Stages 2 and 3 (Rest et al., 1999a). It is important to note that Kohlberg’s Stage 1 was not included in the DIT schema concept. This is because the DIT requires a minimum reading age of 12-year old, and it was shown that most early adolescents progress beyond Stage 1 to more developmentally advanced stages in moral judgment (Narvaez & Bock, 2002; Rest et al., 1999c).

As children enter the period of adolescence, reasoning based on the personal interests schema becomes less dominant and a more developed schema, the *Maintaining Norms* schema, becomes more dominant in their responses to moral dilemmas (Narvaez &

Bock, 2002). Reasoning based on the maintaining norms schema indicates an endorsement of social cooperation (Rest et al., 1999a, 2000). Key elements of the maintaining norms schema are (a) that laws are of an absolute necessity for governing a stable society and encouraging cooperative social interaction among people; (b) that laws are set protect all citizens and are applied equally to everyone in a society; and (c) that individuals are expected to comply with authorities in order to maintain social order (Rest et al., 1999c). Morality is perceived as a tool to maintain social cooperation and stability (Rest et al., 2000). The maintaining norms schema is equivalent to Kohlberg's Stage 4, the *law and order stage* (Rest et al., 1999c).

The highest level of moral judgment is the *Postconventional Thinking* schema, which parallels Kohlberg's Stages 5 and 6. While individuals functioning in the maintaining norms orientation endorse laws and social orders, those in postconventional orientation are aware that laws can be biased and used in favor for some people and that social conventions are not absolute but alterable inasmuch as they suffice to moral purposes (Rest et al., 1999a, 1999c). For postconventional thinkers, moral obligations are to be based on shareable ideals that are reciprocal and are open to legitimate criticisms or challenges. In establishing a just society, postconventional thinkers are appeal to universal ideals, such as the greatest good for all, care for people in need, and fair treatment, rather than to personal welfare or laws and authorities (Rest et al., 1999a, 1999c).

Similar to Kohlberg's theoretical assumptions, the neo-Kohlberg theory of moral reasoning assumes that changes in schemas are sequential and upwards from the personal interests schema to the maintaining norms and postconventional thinking

schemas (Rest et al., 1999a). Nonetheless, Kohlberg explained the development of moral reasoning as invariant, “moving up a staircase one step at a time, without skipping any steps and without reversals” (Rest et al., 1999a, p. 298). Rest and his associates, on the other hand, believed that the progression of moral judgment is similar to the movement of “overlapping waves” in which a more simplistic reasoning is slowly replaced by more advanced thinking (Rest et al., 1999a). This “soft stage” concept is reflected in the use of the term schema in the DIT. Rest and his associates preferred the term schema to stage to signify that individuals are likely to fluctuate across stages rather than inhabit only one stage at a time (Rest et al., 1999a, 1999c). While Kohlberg’s interview procedure aims to classify subjects into one of the moral judgment stages, the DIT postulates that individuals tend to use multiple schemas in solving moral problems. Thus, combinations of schemas are evident in an individual (Rest et al., 2000).

2.4.3.3 Moral schemas in relation to the Defining Issues Test.

As discussed in the previous section, schemas are crucial for information processing and problem solving. In making a moral judgment, individuals are guided by their moral schemas, which provide them with information and knowledge to solve moral dilemmas (Narvaez & Bock, 2002). The three moral schemas relate to the DIT in that the DIT is “a device for activating moral schemas” (Rest et al., 2000, p. 389). Each of the 12 statement items provided in each of the six stories of the DIT represents one of the three schemas. Each statement item is deliberately written as a fragmented line of reasoning. As subjects read each item, they are required to discriminate and supply meaning to the items being read. In addition, given that subjects are asked to evaluate each item based

on degrees of importance and relevance to their moral consideration, their preferred moral schema is activated (Rest et al., 1999a). Items that correspond most to their preferred moral schema are expected to be given high rankings and ratings whereas items which are not relevant to their considerations are expected to be given low rankings and ratings (Narvaez & Bock, 2002). Therefore, it is their moral schemas that guide individuals' decisions on moral situations (Rest et al., 1999a).

Since Piaget, there has been an ongoing effort to investigate moral development of individuals empirically. Piaget's theory of moral judgment has been one of the most influential endeavors to capture of the complex nature of morality. His research in moral development of children has inspired two prominent researchers, Lawrence Kohlberg and James Rest, to study moral development at a variety of ages. Kohlberg synthesized psychological research of moral reasoning with a philosophical theory of justice. Being an interdisciplinary theory that accounts for both psychology and ethics, Kohlberg's theory has been a significant theory on contemporary understanding of moral development (Rest et al., 2000). The Defining Issues Test, which was devised by Rest, has been regarded as the most extensively used objective measure of moral judgment and has contributed to the growing body of research in the realm of moral reasoning (Thoma, 2002).

2.4.4 Moral development of academically gifted adolescents.

One of the unique socio-affective characteristics of gifted individuals often mentioned in literature is their mature sense of morality (Clark, 1983; VanTassel-Baska, 1998). It has

been suggested that gifted individuals possess both cognitive and affective attributes that encourage moral growth. They are described as being able to take the perspective of other people and perceive emotional cues at a young age (Hollingworth, 1942), showing accelerated degrees of empathy and moral sensitivity (Lovecky, 1994b), having an acute sense of justice and idealism (Silverman, 1994; VanTassel-Baska, 1998), having advanced analytical and abstract thinking (Sisk, 1982), and showing well-developed moral judgments (Gross, 1998b, 2004). Hollingworth (1942) described young gifted children as having a deep interest in abstract issues such as social responsibilities, fairness, and honesty.

Not only do gifted children and adolescents develop their sense of morality earlier but their experience with moral concerns is also found to be more intense than age peers or older children of a lower mental age (Piechowski, 2003). The emotional intensity experienced by gifted individuals is often explicated by Dabrowski's (1964) theory of positive disintegration. Of particular emphasis is "overexcitabilities", which is one of the frameworks for characterizing giftedness (Piechowski, 1986, 1997). Overexcitabilities signify the heightened capability to respond to stimuli, in which the greater strength of the overexcitabilities contributes to greater developmental potential for giftedness (Piechowski, 1986, 1997; Silverman, 1993a). Among the five types, emotional and intellectual overexcitabilities are closely related to moral development. Emotional overexcitability is manifested through moral sensitivity and empathy at a deeper level than do individuals not identified as gifted, and intellectual overexcitability is evident from advanced moral judgments (Piechowski, 1986, 1997).

Ackerman (1997) found that intellectual and emotional overexcitabilities were among the three attributes that best distinguished between gifted students and students who were not identified as gifted. Gifted adolescents exhibited significantly higher levels of intellectual and emotional overexcitabilities when compared to those of their non-identified age peers. More importantly, levels of intellectual and emotional overexcitabilities displayed by the gifted participants were comparable to those of adults not identified as gifted (Piechowski & Colangelo, 1984). Based on Dabrowski's theory of positive disintegration, gifted individuals are endowed with greater potential for moral development (Silverman, 1993b; Tannenbaum, 2000).

A seminal longitudinal study conducted by Terman (1925) examined character development of more than 1,500 highly gifted children and early adolescents. When comparing to children of comparable chronological age, the highly gifted children displayed more developmentally advanced moral behaviors, for examples, refusal to cheat in a tempting situation and unwillingness to claim undeserved credit for work accomplished. Approximately 85% of the gifted boys and girls had higher mean scores on character tests than their chronological age peers. In fact, on tests of trustworthiness and moral stability, the gifted participants who were on average nine years old scored at levels normally achieved by children 14 years of age (Terman & Oden, 1976). Even though instruments for measuring moral development were not as sophisticated as those used nowadays, the results shed some light on the fact that gifted students were more developmentally advanced in moral behaviors than their age peers who were not identified as gifted.

One of the factors that are believed to contribute to the well-developed sense of morality among gifted children and adolescents is their superior cognitive ability (Gross, 2004). In fact, it has been established that socio-emotional and moral development of gifted individuals is correlated more strongly with their mental age than with their chronological age (Gross, 1997b; Hollingworth, 1942; Thorndike, 1940). A number of empirical studies have shown that the possession of advanced intellectual ability is associated with such moral qualities as social perspective taking (Selman, 1971) and prosocial behaviors (Harris, Mussen & Rutherford 1976; Hogan, Viernstein, McGinn, Bohannon & Daurio, 1977; Lewis, 1982; Lovecky, 1997; Silverman, 1994; Wanshaffe, 2001). Other studies also showed gifted children and adolescents who were advanced intellectually have expansive interests in social, ethical, and environmental issues pertaining to society (Davis & Rimm, 1994; Lovecky, 1994b; Olenchak, 1999; Piechowski, 2003; Roeper, 1988; VanTassel-Baska, 1998; von Károlyi, 2006).

2.4.5 Moral reasoning of academically gifted adolescents.

Apart from characteristics related to heightened moral sensitivity and moral behaviors, advanced development in moral judgment is another attribute exhibited by gifted individuals that has been well documented in the literature. Kohlberg's stage of moral judgment, which integrates moral development with cognitive development, provides a theoretical framework for examining psychosocial development of the intellectually gifted (Gross, 2004). Studies that specifically investigated the development of moral judgment of gifted individuals generally employed the Defining Issues Test (DIT; Rest, 1979) as a measure of moral reasoning. The DIT provides the postconventional index, which

signifies relative importance one gives to the most developed level of moral judgments, the postconventional level.

One of the initial investigations on gifted adolescents' moral judgment using the DIT is conducted by Karnes and Brown (1981). Among the mildly gifted adolescent students who enrolled in a program for gifted students, the tendency to make postconventional responses positively correlated not only with intelligence but also with age. From the age of 11 to 15 years, there was a steady increase of postconventional responses. It was speculated that these gifted students reach the postconventional level of moral reasoning during their high school years. Lee and Olszewski-Kubilius (2006) found that among the three indices in the DIT the postconventional index was the only index that significantly differentiated the gifted students from the students who were not identified as gifted. Based on this finding, gifted students preferred reasoning based on the universal principle of justice to reasoning based on personal benefits or conformity to laws. Likewise, a study by Andreani and Pagnin (1992, 1993b) found that average/low intellectual ability subjects tended to use moral reasoning based on preferences for immediate gratifications, which was equivalent to Kohlberg's preconventional moral reasoning (Stage 2), and social roles and approval, which was equivalent to Kohlberg's lower conventional moral reasoning (Stage 3). In contrast, highly able students preferred morality based on human rights and fairness, which was equivalent to Kohlberg's postconventional moral reasoning. This finding not only suggested advanced moral reasoning development among the gifted but also the influence of intelligence on preferred moral orientations.

Several studies have shown that the performance of gifted adolescents in the DIT postconventional index was equivalent or superior to that of undergraduate university students (e.g., Derryberry & Barger, 2008; Derryberry et al., 2005; Howard-Hamilton, 1994; Howard-Hamilton & Franks, 1995; Janos & Robinson, 1985; Lewis, 2007). In an unpublished study, Janos, Robinson, and Sather (1983, cited in Janos & Robinson, 1985) compared the moral development of a group of high school gifted adolescents who were radically accelerated to college, two groups of gifted students who were not accelerated, a group of college students, and a group of high school students. All three groups of intellectually gifted students outperformed the college attenders on the postconventional index of the DIT. When comparing to a normative sample of high school seniors of comparable age, gifted students from both accelerated and nonaccelerated groups exhibited substantially higher levels of moral judgment. Using the DIT postconventional scores as the index of moral development of eight Australian exceptionally gifted young adolescents (160+ IQ), Gross (2004) found that each subject had Z-scores of at least one point greater than the DIT norms from the American junior high school population. Four of the eight subjects, while still in junior high school, performed at the high school level and two of them had DIT scores equivalent to college and graduate university students.

Literature has consistently shown that gifted adolescents do not limit themselves to conventional beliefs or values but reflect on moral issues using “moral principles beyond conformity” earlier than their age peers and older students who are not identified as gifted (Webb, Meckstroth & Tolan, 1983, p. 179). In this light, mental age appears to have a stronger influence on the development of moral judgment than does chronological age. Provided that superior social, emotional, and moral development is related to the ability to think abstractly and to reason conceptually (Rogers, 2002), intellectually gifted

adolescents are able to give judgments for moral dilemmas at a superior level to that of less exceptional youths or adults (Jensen, 1998).

2.4.6 Relationships between moral judgment and intelligence.

The theories of moral judgment by Kohlberg (1976) and Rest (1979) assume the cognitive-developmental perspective where the progress in moral judgment parallels the structure of cognitive development. Two major approaches have been used to investigate relationships between moral judgment and intelligence. First, postconventional scores between gifted and non-identified samples were compared. Second, statistical correlations were analyzed to examine associations between cognitive ability scores and moral reasoning scores.

As discussed in the previous section, findings have shown that intellectually gifted adolescents outperformed their chronological age peers not identified as gifted and older individuals with higher levels of education in the postconventional index. Even though some studies (e.g., Narvaez, 1993) found that not all intellectually high achievers exhibited enhanced moral judgment abilities, the vast majority of the high ability group demonstrated average to high postconventional scores whereas none of the low achievers displayed high postconventional scores in moral judgment. This yields a support for the notion that intelligence is a necessary yet insufficient attribute for advances in moral reasoning (Kohlberg, 1984).

The second approach uses statistical techniques to investigate associations between moral judgment and intelligence. Kohlberg (1969) has posited that correlations between the Moral Judgment Interview and scores from intelligence tests were usually in the range of .30s to .50s. This finding was validated by subsequent studies (e.g., Abram, 1985; Arbuthnot, 1973; Grant, Weiner & Rushton, 1976; Harris et al., 1976; Selman, 1971). Positive correlations between measures of intelligence and moral reasoning as assessed by the DIT were also established. According to Rest (1979, 1986), approximately 85% of such correlations were in the range of .20s to .50s. Later studies have also confirmed positive, small to moderate correlations between the DIT postconventional scores and scores from scholastic aptitude tests such as SAT and ACT (e.g., Crowson et al., 2007; Derryberry & Barger, 2008; Derryberry et al., 2005; Sanders, Lubinski & Benbow, 1995). There was also evidence of positive associations between moral reasoning and intelligence tests, such as the Wechsler Intelligence Scale for Children-Revised (e.g., Siefing, 1981), Raven's Progressive Matrices (e.g., Sanders et al., 1995), Stanford-Binet intelligence test (e.g., Karnes & Brown, 1981), and Piagetian measures of formal operational thinking (e.g., Cauble, 1976; Lewis, 1982; Wanshaffe, 2001). Findings from these studies suggest that the positive associations between moral reasoning and intelligence exist regardless of measures of intelligence.

It is evident from previous studies that cognitive ability is an important factor for the development of moral judgment (Andreani & Pagnin, 1993a; Kohlberg, 1976, 1984; Narvaez, 1993; Pagnin & Andreani, 2000). Moral reasoning, similar to other forms of reasoning, requires a certain level of mental maturity to make the thought processes that underlie moral decision making accessible (Boss, 1994; Jensen, 1998). Higher degrees of intellectual ability encourage superior reasoning and critical evaluation of information in

moral dilemmas. Thus, it provides a foundation for advances in moral considerations and judgments (Harris et al., 1976). Gifted children are able to reach Piaget's highest level of cognitive ability, the formal operational thinking stage, at a relatively young age. Consequently, they are able to transfer abstract reasoning and general problem solving skills to making considerations in complex moral dilemmas more efficiently and spontaneously (Sisk, 1982).

Apart from intelligence, other studies also revealed that other personality factors related to cognitive ability, such as preference for complex explanation (Derryberry et al., 2005), openness to experience (Dollinger & LaMartina, 1998; Lonky, Kanes & Roodin, 1984), and creative problem solving (Runco, 2009) are instrumental to the development of moral judgment. Derryberry and Barger (2008) found that gifted participants had a significantly higher mean score on the measure of complex information processing than did undergraduate students. Even though gifted participants and undergraduate participants did not perform significantly differently on the measure of intelligence (as assessed by the ACT), gifted participants scored significantly higher on the measure of attributional complexity than did the college group. This indicated that the gifted group preferred using complex rather than simple thought processes to interpret situations involving human interactions. According to Rest et al. (1999b), advancement in moral development is not only a function of moral judgment but also moral motivation: those who have advanced moral judgment are those who are enthusiastic to cogitate about moral issues through complex moral considerations. Moral reasoning development describes a progress of reasoning about moral situations from a simplistic perspective of personal interest and maintaining norms schema to the most sophisticated perspective of postconventional schema. In making a postconventional moral judgment, complex

reasoning process to consider various aspects and all parties involved in the dilemma is expected to be activated (Derryberry & Barger, 2008).

2.4.7 Relationships between moral judgment and domains of intelligence.

Even though it has long been established that intelligence significantly associates with moral reasoning, only a small number of studies have specifically examined the role of different domains of intelligence on performance in moral judgment. Among studies that surveyed the relationships between specific domains of cognitive functioning and the ability to reason in the postconventional level, verbal and mathematical abilities are the two major facets of intelligence that have been explored.

Literature has yielded conflicting findings with regard to relationships between mathematical abilities and moral reasoning. Some studies have demonstrated positive correlations between moral reasoning scores and scores from tests of nonverbal or mathematical ability. For example, Arbuthnot (1973) found small to moderate correlations between moral judgment and qualitative, abstract reasoning (r ranged from .29 to .43). Similarly, a study by Sanders et al. (1995) showed that the correlations between the DIT postconventional scores and the SAT- Mathematics subtest were small but significant ($r = .27$ in study 1 and $r = .25$ in study 2). In contrast, using structural equation modeling, Derryberry, Jones, Grieve, and Barger (2007) did not find a significant path from fluid intelligence to moral reasoning. The nonsignificant path was believed to result from the maintaining norms schema being used as the modal schema by the subjects (Derryberry et al., 2007). Given that the maintaining norms schema is based on

social conventions and laws, fluid intelligence (i.e., abstract reasoning) is less likely to be invoked in making a decision in a complex moral situation. It was suspected that if the subjects were to reason in the postconventional level a significant path would have been evident (Derryberry et al., 2007).

The relationships between mathematical ability or fluid intelligence and moral reasoning might be well understood within the fundamental mental mechanism shared by mathematical thinking and moral problem solving. Mathematical thinking represents the ability to use inductive and deductive reasoning, make rational inferences from various sources of information, and manipulate abstract concepts to solve a new set of problems logically (Carroll, 1998; Cattell, 1963; Woodcock, 1998). Pedagogical frameworks in mathematics propose several strategies to teach mathematical problem solving.

Bauerfeld (1988, cited in Wieczerkowski, Cropley & Prado, 2000) and Polya (1945, cited in Tall, 1991) have proposed four steps in solving mathematical problems. These include (1) interpretation of a problem, (2) finding different strategies to approach the problem, (3) selecting among available alternatives the most appropriate approach, and (4) evaluating the effectiveness of the chosen approach in relation to the outcome. Following this framework, mathematical skills not only foster critical thinking but also promote creative problem solving (Schoenfeld, 1992). Both critical thinking and creativity are influential to reasoning in the postconventional schema (Lickona, 1976; Paul & Elder, 2009; Runco, 2009).

It is interesting that the metacognitive processes in mathematical problem solving proposed by Bauerfeld and Polya bear a close resemblance to processes of moral decision making proposed by Rest and his colleagues (Rest et al., 1999c). When

confronting a moral conflict, individuals are likely to engage in several cognitive tasks that demand logical problem solving. These include identifying components of the moral problem, considering various lines of action, selecting the most appropriate choice of action, and justifying the chosen action based on a complex moral frame of reference (Rest et al., 1999c). As such, similar cognitive mechanisms pertaining to mathematical problem solving may assist in resolving a moral dilemma.

Neuroscience research has yielded support for the associations between mathematical thinking and problem solving. Mathematically talented students displayed higher magnitudes of brain activation in areas that correspond to strategic thinking, evaluation of information, and conflict resolution when performing cognitive tasks (O'Boyle et al., 2005). The heightened brain activation in the area pertaining to problem solving may also take part in mathematically gifted individuals' superior performance in fluid intelligence, logical thinking, and moral problem solving. In this light, it is possible that adolescents who are highly competent in mathematical ability will benefit from having advanced problem solving skills to be used in moral reasoning than those who are less competent in mathematical ability.

In terms of the relationships between verbal ability and moral reasoning, there is evidence of small to moderate associations between verbal intelligence and postconventional moral reasoning (e.g., Karnes & Brown, 1981; Sanders et al., 1995). A study which investigated the strengths of relationship between moral reasoning and various tests of intelligence and cognitive skills by Arbuthnot (1973) demonstrated moderate correlations between moral judgment and verbal subtests of cognitive batteries (r ranged from .41 to .50). Derryberry et al. (2007) reported a significant path from

crystallized intelligence to the DIT postconventional moral reasoning. Based on this finding, it can be anticipated that skills underpinning crystallized intelligence play a crucial role in the development of moral schemata.

Crystallized intelligence is the ability to acquire conceptual knowledge through previous learning and engagement in intellectual activities (Carroll, 1996; Cattell, 1963, 1998). In this light, intellectual growth derived from crystallized intelligence may enhance one's ability to conceptualize moral concepts and develop a set of moral schemata. Individuals with a wealth of information relevant to moral concepts are equipped with socio-cognitive tools to approach moral problems more efficiently. The ability to retain and apply abstract moral principles is central to completing the DIT because the test is designed to activate one's moral schemas (Rest et al., 1999a). Therefore, it is likely that individuals who are highly competent in using crystallized intelligence have well-developed mental tools to retrieve moral schemas from long-term memory more effectively and show preferences for a more developed moral schema in response to moral dilemmas presented in the DIT.

The significant relationships between crystallized intelligence and moral reasoning can also be understood in terms of the role of verbal ability in making mature moral judgments (Derryberry et al., 2005, 2007). Written language is the medium used to present the moral dilemmas in the DIT. Consequently, a certain degree of verbal ability is required in the process of test taking, especially in comprehending moral situations and interpreting moral considerations (Derryberry et al., 2005, 2007). Previous studies have revealed significant associations between preferences for postconventional moral reasoning and aspects of verbal ability such as reading comprehension, verbal reasoning, and vocabulary (Narvaez, 1993). Tirri and Pehkonen (2002) found qualitative differences in

the ability to make moral arguments on science-related moral dilemmas among gifted participants. Through interviews and essays, gifted students who gained high scores in the DIT tended to reflect on the dilemma with more sophisticated ethical values than those who attained average DIT scores. Verbally talented students were better at presenting arguments that were based on critical thinking, moral sensitivity, and complex ethical principles.

From a review of the literature, it is possible that mathematical and verbal intelligence have significant but distinctively different roles in the ability to approach moral conflicts. Mathematical or logical abilities may enable individuals to think abstractly, see complex relationships among elements and concepts, and use logical reasoning to solve moral problems (Derryberry et al., 2005, 2007; Rest et al., 1999c). On the other hand, language abilities expedite the manipulation of linguistic symbols (Boss, 1994). Given that the DIT is completed by the use of sophisticated language, high levels of linguistic comprehension is required (Derryberry et al., 2007).

2.4.8 Gender differences in moral reasoning of gifted adolescents.

Findings concerning gender effects on moral reasoning of the gifted population using the DIT are inconsistent in the literature. A number of studies have indicated a lack of significant gender effect on moral judgment (e.g., Cantrell, 1999; Chovan & Freeman, 1993; Derryberry et al., 2005; Howard-Hamilton & Franks, 1995; Karnes & Brown, 1981; Lewis, 1982; Narvaez, 1993; Sanders et al., 1995; Siefiring, 1981; Shoffner, 1996; Tan-Willman & Gutteridge, 1981). Gifted males and females did not perform significantly

differently in the postconventional index, suggesting that both genders were able to reason based on the most developed moral reasoning schema.

On the contrary, other studies found significant differences between gifted male and female high school students (e.g., Lee & Olszewski-Kubilius, 2006; O'Leary, 2004). In the studies that found gender differences, data pointed toward gifted female adolescents outperforming their male counterparts in the index of postconventional moral thinking. Interestingly, a study by Lee and Olszewski-Kubilius (2006) illustrated that gifted female high school students showed preferences for the postconventional schema whereas gifted male students were more likely to reason based on the maintaining norms schema. This finding did not support Gilligan's (1982) claim that females were inferior to males in making justice-based moral reasoning. Her assumption that females tended to use Kohlberg's Stage 3, which encompasses the theme of care, than men and men were likely to excel women in their use of postconventional moral reasoning was not supported by studies that employed gifted high school students.

Overall, studies have established that academically gifted adolescents possess cognitive and affective characteristics that promote moral understanding and awareness (e.g., Clark, 1983; Hollingworth, 1942; Piechowski, 2003; Silverman, 1994; Sisk, 1982). Gifted adolescents were found to reach the highest level of moral judgment, the postconventional thinking, earlier than did their age peers not identified as gifted (e.g., Chovan & Freeman, 1993; Howard-Hamilton, 1994; Tan-Willman & Gutteridge, 1981). Levels of moral reasoning exhibited by the gifted were relatively comparable or superior to those of university students and adults who were not identified as gifted (e.g., Derryberry et al., 2005; Derryberry & Barger, 2008; Gross, 2004).

Empirical evidence demonstrated significant correlations between moral reasoning and intelligence, suggesting that a high level of moral judgment is positively related to superior cognitive functioning (Kohlberg, 1984; Rest, 1986). However, only a limited number of studies have investigated the role of verbal and mathematical abilities on moral reasoning. In addition, previous studies have yielded somewhat conflicting findings. More importantly, none of the existing research on specific domains of intelligence on moral reasoning has involved the gifted population.

In terms of gender differences on the development of moral reasoning, studies that employed gifted high school samples showed inconclusive findings. While some studies did not reveal a significant effect of gender on the development of moral judgment, others suggested that young gifted women were more advanced in postconventional moral thinking than their male counterparts.

2.5 The Development of Identity Formation

One of the psychosocial tasks associated with the adolescent period is to establish a well-defined sense of identity (Mönks & Ferguson, 1983). Erikson's theory of psychosocial development (Erikson, 1968) and Marcia's ego identity status theory (Marcia, 1966) are the two major frameworks applied to adolescent psychological development.

This section outlines the theoretical foundation of the two theories. In addition, empirical research with respect to the relationship between ego identity status and moral reasoning will be discussed. Literature relating to the identity development of gifted adolescents drawn from Marcia's ego identity status paradigm will be addressed.

2.5.1 Erikson's theory of identity formation.

Much of the current research on adolescent identity development has resulted from the pioneering work of Erik Erikson (Bourne, 1978a; Hébert & Kelly, 2006). Erikson's framework of identity development is an expansion on the fifth stage (i.e., *Identity vs. Role Confusion*) of the eight-stage psychosocial developmental theory (Cross, 2001). According to Erikson (1968), adolescence is the primary period in which young individuals establish a sense of personal identity. With physical, intellectual, and social maturity, adolescents are driven to establish their sense of self and develop life goals (Erikson, 1968). A well-defined identity allows adolescents to abandon their child-like mentality and prepares them to enter adulthood (Erikson, 1968). Successful identity formation is a prerequisite for proceeding to the next psychosocial stage of intimacy (Beyers & Seiffge-Krenke, 2010). Failure on the task can result in a reduced ability to progress to the subsequent stage of intimacy and a likelihood of developing an unhealthy personality (Erikson, 1968).

According to Erikson (1968), ego identity is defined as a coherent personality structure. Identity entails a sense of individuality and uniqueness, which signifies the conscious perception of oneself as being distinct from other people (Ewen, 1993). Identity also reflects the sense of sameness and connectedness with who one was in the past (i.e.,

childhood), who one is in the present, and who one is likely to be in the future (i.e., adulthood) (Erikson, 1968). In other words, the process of identity formation represents continuity with one's past, which provides meaning for one's present, and a clear and meaningful direction for one's future (Bourne, 1978a). The sense of sameness provides individuals with inner cohesiveness, which enables them to recognize their roles in the society (Hébert & Kelly, 2006). Furthermore, Erikson (1968) proposed that successful identity formation requires that one's self-perception corresponds to the perceptions and expectations that adolescents want other people to have of them. This gives young individuals a feeling of social support and validation during the process of identity formation (Ewen, 1993).

Erikson proposed that identity formation is an autonomous process where adolescents differentiate themselves from identification with adults and develop their unique self through sustained personal efforts in exploring life alternatives (Adams, 1998; Kroger, 1989). Successful identity formation is dependent on establishing a relatively stable set of basic life commitments. This can be used as a frame of reference for interpreting personal experiences and negotiating the meaning, purpose, and direction of one's life (Berzonsky, 2003; Bourne, 1978a). Adolescents who are able to fulfil the task of identity formation are likely to have a strong sense of purpose and are able to proceed to the subsequent psychosocial phase, *Intimacy versus Isolation*. In contrast, if the identity formation process is not resolved, they tend to experience role confusions. The state of identity confusion might result in the sense of inner fragmentation, isolation, or psychological insecurity (Erikson, 1968).

2.5.2 Marcia's ego identity status paradigm.

Erikson's theory of ego identity formation has provided a conceptualization of complex processes of adolescent identity development (Bourne, 1978a). However, Erikson's methods require complicated research procedures, which are restrictive for further empirical investigations (Waterman, 1988). James Marcia (1966, 1980) is among researchers who attempted to revise and expand Erikson's complex theoretical framework of ego identity development to make it more amenable to research.

For the past 40 years, Marcia's (1966) identity status paradigm has been one of the most influential frameworks used to explain the fundamental process of adolescent identity development in the realm of occupation, ideological values, and interpersonal preferences (Berzonsky & Adams, 1999; Kroger, 1989, 1995). It has inspired an extensive number of scientific investigations of identity formation among high school students, college attenders, and adults (Adams, 1998; Berzonsky, 2003; Kroger, 1995, 2000). To date, over 500 research publications have employed Marcia's ego identity status paradigm to examine the development of adolescent identity (Schwartz, Adamson, Frrer-Wreder, Dillon & Berman, 2006).

2.5.2.1 *The ego identity status paradigm.*

Marcia (1994) defined ego identity as a personality structure which contains "an individual's organization of drives (needs, wishes) and abilities (skills, competencies) in the context of his or her particular culture's demands (requirements) and rewards (gratification)" (p. 64). His theory of ego identity status depicts relationships between two

significant dimensions of identity formation. These dimensions are the presence or absence of a crisis or exploration period, and the presence or absence of a clearly defined and stable commitment to values and beliefs (Marcia, 1980, 1994).

Crisis or exploration refers to the period when adolescents actively examine identity issues. It signifies critical evaluation of goals and values drawn from significant others, and engagement in the search for personally meaningful alternatives in the areas such as occupation, life goals, ideological beliefs, as well as interpersonal preferences (Marcia, 1980). This exploration period is a prerequisite for achieving in the task of identity formation (Adams, 1998). Commitment is characterized as the extent to which adolescents express a desire to firmly commit to self-chosen aspirations and incorporate them into life plans (Marcia, 1980).

In contrast to Erikson's conception of identity, which presents two opposite poles of identity development, Marcia (1966, 1980) proposed four identity status classifications. The four ego identity statuses include two original Eriksonian statuses, *Identity Achievement* and *Identity Diffusion*; and two additional intermediate statuses, *Moratorium* and *Foreclosure* (Marcia, 1966, 1980, 1994). Figure 4 shows Marcia's four statuses of adolescent identity development.

Identity achievers are adolescents who have gone through a period of intense exploration and have made well-defined commitments to identity issues in such areas as occupation, religion, politics, and gender role (Kroger, 2003; Marcia, 1966, 1980; Muuss, 1996). They have critically evaluated previous identity values and have discarded those that are not personally appropriate (Marcia, 1966).

Foreclosed adolescents have neither experienced an identity crisis nor undergone a period of self-exploration. However, they have decided on aspirations, values, and beliefs that are strongly influenced by parental expectations (Marcia, 1966, 1980). Without a period of exploration, foreclosed adolescents are at risk of prematurely making firm commitments to a set of values without advancing toward the identity achievement status (Muuss, 1996).

Adolescents functioning in the *Moratorium* status undergo an exploratory phase by experimenting with alternative roles and beliefs (Marcia, 1966, 1980). As such, the evidence of commitment is relatively obscure. They have not yet made firm commitments or have developed only temporary commitments, which can be changed and modified as they resume the process of identity exploration (Kroger, 2003).

Identity Diffused youths may or may not have experienced an identity crisis or self-exploration (Marcia, 1966, 1980). However, they display a lack of commitments to identity choices (Berzonsky & Adams, 1999). They generally express indifference to the process of identity formation and often perceive it as insignificant or uninteresting (Marcia, 1966).

According to Marcia (1994), identity formation occurs rather informally and is usually established independently. In Western societies, a constructed identity is considered preferable to an adopted identity given that the constructed identity involves a period of self-initiated exploration (Marcia, 1994). Consequently, identity statuses that involve exploration (i.e., achievement and moratorium) are regarded as more advanced and favorable than those that lack exploration (i.e., foreclosure and diffusion).

Figure 4: Marcia's Taxonomy of Adolescent Ego Identity Development

		Commitment	
		No	Yes
Exploration	No	Identity Diffusion	Foreclosure
	Yes	Moratorium	Identity Achievement

Note. Adapted from "Theoretical expansion and empirical support for Erickson's theory: James Marcia's theory of ego identity status" by R. E. Muuss, 1996. *Theories of adolescence*, p.59. Copyright 1996 by McGraw-Hill.

2.5.2.2 Theoretical assumptions of ego identity status paradigm.

Marcia's ego identity status framework is viewed as an ongoing developmental process in which adolescents progress from diffusion to foreclosure or moratorium, from foreclosure to moratorium, and from moratorium to identity achievement (Adam, 1998). However, the trajectory of identity statuses should not be viewed as invariant but a fluid developmental sequence, in which no one status is necessarily a prerequisite for another (Berzonsky & Adams, 1999; Waterman et al., 1974; Waterman & Waterman, 1972).

Even though there was evidence of progressive, regressive, and stable trajectories, a growing number of studies have confirmed the prevalence of progressive developmental patterns of identity status. In a meta-analysis of some 124 studies, Kroger, Martinussen, and Marcia (2010) found greater mean proportions of adolescents making progressive

movements (.36) than regressive movements (.15). Data from longitudinal studies have also verified the progressive developmental shift of identity statuses over the period of adolescence (e.g., Adam, 1998; Adam & Fitch, 1982; Berzonsky & Adams, 1999; Kroger, 1995; Meeus, 1996; Waterman, 1982). Specifically, there was evidence of a steady increased magnitude of the moratorium and identity achievement statuses and a declined proportion of the foreclosure and diffusion statuses from the period of early adolescence to late adolescence (Archer & Waterman, 1983; Jones & Streitmatter, 1987; Kroger et al., 2010; Meeus, 1996; Meeus, Van de Schoot, Keijsers, Schwartz & Branje, 2010; Streitmatter, 1993a). In fact, decreased proportions of the diffusion and foreclosure statuses were found to be most apparent among high school samples whereas increased proportions of the moratorium and achievement statuses were most prominent among college samples (Meeus, Iedema, Helsen & Vallerberg, 1999; Meeus et al., 1996, 2010; Streitmatter, 1993a). As suggested by Meeus et al. (1999, 2010), early and middle adolescence is a crucial transitional period where youth begin to reexamine their current values and prepare to explore other identity options. This process is expected to continue until late adolescence and early adulthood.

2.5.2.3 Profiles of ego identity statuses.

A number of studies have investigated cognitive and personality characteristics of individuals who belong to one of the four ego identity statuses. They have demonstrated that each identity status is associated with distinctively different intellectual and psychosocial profiles (e.g., Bourne, 1978a, 1978b; Kroger, 1989, 2003; Marcia, 1980,

1994; Waterman, 1982). Differences in characteristics among the identity status group signify identity exploration and commitment in adolescent psychological development.

Identity achieved adolescents, who have undergone a period of self-initiated exploration and have chosen particular identity options, have been found to exhibit the more favorable intellectual and psychological profiles than other statuses (Marcia, 1994). Identity achievers had the highest motivation for achievement (Orlofsky, 1978), internal locus of control (Schwartz, 2004), autonomy (Schwartz, Côté & Arnett, 2005), resistance to external pressures (Toder & Marcia, 1973), perseverance (Zou & Tao, 2001), and purpose in life (Shoffner & Newsome, 2001). Cognitively, identity achieved and moratorium adolescents demonstrated complex thinking processes and high degrees of persistence in challenging cognitive tasks (Marcia, 1966). Both identity achievers and those with the moratorium status were found to use an information-oriented identity style when approaching information relevant to identity issues (Berzonsky, 1989; Schwartz & Dunham, 2000). They were reported to actively seek information and new experiences and show willingness to revise aspects of their identity when facing conflicting information about themselves (Berzonsky, Nurmi, Kinney & Tammi, 1999; Berzonsky & Neimeyer, 1994; Streitmatter, 1993b). Among the four statuses, identity achievers showed the highest degrees of readiness to engage in interpersonal intimacy (Beyers & Seiffge-Krenke, 2010; Orlofsky, Marcia & Lesser, 1973).

Moratorium adolescents, who are in the process of exploration, were similar to identity achievers in advancement in the performance in cognitive tasks (Marcia, 1966; Stephen, Fraser & Marcia, 1992), high levels of self-esteem (Marcia, 1967), and a heightened sense of persistence (Zou & Tao, 2001). Moratorium and identity achieved adolescents

were more capable of integrating and analyzing information from a variety of perspectives than adolescents in other identity groups (Read, Adams & Dobson, 1984). Furthermore, moratorium individuals rarely endorsed authoritarian values (Marcia, 1966, 1967; Marcia & Friedman, 1970) and showed the highest capacity for autonomous decision-making (Bourne, 1978b). However, moratorium adolescents also displayed the highest measures of anxiety, depression, procrastination, and obsessive behaviors amongst the four identity statuses (Bilsker & Marcia, 1991; Meeus et al., 1999; Shanahan & Pychyl, 2007). The low level of psychosocial well-being exhibited by moratorium adolescents signifies that high degrees of exploration and low degrees of commitment can lead to identity crises (Meeus et al., 1999).

Foreclosed adolescents, who have constructed their identities by adopting values of significant others without exploration, have been found to endorse authoritarian values and conform to authority figures (Marcia, 1966, 1967). They generally used a normative identity style in approaching identity formation task by adopting social norms and familial expectations when facing identity relevant information or problems (Berzonsky, 1989; Berzonsky & Neimeyer, 1994; Streitmatter, 1993b). They had high needs for structure and cognitive closure (Berzonsky & Sullivan, 1992), low degrees of openness to experience (Clancy & Dollinger, 1993), and a low sense of autonomy (Marcia, 1966). Although foreclosed adolescents were generally content and had the lowest level of anxiety (Kroger, 1989; Marcia & Friedman, 1970), late adolescents who remain foreclosed were more anxious and were likely to be unsuccessful in establishing intimate relationships (Kroger, 1995).

Identity Diffused adolescents are those who have yet to experience identity crises and define a clear sense of identity. They tended to use the diffused/avoidant orientation in dealing with identity issues, lacking in active information seeking (Berzonsky, 1989; Berzonsky et al., 1999). In particular, they tended to procrastinate decisions until situational or social demands dictate their decisions (Berzonsky, 1989, 1994; Shanahan & Pychyl, 2007). Identity diffusers displayed low levels of autonomy, self-directedness, and self-esteem (Marcia, 1966, 1967). Furthermore, they had the lowest scores on scales that assess internal locus of control, self-confidence, ego strength, and purpose in life (Schwartz, 2004; Zuo & Tao, 2001). It is important to note that Identity diffusion is not considered a psychological problem for younger individuals given that it is the status commonly experienced by early adolescents (Archer, 1989). However, if it persists to late adolescence and adulthood, identity diffusion is regarded as impaired psychosocial development. This is because it indicates low levels of psychological functioning and can lead to difficulties in coping with life problems (Kroger, 1989, 2003).

2.5.3 Gender differences in ego identity status development.

Gender differences have been one of the most investigated topics in relation to identity formation. Early research focused predominantly on male identity development, emphasizing on the areas of occupation, politics, and religion (Marcia, 1966). It was not until the 1970s that female identity was being investigated empirically. Erikson (1968) proposed the concept of “Inner Space”, which states that women establish their self-understanding through interpersonal relationships, especially marriage and child bearing (Muuss, 1996). The need for interpersonal closeness among women is not only a result

of different “voices” in identity orientation between men and women (Gilligan, 1982) but also gender roles and responsibilities prescribed by the society (Marcia, 1980). In order to fulfill the roles of wives and mothers, women must put aside the urge to establish ideological and occupational identity and engage in the pursuit of intimacy (Marcia, 1980). On the contrary, male identity is associated with “Outer Space”, where identity is constructed autonomously around the issue of ideological beliefs and vocational goals (Muuss, 1996).

Erikson’s idea of “Inner Space” has been challenged by numerous studies (Marcia, 1994). Two issues concerning gender differences have been highlighted. First, studies examined if gender has a significant effect on the process of identity development to determine whether men and women pursue different developmental trajectories. Second, they investigated if men and women focused on different identity *content*. That is, whether interpersonal identity is in fact most dominant among women and ideological identity is most common among men.

Studies investigating developmental patterns of identity status generally found no effect from gender on vocational, religious, and political identities, indicating that the identity formation in females is not different from that of males (e.g., Cramer, 2000; Kroger, 1997). Regardless of gender, these studies found an increased frequency of adolescents being classified in the moratorium and achievement statuses and decreased frequency of adolescents being classified as foreclosed and diffused over time. Nonetheless, results from a review of studies involving high school students showed a trend towards male adolescents progressing from less advanced to more advanced statuses later than females (Kroger, 1997).

In terms of gender differences and identity content, literature has shown inconsistent findings (Adams, 1998; Kroger, 1997; Marcia, 1994). Investigations that employed late adolescents reported no significant gender effect in the areas of occupation, religion, politics, and gender role (Archer, 1982, 1989; Streitmatter, 1993a; Waterman, 1982). Nonetheless, studies employing high school samples have shown that adolescent females were more advanced than their male counterparts in both ideological and interpersonal identity domains (e.g., Bergh & Erling, 2005; Carn-Watkins, 1991; Cooper & Grotevant, 1987; Jones & Steitmatter, 1987; Meeus et al., 2010; Pearson & Rodgers, 1998; Phillips & Pittman, 2007). In a study of a Swedish high school sample, data from the total domains of the EOM-EIS-2 showed that female adolescents had significantly higher scores in the more advanced status of moratorium whereas male adolescents scored significantly higher in the less developed statuses of identity diffusion and foreclosure (Bergh & Erling, 2005). Likewise, in a study of ideological identity development among gifted adolescents, a higher percentage of young gifted women were classified in the more mature status of moratorium and a lower percentage in the less mature statuses of foreclosure and diffusion in the ideological and interpersonal identity domains (Carn-Watkins, 1991). These and similar findings suggest that high school girls tend to begin identity formation and exploration earlier than their male counterparts.

2.5.4 Relationships between ego identity status and moral reasoning.

It has been proposed in literature that identity may play a significant role in moral development and enhance moral motivations and behaviors (Hardy & Carlo, 2005). Research investigating the relationships between moral reasoning and ego identity status has yielded inconclusive findings. Some studies have a suggested nonsignificant

relationship between moral reasoning and identity status (e.g., Cauble, 1976; Wanshaffe, 2001). On the contrary, others reported positive and significant relationships between the two constructs (e.g., Hult, 1979; Keegan, 1986; Podd, 1972; Rowe & Marcia, 1980; Shoffner, 1996). Subjects who functioned in the higher ego identity statuses (i.e., identity achievement and moratorium) were found to perform at the postconventional level of moral reasoning, while those who functioned in the lower identity statuses (i.e., foreclosure and identity diffusion) tended to operate at the pre-conventional and conventional levels (Podd, 1972; Rowe & Marcia, 1980). Comparing performance on the DIT between subjects who were classified in each of the four identity statuses, identity achievers had the highest mean postconventional score, followed by that of moratorium, foreclosed, and identity diffused subjects (Hult, 1979). A study by Shoffner (1996) found that interpersonal identity was a significant predictor of moral reasoning as assessed by the DIT, accounting for 12% of the variance. Gifted adolescents who were categorized in the achievement or moratorium status in the interpersonal identity domain were likely to have higher levels of moral reasoning than their counterparts who were classified as identity foreclosed or diffused.

The finding that identity achievement and moratorium were positively related to postconventional moral reasoning indicates the significant role of exploration on the ability to make mature moral judgments. Identity achievers and moratoria are those who employ the information-oriented identity approach to the task of identity formation (Berzonsky, 1989; Berzonsky & Neimeyer, 1994). They generally express a genuine interest in searching for and evaluating identity relevant concepts, high tolerance of unconventional ideas, and willingness to explore different identity options (Berzonsky & Sullivan, 1992; Clancy & Dollinger, 1995). The intrinsic drive for exploration exhibited by

identity achieved and moratorium individuals may encourage the use of moral considerations beyond social conventions. In order to reason based on the postconventional moral schema, individuals not only challenge conventional social norms but also construct their own ethical values based on the universal principle of justice (Kohlberg, 1976; Kohlberg & Hersh, 1977). In this light, exploration of alternative belief systems and openness to different values are mandatory for postconventional moral thinking. Therefore, individuals who are dynamic in identity exploration and strive for self-clarification (i.e., identity achievement and moratorium) are more likely to appeal to postconventional thinking than those who define their identity based on familial or social expectations (i.e., foreclosure) and those who avoid the task of identity searching (i.e., diffusion).

2.5.5 Identity development of academically gifted adolescents.

The issue of identity development in gifted adolescents has received considerable attention from researchers in the field of gifted education (Coleman & Sanders, 1993; Mönks & Ferguson, 1983). Like every adolescent, gifted youths undergo identity formation (Coleman & Sanders, 1993; Silverman, 1998a). Consistent with Erikson (1968) and Marcia (1966, 1980), Mönks and Ferguson (1983) suggested that identity development of gifted adolescents should be examined in terms of their life direction and interests in ideological values and interpersonal relationships. Gifted individuals generally experience asynchronous development (The Columbus Group, 1991, cited in Morelock, 1996; Silverman, 1998a) where differences in rates of intellectual, social, and physical development affect their identity (Silverman, 1995). Qualitative research has shown that gifted youth are likely to experience an onset of identity crisis earlier than their

age peers not identified as gifted due to the feeling of asynchrony (e.g., Silverman, 1998a). They tend to ask questions about their existence, vocational plans, and ideological principles early in the course of their lives (Silverman, 1998a).

Empirical studies that used Marcia's ego identity status paradigm to examine the identity development of academically gifted adolescents are scarce. Nonetheless, some findings have shed light on gifted adolescents' identity formation. In an attempt to investigate ego identity status of academically gifted high school students using the EOM-EIS-2, Carn-Watkins (1991) found that gifted students who participated in an accelerated summer residential program showed significantly lower mean scores on the identity achievement, foreclosure, and identity diffusion statuses than the average for their age peers not identified as gifted provided in the instrument manual. Seventy-six per cent of the gifted students were classified in the moratorium status in the ideological identity domain and 80% were in the moratorium status in the interpersonal and total identity domains. The results suggested that gifted high school students were more likely to engage in the exploration of ideological values and interpersonal preferences. Likewise, Shoffner (1996) used EOM-EIS-2 to examine ego identity formation of gifted high school students ($N = 50$). Analyses revealed that more than half of academically gifted high school students were in the more advanced statuses for both ideological and interpersonal domain. Specifically, 66% of the gifted students were in the achievement or moratorium statuses in the ideological domain and 70% of the gifted students were in the achievement or moratorium statuses in the interpersonal domain. Based on these findings, gifted adolescents had generally progressed to the more developed status of identity achievement or moratorium. They have thoroughly examined and surveyed ideological values and interpersonal relationships. They also have made firm

commitments to self-chosen beliefs and life goals following a period of active identity exploration.

Using a different methodology to investigate the ego identity status of gifted adolescents, Zuo (2005) analyzed Terman's longitudinal data of some 1,500 children who were identified as having superior intellectual ability (IQ score of 135 or above). In examining Terman's data, interview scripts were transcribed to look for evidence of identity exploration and commitment in order to classify subjects into Marcia's ego identity statuses. The data used in this study contained information about the occupational development of gifted individuals in their late teens and early twenties. It was evident that the majority of the gifted subjects were in the identity achievement or moratorium status and only a small percentage of them were classified as foreclosed or diffused. Consistent with results from the aforementioned studies that used more current data, gifted adolescents from Terman's study were advanced in their identity formation development, showing a greater degree of identity exploration and commitment in the area of vocational identity. Comparing between the gifted high achieving group and the gifted low achieving group, findings showed that subjects who were identified as identity achievers were from the high achieving group whereas those who were diffused were from the low achieving group (Zuo & Cramond, 2001). Based on these findings, even though cognitive ability is believed to be a necessary ingredient for identity exploration and commitment, it is not sufficient for achieving the task of identity formation.

Apart from the studies that employed Marcia's ego identity status paradigm, another group of researchers made use of a different approach to examine vocational identity development of academically gifted children. Despite the difference in methodology and

theoretical framework, research conducted within the Study of Mathematically Precocious Youth (SMPY) supports the notion that gifted adolescents are likely to be more advanced in their vocational identity development than their age peers not identified as gifted.

Over the five decades, the SMPY has conducted a series of longitudinal studies on the educational and occupational preferences of gifted individuals who performed in the top 1%, top 0.5%, and top 0.01% in either the SAT-Mathematics subtest or the SAT-Verbal subtest (e.g., Achter et al., 1999; Lubinski et al., 2001; Lubinski, Benbow & Ryan, 1995; Lubinski, Schmidt & Benbow, 1996). These studies have consistently demonstrated that young highly and exceptionally gifted adolescents at the age of 13 years were well aware of their educational and vocational interests and aspirations (Lubinski & Benbow, 2006). Findings from follow-up studies also revealed that the vocational choices of these gifted adolescents assessed when they were 13 years old were maintained until they reached their adulthood years (Lubinski et al., 1995, 1996). More importantly, by early 20s these young gifted adults were successful in their career and had firm commitments in terms of friendship, intimacy, and leisure activities (Lubinski et al., 2001). Consistent with analyses from Marcia's ego identity status paradigm, SMPY studies indicated that the academically gifted are likely to establish a relatively clear picture of themselves in terms of vocational identity and lifestyle preferences earlier and their commitments to such choices are more stable than their age peers of average ability (Lubinski et al., 2001). In contrast to the concept of multipotentiality, which states that gifted individuals often face difficulties in narrowing down their interests or making a career choice due to their high ability, results of these studies seem to indicate that gifted adolescents are receptive to their strengths and pursue their own interests in respect to vocational and educational alternatives (Achter, Lubinski & Benbow, 1996).

2.5.6 Relationship between ego identity status and cognitive ability.

According to Erikson (1968), identity formation is related to cognitive growth. Progression to more mature identity statuses is generally associated with increasingly mature cognitive abilities. Nevertheless, research has produced contradictory findings on the relationships between cognitive ability and ego identity status. While some studies found no evidence of significant correlations between measures of cognitive ability and ego identity development (e.g., Cross & Allen, 1970; Schenkel, 1975; St.Clair & Day, 1979), others demonstrated significant relationships between the two constructs (e.g. Boyes & Chandler, 1992; Krettenauer, 2005). Using Piaget's measure of cognitive ability, Rowe and Marcia (1980) found positive correlations between ego identity status and cognitive ability. Only subjects who reached formal operations were categorized in the identity achievement status and none of the identity achieved subjects performed in the lower cognitive level of concrete operations (Rowe & Marcia, 1980).

Although empirical evidence of relationships between intelligence and ego identity status was inconsistent, the link between the two variables is conceptually expected. Erikson's formal operational thinking is a necessary but insufficient condition for identity development (Grotevant, 1987). Individuals who have progressed through the formal operational thinking are more capable of exploration and experimentation. This is because formal operational thinkers are equipped with the ability to think abstractly, reason hypothetically, make systematic self-observations, and set realistic goals (Grotevant, 1987). These characteristics facilitate the process of identity exploration and commitment (Boyes & Chandler, 1992). With the ability to consolidate and assimilate information, individuals with high cognitive ability are expected to make better use of knowledge gained from the experiences obtained through defining their sense of self.

Other lines of research also found that cognitive flexibility were contributory to identity achievement (e.g., Boyes & Chandler, 1992; Krettnauer, 2005). Those who performed in the more advanced statuses were likely to question foundation of their knowledge and view that knowledge is to be evaluated rationally. On the contrary, those in the less advanced statuses perceived knowledge as absolute. The tendency to critically examine knowledge especially that pertaining to identity options allows for identity achieved individuals to make rational choices about their identity options (Krettnauer, 2005).

A limited number of studies have examined the relationships between mathematical ability and ego identity status based on Erikson's or Marcia's framework. Findings from these studies were, however, inconsistent. Berzonsky and Kuk (2005) did not find significant correlations between the Mathematics subscores of the SAT and ego identity styles. This indicated that college students who preferred the information-oriented style, which is prevalent among identity achievers and moratoria, did not have significantly different mathematical ability from their counterparts who preferred normative identity style (i.e., foreclosure status) and diffused/avoidant identity style (i.e., identity diffusion status). On the contrary, in a study that used an objective measure, Grotevant and Adams (1984) found small correlations between the EOM-EIS and the Mathematics subtests of the ACT ($r = .16$) and the SAT ($r = .11$). When identity classifications were taken into consideration, there was a significant effect of ideological identity on the ACT-Mathematics subscale. Adolescents in the more advanced status of identity achievement had the highest ACT-Mathematics subscores (Grotevant & Adams, 1984).

The positive relationships between mathematical ability and identity status might be understood in light of cognitive skills involved in mathematical thinking and identity

formation. According to Schoenfeld (1992), mathematical thinking involves abstract reasoning, logical analysis, inferences from available information, and critical evaluation of solutions. These assist individuals in approaching identity problems by providing additional cognitive tools. These tools help to consolidate new information with existing knowledge, draw inferences from available information in relation to themselves as well as their social or familial milieu, and make a decision on an option that is most personally appropriate (Grotevant, 1987). From this perspective, identity formation is closely related to critical problem solving. This is because it is partially dependent upon the ability to make rational, analytical decisions rather than spontaneous, impulsive responses (Klacynski, Fauth & Swanger, 1998).

In terms of the associations between verbal ability and identity development, research has shown small correlations between measures of verbal ability and ego identity status. For example, Grotevant and Adams (1984) found that identity status as assessed by the EOM-EIS was weakly but significantly associated with scores from the English subscale of the ACT ($r = .14$) and with vocabulary scores ($r = .07$). Furthermore, there was a significant difference between students classified in different ideological identity statuses with identity achievement having the highest ACT- English scores followed by foreclosure, moratorium, and diffusion. In the interpersonal identity domain, vocabulary scores of moratorium students were significantly higher than those of the achieved, diffused, and foreclosed students (Grotevant & Adams, 1984).

The significant associations between verbal ability and identity formation may be explained in light of personality characteristics exhibited by verbally able individuals. Individuals whose strength is in verbal ability are found to have characteristics that are

attributional to intrapersonal and intellectual growth mechanisms such as autonomous, reflective, assertive, self-confident, and unconventional (Ackerman, 2000; Altus, 1952, 1958; Cattell, 1945; Chamorro-Premuzic & Furnham, 2004; Heiss, 1995; Mills, 1993). They were likely to channel their energy into activities that involved discussion of ideological values or philosophical principles (Altus, 1952, 1958). Verba, Burns, and Schlozman (1997) found that verbally talented individuals perceived themselves as more interested in political affairs, better at making decisions regarding politics, and more knowledgeable in politics than those who were less competent in verbal ability. Studies that examined identity values of gifted youth revealed that verbally gifted adolescents showed higher degrees of interests in politics and religion than did mathematically gifted adolescents (Heiss, 1995). Mills (1981) found that gifted high school females who rated religion as the most important value in life had highest SAT-Verbal subscores whereas gifted boys who perceived religion as of the highest personal value had lowest SAT-Mathematics subscores. Gifted boys with high verbal ability reported higher interests in moral and ethical issues (Mills, 1981).

A growing number of studies have confirmed significant associations between crystallized intelligence as a representation of verbal ability and measures of intellectual engagement and openness to experience (e.g., Ackerman, 2000; Ashton et al., 2000; Ackerman & Goff, 1994; Bates & Shieles, 2002; Goff & Ackerman, 1992; McCrae & Costa, 1987). Intellectual engagement refers to the extent to which one invests intellectually in the pursuit of knowledge and skills (Goff & Ackerman, 1992). It has been found to correlate highly with the measure of openness to experience ($[r = .51]$ Furnham, Monsen & Ahmetoglu, 2009). Openness to experience, which is described as enthusiasm to engage in new experiences, intellectual curiosity, and willingness to reevaluate social,

political, and religious values (McCrae, 1992; McCrae & Costa, 1987), has been found to modestly correlate with crystallized intelligence (Ashton et al., 2000; Goff & Ackerman, 1992). Specifically, the *Understanding* subscale, which involves preferences for literature and scientific writings, had the highest correlation with crystallized ability ($[r = .44]$ Ashton et al., 2000). Likewise, Goff and Ackerman (1992) found significant correlations between crystallized intelligence and various measures of personality traits such as extroverted intellectual engagement (i.e., enjoy involved discussions), interests in arts and humanity, and problem-directed thinking.

The review of literature pointed toward verbally competent individuals possessing characteristics such as openness to experience and intellectual engagement, which facilitate identity formation. The fact that verbally talented adolescents are more engaged in activities that encourage intellectual growth might positively influence the process of identity construction especially identity exploration (Goff & Ackerman, 1992). Given that identity exploration signifies the process of searching and evaluating identity options in order to make an appropriate identity choice, individuals who are more competent in processing information (i.e., verbal ability) may be equipped to approach the task of identity formation more efficiently.

Identity formation is the most important psychosocial task that most adolescents complete prior to entering adulthood (Erikson, 1968). Marcia's ego identity status paradigm provides a framework of adolescent identity development based on two key processes, identity exploration and commitment (Marcia, 1994). Investigations of gifted adolescents' identity development based on Marcia's typology are limited despite its merits for understanding adolescent identity formation (Hébert & Kelly, 2006). Previous

studies point toward gifted adolescents performing in the more developed statuses of moratorium or achievement in the area of occupation, ideological values, and interpersonal relations. They reported to have extensively explored various identity options prior to making commitments to self-chosen values and beliefs (Carn-Watkins, 1991; Shoffner, 1996). It has been postulated that cognitive ability plays a significant but partial role in identity status development (Grotevant, 1987). Nonetheless, existing research that conducted on gifted adolescents had some limitations such as a small sample size and a lack of control groups. Furthermore, there is a lack of research that investigates the effect of specific domains of intelligence, namely mathematical and verbal ability, on the development of identity status. Even though the literature suggests that mathematical and verbal ability are correlated with ego identity development, findings were still conflicting and unclear.

2.6 Definitions and Conceptions of Key Terms

This section briefly addresses the key variables included in the study, which are moral reasoning, ego identity status, giftedness, mathematical giftedness, and verbal giftedness.

2.6.1 Moral reasoning.

Moral reasoning is conceptualized based on Kohlberg's theory of moral judgment and Rest's neo-Kohlbergian approach. Moral judgment refers to a cognitive process in which

individuals respond to a moral dilemma by giving reasons for the way they choose to react (Kohlberg, 1976). According to Rest, there are three moral schemas that underlie individuals' moral reasoning. These are Personal Interest, Maintaining Norms, and Postconventional Thinking schemas, with Postconventional being considered the most developed schema (Rest et al., 1999a, 1999c). The Defining Issues Test, which has been extensively used as a measure of moral reasoning, provides the postconventional index (Rest, 1986). It signifies an individual's preference for dealing with moral dilemmas using the postconventional thinking schema. Individuals who favor the postconventional thinking schema are those who appeal to universal humanitarian ideals, such as the greatest good for all, human rights, and fair treatment (Rest et al., 1999c).

2.6.2 Ego identity status.

Marcia's ego identity status paradigm (Marcia, 1966, 1980) is employed as a theoretical construct to conceptualize identity development of adolescents. It describes the extent to which adolescents progress in the task of identity formation based on two major identity processes. These processes are identity exploration and commitment (Marcia, 1994). Exploration describes a period of active gathering of information about identity options and examining identity issues in respect to occupation, goals, values, and beliefs (Marcia, 1980). Commitment refers to the extent to which adolescents express firm allegiance to self-selected vocational aspirations, values, and beliefs (Marcia, 1980). Adolescents who successfully complete the task of identity formation take information gathered from the exploratory period and make commitments to the chosen identity options (Marcia, 1980). According to Marcia (1994), two statuses that lack the exploration process (i.e., identity

diffused and foreclosure) are considered less advanced than those that involve the exploration process (i.e., identity achievement and moratorium).

2.6.3 Giftedness.

The definition of giftedness in the study is adopted from that of Gagné's (2003, 2004b, 2008) DMGT (see section 2.3). Furthermore, giftedness is conceptualized as incorporating both cognitive and socio-affective characteristics (Gagné, 2003, 2004b; Tannenbaum, 1983, 2003). As defined by the Columbus Group (1991, cited in Morelock, 1996), giftedness is "asynchronous development in which advanced cognitive abilities and heightened intensity combine to create inner experiences and awareness that are qualitatively different from the norm" (p. 8). Given that giftedness is manifested by a rapid rate of cognitive and affective development and by the intensity of experiences (Piechowski, 1992), this study proposes that intellectual and psychosocial development of gifted adolescents are more advanced and complex than that of their age peers of average ability.

Contemporary conceptions of giftedness and talent (e.g., Cohn, 1981; Gagné, 2004b, 2008; Marland, 1972; Tannenbaum, 2003) have supported a multidimensional view of intelligence. In particular, Gagné's DMGT (2004b) describes intellectual giftedness as comprised of several domains, such as fluid reasoning (i.e., deductive, inductive, and logical reasoning) and crystallized intelligence (i.e., verbal abilities). This conceptualization is used by the present study.

2.6.4 Mathematical giftedness.

For the purpose of this study, mathematical giftedness is defined as the ability to think abstractly (Rickart, 1996), analyze and synthesize numerical data (Dreyfus, 1991; Tall, 1991), and draw inferences from information in order to solve mathematical problems (Ben-Zeev, 1996). In a review of literature, Sowell, Zeigler, Bergwall, and Cartwright (1990) proposed that mathematically gifted students possess cognitive characteristics such as advanced mathematical reasoning (i.e., logical thinking and numerical judgment) and superior spatial abilities (e.g., seeing relationships, structures, and patterns of visual stimulus). They were also found to have advanced problem solving abilities, for examples, analyzing elements of a mathematical material and synthesizing information to establish a structure for solving a mathematical problem (Sowell et al., 1990). A study that asked mathematically gifted students about skills that are crucial to mathematical thinking revealed that cognitive flexibility (e.g., flexibility of thought and divergent thinking) was rated as most important. The ability to see mathematical structures and patterns and the ability to visualize abstract or spatial problems were also perceived by the mathematically gifted as having significant roles in solving mathematical problems (Wieczerkowski et al., 2000). Interestingly, they did not rate characteristics such as goal orientation, ambition, and concentration as facilitative in doing well in mathematical pursuits (Wieczerkowski et al., 2000).

Another approach to mathematical ability is the psychometric approach. Theorists such as Carroll (1993, 1996) and Cattell and Horn (1978) proposed that fluid intelligence is comprised of specific abilities that closely relate to mathematical thinking, such as logical, inductive, and deductive reasoning. Even though fluid intelligence is found to be highly correlated with the general intelligence factor (see Uhdheim & Gustafsson, 1987, for

discussion), Carroll (1996) affirmed that fluid intelligence represents thinking activities that are relatively specific to numerical content and quantitative concepts.

2.6.5 Verbal giftedness.

Verbal giftedness in the present study is defined based on, but not limited to, the model of intelligence devised by Carroll (1993, 1996, 1998). Verbal ability is associated with crystallized intelligence, which is one of the distinguishable factors categorized under the general intelligence factor (Carroll, 1993, 1996; Cattell & Horn, 1987). Broadly speaking, crystallized intelligence represents aspects of language ability that are acquired through learning and practice, such as reading comprehension, spelling and grammar, listening ability, and reading decoding (Carroll, 1996). Crystallized intelligence is common in tasks that involve application of verbal reasoning (e.g., vocabulary and verbal comprehension tests) and retrieval of conceptual knowledge such as tests of general knowledge (Woodcock, 1998). Given that crystallized ability reflects breadth and depth of general knowledge, it is believed that growth in this area is a product of individuals' intellectual interaction with their environment from formal learning or personal experiences (Carroll, 1996; Cattell, 1993, 1996; Gustafsson, 1984). However, it is important to note that some facets of mathematical thinking are related to crystallized intelligence, such as decoding word problems into a mathematical representation (Ackerman & Beier, 2003; Carroll, 1996; Sternberg, 1996).

Literature in the field of gifted education has attempted to define verbal giftedness. For example, VanTassel-Baska (1996, cited in Olszewski-Kubilius & Whalen, 2000) described verbally gifted students as having characteristics such as fluency in reading,

having interests in words and word relationships, using advanced vocabulary, writing in a descriptive manner, reading extensively, taking pleasure in playing with words or word games, and having advanced understanding of linguistic structures in both oral and written forms. These characteristics closely resemble to the conception of verbal or crystallized ability proposed by Carroll (1993, 1996).

2.7 Theoretical Framework

The Moral Reasoning and Ego Identity Status Theoretical Framework (see Figure 5)

attempts to explain possible associations among variables in the present study.

Giftedness has been included in the framework because previous studies have shown that gifted high school adolescents are more advanced in moral reasoning than their age peers or older student who were of average ability (e.g., Derryberry et al. 2005; Derryberry & Barger, 2008; Howard-Hamilton, 1994; Sanders et al., 1995;). Furthermore, this speculation is derived from studies that found positive correlations between moral judgement and various measures of cognitive ability (e.g., Arbuthnot, 1973; Crowson et al., 2007; Kohlberg, 1976; Rest, 1979). Cognitive ability, especially that which involves abstract reasoning, is believed to facilitate the ability to solve complex moral dilemmas logically (Kohlberg, 1976, 1984). As stated by Kohlberg (1976), “since moral reasoning clearly is reasoning, advanced moral reasoning depends upon advanced logical reasoning” (p. 32).

The literature contains conflicting findings on relationships between mathematical ability and moral reasoning. While some did not find significant correlations between mathematical reasoning and moral judgment (e.g., Derryberry et al., 2007), others have shown that the two constructs were significantly albeit weakly correlated (e.g., Arbuthnot, 1973; Sanders et al., 1995). Regardless of the conflicting findings, it is speculated that aspects of mathematical thinking may relate to the process of moral judgment. Given that moral reasoning involves abstract thinking ability to solve moral problems (Kohlberg, 1976), inductive and deductive reasoning similar to mathematical thinking is expected expedite the process of moral problem solving. Even though literature has yielded conflicting findings, this study anticipates that mathematical giftedness will relate positively to moral reasoning.

Verbal ability has been found to have small to moderate associations with moral reasoning (e.g., Derryberry et al., 2007; Karnes & Brown, 1981; Narvaez, 1993; Sanders et al., 1995). Individuals with high verbal ability performed significantly better on measures of moral reasoning than those who were less competent in verbal ability (Tirri & Pehkonen, 2002). Language skills may assist the ability to read, comprehend, and interpret information represented in the form of written language more efficiently (Derryberry et al., 2007). Therefore, verbal giftedness is incorporated into the theoretical framework.

Studies that employed Marcia's ego identity status paradigm to investigate identity development of gifted adolescents were rare (Hébert & Kelly, 2006). Nonetheless, they pointed toward gifted high school adolescents being more advanced in ego identity status development. Specifically, they were found to operate in the more developed statuses of

achievement and moratorium in the ideological, interpersonal, and total identity domains (Carn-Watkins, 1991; Shoffner, 1996; Zuo, 2005). The advancement of identity formation among the gifted is believed to partially result from cognitive ability (Lubinski et al., 1996; Shoffner & Newsome, 2001). According to Erikson (1968), progression into more mature identity statuses corresponds to increasingly mature cognitive abilities. Consequently, giftedness is included in the theoretical model. It is assumed that giftedness will have a significant effect on ego identity status development in ideological, interpersonal, and total domains.

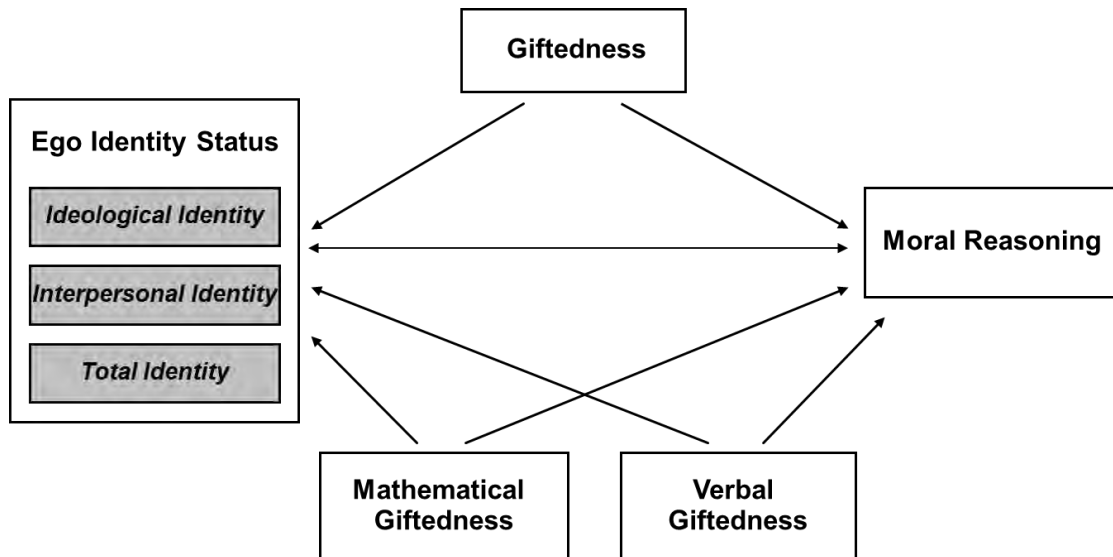
A limited number of studies that incorporated mathematical ability in the analysis of ego identity status have demonstrated small or nonsignificant relationships between the two variables (e.g., Berzonsky & Kuk, 2005; Grotevant & Adams, 1984). It has been speculated that cognitive mechanisms that govern mathematical thinking such as abstract reasoning and logical thinking may play a significant role in identity exploration and commitment (Boyes & Chandler, 1992). Logical reasoning may provide individuals with mental tools to analyze and critically evaluate information about identity options, make inferences from available alternatives, and arrive at identity options which are responsive to potentials and life goals (Grotevant, 1987). Given the theoretical speculation, mathematical giftedness has the potential to influence ego identity development.

Existing research has shown small and positive correlations between verbal ability and ego identity status (Grotevant & Adams, 1984). Personality research has indicated that verbal ability promotes personal growth by stimulating independent, unconventional, assertive, and inquisitive characteristics (Chamorro-Premuzic & Furnham, 2004; Heiss,

1995; Mills, 1993). In addition, verbal ability as crystallized intelligence was significantly associated with openness to experience which is one of the predictors of advanced identity development (Tesch & Cameron, 1987). Based on existing literature, verbal giftedness is integrated into the theoretical framework of the present study.

Ego identity status has been analyzed in relation to moral reasoning. Even though findings with respect to the relationships between ego identity status and moral reasoning were inconclusive, the majority of studies have shown positive associations between the two constructs. Specifically, identity achieved and moratorium individuals were likely to reason at the postconventional level whereas foreclosed and diffused adolescents tended to prefer pre-conventional or conventional moral reasoning (Hult, 1979; Keegan, 1986; Podd, 1972; Rowe & Marcia, 1980). Identity achieved and moratorium individuals who explore alternative ways of thinking and seek independence from conventional beliefs, are more likely use postconventional schemas in response to moral dilemmas than foreclosed or diffused adolescents. Therefore, it can be drawn from previous studies that ego identity status and moral reasoning are positively correlated. By linking moral reasoning and ego identity status in this theoretical framework, it is possible to investigate relationships between two central aspects of adolescent psychosocial development.

Figure 5: The Moral Reasoning and Ego Identity Status Theoretical Framework



2.8 Research Questions

Based on the *Moral reasoning and Ego Identity Status Theoretical Framework*, the following research questions are posted in the study.

1. Do academically gifted adolescents have higher levels of moral reasoning than age peers who were not identified as being gifted?
2. Do gifted adolescents who have a higher level of mathematical ability have higher levels of moral reasoning than gifted adolescents who have a lower level of mathematical ability?
3. Do gifted adolescents who have a higher level of verbal ability have higher levels of moral reasoning than gifted adolescents who have a lower level of verbal ability?
4. Are academically gifted adolescents more advanced in ego identity status than age peers who were not identified as being gifted?
5. Are gifted adolescents who have a higher level of mathematical ability more advanced in ego identity status than gifted adolescents who have a lower level of mathematical ability?
6. Are gifted adolescents who have a higher level of verbal ability more advanced in ego identity status than gifted adolescents who have a lower level of verbal ability?
7. Does a positive correlation between moral reasoning and ego identity status exist?

2.9 Hypotheses

Following the proposed theoretical framework, the following hypotheses were derived.

Hypothesis 1: Gifted adolescents will have higher levels of moral reasoning than age peers who were not identified as gifted.

Hypothesis 2: Gifted adolescents who have a higher level of mathematical ability will have higher levels of moral reasoning than gifted adolescents who have a lower level of mathematical ability.

Hypothesis 3: Gifted adolescents who have a higher level of verbal ability will have higher levels of moral reasoning than gifted adolescents who have a lower level of verbal ability.

Hypothesis 4: Gifted adolescents will be more advanced in ego identity status than age peers who were not identified as gifted.

Hypothesis 5: Gifted adolescents who have a higher level of mathematical ability will be more advanced in ego identity status than gifted adolescents who have a lower level of mathematical ability.

Hypothesis 6: Gifted adolescents who have a higher level of verbal ability will be more advanced in ego identity status than gifted adolescents who have a lower level of verbal ability.

Hypothesis 7: A positive correlation between moral reasoning and ego identity status will exist.

Chapter Three

Methodology

3.1 Introduction

This chapter describes the design of the study. The instruments, sample, research procedures, and statistical analysis methods are explained in detail.

3.2 Research Design

The study employed a non-experimental, comparative design. Quantitative data were used to investigate the presence and/or absence of group differences on moral reasoning and identity status between academically gifted participants and participants who were not identified as academically gifted. Differences between academically gifted participants who differed in levels of mathematical giftedness and levels of verbal giftedness were also addressed. In addition, the study endeavored to explore possible relationships between moral reasoning and identity statuses in the ideological and interpersonal domains. Relationships between moral reasoning and identity statuses in the total identity, which represents an overall identity development, were also investigated.

3.3 Research Instruments

In order to measure the moral reasoning and identity status of participants, two separate instruments were required. An adaptation of the Defining Issues Test (Rest, 1986) was employed to measure moral reasoning and the Extended Objective Measure of Ego Identity Status-2 (Adams, Bennion & Huh, 1989) was selected to assess the status of identity development. This section describes the two instruments.

3.3.1 The Defining Issues Test.

3.3.1.1 A description of the Defining Issues Test.

The Defining Issues Test (DIT) was first developed by Dr. James Rest in 1972. The primary objective of the DIT is to gain an insight into the moral schemata on which individuals' decisions and reasoning are based when approaching morally conflicting situations (Narvaez & Bock, 2002). The DIT is derived from Kohlberg's theory of moral judgment and the depiction of the schemata used in the DIT is fundamentally based on that of Kohlberg's six stages of moral judgment (Rest, 1979, 1983, 1986; Rest et al., 2000; Thoma, 2002).

Although the DIT maintains its conceptual alignment with Kohlberg's cognitive-developmental theory of moral judgment, the DIT and Kohlberg's theory are different in some significant ways (see Rest et al., 1999c, for fuller discussion; Thoma, 2002). Kohlberg focused on interviews as a means to obtain information regarding individuals' personal construction of moral reasoning and frames of reference in resolving moral

dilemmas (Colby & Kohlberg, 1987a; Kohlberg, 1976). However, even though Kohlberg's interview method provided "a clear window into the moral mind" (Rest et al., 1999a, p. 295), there were apparent complications and limitations especially in administering and scoring procedures (Elm & Weber, 1994; Rest et al., 1999c). Acknowledging difficulties associated with the interview process, Rest developed the DIT in order to create an alternative measure of moral judgment that was easier to administer and could be scored objectively (Rest, 1983). Unlike interviews, the use of an objective method allows the DIT to assess moral reasoning without being overly reliant on subjects' oral language skills. It also provides continuous scores representing a developmental continuum rather than merely categorizing subjects into one of the stages of moral reasoning (Rest, 1986).

Unlike Kohlberg who used the term "stage" to identify levels of moral judgment, Rest preferred the term "schema" (Rest et al., 1999a, 1999c). Moral schemata play a crucial role in the moral judgment process by guiding and structuring individuals' moral thinking (Narvaez, 1998, 2001; Narvaez & Bock, 2002; Rest et al., 1999a, 2000). As individuals read the moral dilemmas and issue statements presented in the DIT, their preferred moral schemata, which are installed in long-term memory, are invoked (Narvaez & Bock, 2002; Rest et al., 1999a, 1999c, 2000). With the assumption that individuals who are in different stages of moral judgment are likely to prioritize moral considerations differently, they tend to choose different statements in the DIT as representing the most important issue in considering moral choices (Rest, 1983). In this light, a statement that appears to be sensible and stimulates preferred moral schema is expected to be given both a high rating and ranking. In contrast, a statement that seems irrational, too simplistic, or unpersuasive is anticipated to be given a low ranking and rating because it does not activate a preferred moral schema (Rest et al., 1999c). The ratings and rankings which

subjects give items allow for their preferred schema to be observed and the magnitude of the preferred schema in making moral judgment to be obtained (Rest et al., 1999a).

3.3.1.2 Relevance for the use of the DIT in this study.

The DIT has been the most widely accepted measure of moral reasoning. This is due to its well-established reliability and validity, ease of administration, and suitability for use with a wide range of subjects from different ages, professions, and educational backgrounds (Elm & Weber, 1994). In order to assess moral reasoning effectively, it is necessary to ensure that an appropriate instrument is chosen to measure the moral reasoning of a target age group. The DIT has been recommended for use with subjects with a minimum reading age of 12 years old so as to minimize the effect of reading ability (Rest, 1986).

Apart from age appropriateness, it has been emphasized that instruments used to assess gifted adolescents must have an adequate ceiling especially those which were normed on the general population (Heller, 2004; Olszewski-Kubilius & Subotnik, 1991). Even though the DIT has not been specifically standardized to the gifted population, it has been widely used in studies whose subjects were of different ages and levels of education. Among the indices provided by the DIT, the postconventional index is the most thoroughly validated index of moral reasoning and has been recommended for comparing levels of moral reasoning exhibited by subjects across studies (Rest, 1986; Rest, Thoma, Narvaez & Bebeau, 1997b). The manual provides normative data for the postconventional index from over 12,000 subjects ranging from junior high school, high school, college, graduate

school, and adult populations (Rest, 1986). Given that the DIT has been normed on subjects from different ages and levels of education, it provides a high ceiling that can be used as a normative reference point to compare gifted adolescents' levels of moral reasoning. The effectiveness and suitability of the DIT is evident from its extensive use as a measure of moral judgment among the gifted population (e.g., Derryberry et al., 2005; Gross, 2004; Karnes & Brown, 1981; Narvaez, 1993; Sanders et al., 1995; Tan-Willman & Gutteridge, 1981). In terms of administration, the DIT offers a range of administering options, one of which is self-administration at home without the influence of time pressure. The aforementioned aspects qualify the DIT as a valid instrument for measuring moral judgment of participants in this study whose level of education ranged from year 9 to year 12.

3.3.1.3 Adaptation of the DIT in this study.

The DIT was originally developed and used with North American subjects. In order to avoid confusion among Australian subjects caused by unfamiliar terms, some terms were modified to suit the Australian context. O'Leary (2005), in her study of moral reasoning and the development of personal strengths in Australian academically gifted adolescents, made use of the DIT to measure the moral reasoning of a sample of students in years 9 to 11. Given that the adapted version of the DIT developed by O'Leary was successfully used to assess levels of moral reasoning of Australian subjects, the adaptation of the DIT in this study was based on the adaptation made by O'Leary (2005). These included:

- In the story “Heinz and the Drug”, the term “druggist” was changed to “chemist.”
- In the Student Takeover story, the acronym “ROTC” was changed to “Army Reserve.”
- In the Student Takeover story and the Newspaper story, the reference to the Vietnam War was changed to “war” to denote a broader concept. In addition, “men” was changed to “men and women” to reflect the modern situations where both genders serve in the armed forces.
- In the Webster story, the term “gas station” was changed to “petrol station” and the word “Orientals” was changed to “Asians.”

3.3.1.4 Scoring of the DIT.

The DIT is a multiple-choice, standardized paper-and-pencil assessment in which a subject is presented with unresolved hypothetical moral dilemmas. The full version of the DIT comprises six dilemmas. Each dilemma contains a series of 12 statements. Each of the statements reflects a moral consideration based on Stage 2 or Stage 3, Stage 4, Stage 5A, Stage 5B, and Stage 6 of Kohlberg’s moral judgment. The completion of the DIT is in two parts. First, subjects are asked to read a dilemma and rate each of the 12 statements on a five-point rating scale ranging from Great to No. Second, subjects select four statements from the pool of 12 statements and rank them based on the degree of importance to the decision presented in the story. Items are to be ranked from Most Important to Fourth Most Important (Rest, 1986). Ratings and rankings of items allow for the relative importance of each statement when making a decision about the dilemma to be observed.

Scoring of the DIT is derived from the ranked data. Once the subject has indicated the importance of each statement through ranking of the four statements, the response is checked against a scoring chart provided in the DIT Manual (Rest, 1986). After finding the item's stage, the weighted rank of each stage in a dilemma can be calculated. Items are ranked from one to four with Most Important being weighted as four; Fourth Most Important being weighted as one, and so on (Rest, 1986). This calculation provides raw stage scores that reflect the degree to which the subject prefers Stage 2, Stage 3, Stage 4, Stage 5A, Stage 5B, and Stage 6 responses. After each raw stage score is totaled across the six stories, it is divided by 0.6 in order to obtain a percentage score of each stage. It is the percentage scores that are used for the analysis of moral reasoning.

Even though the DIT offers a percentage score for each stage, the postconventional score is regarded as “the most used index” for moral reasoning (Rest, 1986, section 5, p. 2). The postconventional score is calculated from the sum of weighted ranks given to items corresponding to Stage 5 and Stage 6 items (Rest, 1986; Rest et al., 1999c). It reflects “the relative importance a subject gives to principled [postconventional] moral considerations in making a decision about a moral dilemma” (Rest, 1986, section 5, p. 2). Postconventional moral thinking corresponds to the Postconventional schema, where the justification of a moral decision is derived from whether or not the act serves sharable social ideals (e.g., the greatest good for all) rather than personal needs.

Postconventional thinking also respects genuine equality among individuals in a society and reflects the view that social conventions are alterable and open to scrutiny (Rest et al., 1999c). It is regarded as more developmentally advanced than the Personal Interests schema (equivalent to Kohlberg's Stage 2 and Stage 3), where an emphasis is put on personal welfare or that of significant others; and the Maintaining Norms schema

(equivalent to Kohlberg's Stage 4), where the need for laws and social conventions is emphasized (Rest et al., 1999c, 2000).

3.3.1.5 Reliability checks of subjects' responses.

Similar to other objective measures, the DIT has procedures to check the reliability of the subject's responses. In order to identify subjects who choose items based on syntactic complexity rather than on meaning or content, one of the twelve statements presented in each dilemma in the DIT is an M item. The M, or "Meaningless," items are written with sophisticated language but do not convey any meaningful message. Therefore, choosing an M item does not reflect any stage of moral thinking construct: rather, it represents an endorsement on the grounds of language complexity. If a subject's M percentage score is high, it can be assumed that the subject pretends to understand the test or does not take the test seriously. Consequently, protocols with an excessive M score are to be discarded (Rest, 1983, 1986; Rest et al., 1999b).

In addition, the DIT also provides a consistency check as an indicator of the usability of a subject's protocol (Rest, 1983, 1986). The consistency check aims to detect subjects who select items in a random manner. In so doing, consistency of both ratings and rankings is taken into consideration. If an excessive inconsistency between a subject's ratings and rankings of items is evident, the protocol is to be eliminated from further analysis. This is because the results from the test do not truly reflect the subjects' moral thinking (Rest, 1986; Rest et al., 1999b). The reliability check procedure will be discussed in detail in section 3.6.2.

3.3.1.6 Validity and reliability of the DIT.

The DIT has been extensively validated by several empirical findings using a number of criteria (Rest, 1986). Rest et al. (1999c) outlined seven criteria that were used as a basis for establishing construct validity and reliability of the DIT as a measure of moral reasoning.

3.3.1.6.1 Criterion group validity.

Criterion group validation confirms that groups of subjects that are expected to show different scores on the DIT test actually do elicit different scores (Rest et al., 1974, 1997a). People who are of greater expertise in moral reasoning (e.g., moral philosophers, political scientists) are assumed to have higher postconventional scores than those who are younger and of lesser expertise (e.g., junior high school students). From a large-scale study comprising a sample from various educational backgrounds, it was found that level of education was the most powerful correlate of the DIT, accounting for 30% to 50% of the variance (Rest, 1979). Comparing the performance on the DIT between doctoral students in philosophy and in political science to that of high school students, the difference in the postconventional scores between the two groups was statistically significant (Rest, 1986). The significant correlations between moral reasoning and level of education have also been validated by other studies (e.g., Martin, Shafto & Vandemine, 1977; Narvaez, 1998; Rest et al., 1974; Rest et al. 1999c; Rest, Thoma, Narvaez & Bebeau, 1997b; Rest, Thoma & Edwards, 1997a).

3.3.1.6.2 Longitudinal validity.

Moral reasoning is a theory that assumes a developmental progress: that is, individuals evolve from a less developed stage to more developed stages (Rest, 1977). As a measure of moral reasoning, the DIT has been validated through longitudinal studies to test upward movement of moral reasoning over time (Rest, 1986). From over 35 years of research, several longitudinal studies have confirmed that the DIT reflects a pattern of progressive developmental changes in moral judgment ability. A review of studies comprising over 700 university freshmen to seniors showed significant upward trends with a large effect size of .80. The improvement in moral reasoning was regarded as one of the most pronounced longitudinal growths comparing to other variables investigated among college students (Rest et al., 1997a, 1997b, 1999c).

3.3.1.6.3 Validation through moral education interventions.

The DIT has been employed as an instrument to determine the effectiveness of interventions aiming to enhance moral judgment (Lawrence, 1977; Rest et al., 1999c). A review of four datasets from studies that used the DIT as a pre- and post-test instrument to assess the effectiveness of moral intervention programs reported a statistically significant effect in the change of the postconventional score with a medium effect size of .54 (Rest et al., 1997a). The post-test postconventional scores of the subjects increased significantly as a result of moral education interventions. This signifies the sensitivity of the DIT's postconventional index in measuring the development of moral reasoning (Rest et al., 1997a).

3.3.1.6.4 *Validation through developmental hierarchy.*

This criterion addresses that moral judgment is a developmentally hierarchical construct in which a higher score on the DIT is considered more advanced than a lower score. In other words, it seeks to verify that postconventional thinking is more advanced than preconventional and conventional thinking. Rest et al. (1999c) outlined three criteria that support this proposition. First, the postconventional index is associated with superior moral comprehension. Moderate correlations have been found between the postconventional score and measures of moral comprehension ($r = .67, p < .001$) among high school, college, and graduate students (Rest et al., 1974). Subjects with higher postconventional scores manifested their comprehension of moral concepts at a more sophisticated level than those with lower postconventional scores.

Second, the DIT has been found to correlate with other measures that assess developmental constructs. One of the developmental measures that correlated with the DIT was academic achievement tests. The correlations were reported to be small to moderate, ranging from $r = .20$ to $.50$ (Rest, 1979). Third, empirical evidence that a higher DIT score is more developmentally advanced than a lower DIT score was supported by studies where cognitive capacity influenced the performance on the postconventional index. A study by Narvaez (1998) demonstrated a positive relationship between postconventional scores and reconstruction of moral arguments using moral texts. Subjects with higher postconventional scores reconstructed more advanced moral arguments than did those with lower postconventional scores. This finding was valid even when reading comprehension, age, and levels of education were accounted for.

3.3.1.6.5 Validation through links to behaviors.

Studies have shown that links exist between DIT scores and prosocial behaviors: one of which is a longitudinal study conducted by Rest (1986). The postconventional index correlated with measures of prosocial behaviors including perception of social contribution of one's work, involvement in activities that benefit one's community, and concern for community welfare. A review of literature reported that 32 out of 47 analyses found statistically significant association between the postconventional scores and several types of behaviors, such as cheating, delinquency, cooperative behaviors in the prisoner's dilemma game, and objection to the Vietnam War derived from analytical, thoughtful consideration (Thoma, Rest & Barnett, 1986, cited in Rest et al., 1999c). The correlations were found to be significant with a wide range of testing conditions, including "naturalistic and experimental measures of behavior; with prosocial and antisocial measures; and with measures based on self-report, ratings by others, and laboratory measures of behavior" (Rest et al., 1999c, p. 81).

3.3.1.6.6 Validation through links to political attitudes and political choices.

The sixth criterion involves the association between the DIT scores and political attitudes, political choices, and the manner in which individuals participated in the society at large. A review of several studies has shown that the DIT score and political attitudes were moderately correlated within the range of $r = .40$ to $.60$. When the postconventional scores and political attitudes were combined with measures of cultural ideology, there was a significant increase of variance. Results from multiple regressions revealed that the variance increased up to two-thirds on opinions about controversial public issues such as abortion, free speech, and women's roles (Rest et al., 2000).

3.3.1.6.7 Psychometric reliability.

From 25 years of DIT research with subjects drawn from various age groups and from different educational backgrounds, Cronbach's alpha index of the internal consistency for the postconventional score was reported to be in the upper .70s. Table 1 presents Cronbach's alphas from two samples: one from the 1995 composite sample and the other from the 1979 composite sample (Rest et al., 1997b). Across several studies, the test-retest reliability of the postconventional index was in the .70 to .80 range (Davidson, 1979, cited in Rest et al., 1999c). These reliability estimates indicate that the DIT has adequate internal consistency (Hair, Black, Babin & Anderson, 2010).

Table 1: Reliability of the DIT's Postconventional Index

Sample	Cronbach's alpha
1995 composite sample ($N = 932$)	.78
1979 composite sample ($N = 994$)	.76

Note. Adapted from "Alchemy and Beyond: Indexing the Defining Issues Test," by J.R. Rest, S.J. Thoma, D. Narvaez, and M.J. Bebeau, 1997, *Journal of Educational Psychology*, 89, p. 503. Copyright 1997 by the American Psychological Association.

The DIT is a suitable instrument for assessing the participants' levels of moral judgment in this study. It is within the appropriate reading level for the target age group of this study and has been used with academically gifted samples in previous studies. With over 400 published books and articles, the DIT is the most widely used and thoroughly validated measure of moral judgment with good psychometric properties. In addition, it has been found to have acceptable internal consistency. Several construct validity

criteria have confirmed that the DIT is a valid measure of moral judgment based on Kohlberg's stages of moral reasoning (Narvaez, 1993; Narvaez & Bock, 2002).

3.3.2 The Extended Objective Measure of Ego Identity Status-2.

3.3.2.1 A description of the Extended Objective Measure of Ego Identity Status-2.

The Extended Objective Measure of Ego Identity Status-2 (EOM-EIS-2) is a standardized objective paper-and-pencil instrument in the form of a self-report questionnaire. It is based on Marcia's ego identity status paradigm, which discusses identity development based on two identity processes: that is, exploration and commitment (Adams, 1998). The EOM-EIS-2 is designed to determine the degree to which a subject perceives himself as being identity diffused (lack exploration and commitment), foreclosed (commitment based on minimal or no exploration), in moratorium (exploration in progress but not yet committed), or achieved (commitment to a choice based on exploration of alternatives). It also classifies a subject into one of the identity status categories (Craig-Bray & Adams, 1986; Schwartz, 2004). The EOM-EIS-2 provides scores in two identity domains, which are ideological and interpersonal. It also offers a total identity score, which is a composite of scores obtained from the ideological and interpersonal identity domains (Adams, 1998). It is regarded as an index of overall identity status.

The EOM-EIS-2 was developed from the prototype instrument known as the Objective Measure of Ego Identity Status (OM-EIS, Adams, Shea & Fitch, 1979), which contained 24 items and covered three ideological identity areas: occupation, religion, and politics. However, the OM-EIS did not capture Erikson's theory of identity development

adequately due to a limited range of identity issues covered in the instrument. The prototype was then improved in two significant ways: first, philosophical lifestyle was added as the fourth identity area in the ideological domain, adding to occupation, religion, and politics; second, items assessing four areas of interpersonal domain (i.e., friendship, sex roles, dating, and recreation) were added to the instrument (Bennion & Adams, 1986; Grotevant & Adams, 1984; Grotevant, Thorbecke & Meyer, 1982). The improved version contained 64 items in total and was named the Extended Measure of Ego Identity Status-1 (EOM-EIS-1). After being validated with samples of university undergraduate, the EOM-EIS-1 prototype was found to contain ambiguous items especially those in the interpersonal subscales (Grotevant & Adams, 1984). In order to prevent misinterpretations, the ambiguous statements in the EOM-EIS-1 were rewritten and retested to establish the validity of the measure as well as to improve its psychometric properties (Adams et al., 1989; Bennion & Adams, 1986). After extensive validation, the EOM-EIS-1 was renamed EOM-EIS-2 and considered a comprehensive measure of identity formation. It provides a clear identification of two differentiated domains of identity, namely the ideological and the interpersonal, in eight different identity areas (Grotevant & Adams, 1984; Jones & Streitmatter, 1987).

The interview method was originally used to measure identity status and was recognized as providing a wealth of information on identity development (Craig-Bray & Adams, 1986). Nonetheless, the administration of interviews is generally time consuming and scoring of interview transcripts is often complicated (Adams, 1998; Adams et al., 1979). Not only do these limitations pose a threat to reliability but also limit to studies with a larger number of subjects (Bennion & Adams, 1986; Schwartz, 2004). With the assumption that identity formation is a relatively conscious process, the use of a self-

report questionnaire is suggested as an alternative method to an interview to measure the development of identity (Schwartz, 2002). Objective measures are accommodating for large-scale studies and suitable for a variety of administering procedures, such as face-to-face or postal questionnaire method, group or individual administration (Adams, 1998; Grotevant & Adams, 1984; Schwartz, 2002, 2004). In addition, given that self-report scales present subjects with the same set of items, an estimate of the reliability and validity of the instrument can be established either within a sample or between samples across studies. Not only do well-validated estimates increase the reliability and validity of findings but also enable findings from different studies to be compared and contrasted (Adams, 1998; Grotevant & Adams, 1984).

3.3.2.2 Relevance for use in this study.

Adolescent identity formation based on Erikson's and Marcia's framework has long been a topic of interest among developmental psychologists and educators (Schwartz et al., 2006). Various objective measures have been developed in order to assess identity formation based on Marcia's identity status framework (see Schwartz, 2001, for discussion). Among the available measures, the EOM-EIS-2 is the most commonly used paper-and-pencil, self-report measure in identity status research (Grotevant & Adams, 1984; Jones & Streitmatter, 1987; Schwartz et al., 2006). It has been reported to have an acceptable convergent validity with an adapted version of Marcia's interview (Craig-Bray & Adams, 1986). In addition, the EOM-EIS-2 has been extensively validated not only with university students but also with high school students (see Adams, 1998, for discussion; Bennion & Adams, 1986). It represents a substantial improvement on

psychometric properties from the previous versions and has been shown to have good reliability and validity in comparison to other measures of the identity status (Grotevant & Adams, 1984; Jones & Streitmatter, 1987; Klaczynski et al., 1998).

The merits of the EOM-EIS-2 in research are two-fold. First, it provides categorical scores, which allow for classifying subjects into one of the four identity statuses (i.e., identity achievement, moratorium, foreclosure, and diffusion) in the ideological and interpersonal domains. It also provides categorical scores for the total identity domain, which represents an overall identity category. Second, it yields continuous scores in each identity domain, which reveal the magnitude of each identity status (i.e., identity achievement, moratorium, foreclosure, and diffusion) manifested in an individual (Adams, 1994). Categorical data are most applicable to assigning subjects into one of the identity statuses. Continuous data, on the other hand, are more useful in correlational analyses of the identity construct with variables from other constructs and are suitable when predictors of the identity statuses are to be determined (Grotevant & Adams, 1984; Schwartz & Dunham, 2000; Schwartz, 2004). In this light, the EOM-EIS-2 is an appropriate instrument for this study because it allows for a comparative analysis of results between groups as well as for a correlational analysis with the moral reasoning construct.

3.3.2.3 Scoring of the Extended Objective Measure of Ego Identity Status-2.

Test items of EOM-EIS-2 are designed to measure the presence or absence of exploration and commitment in the ideological and interpersonal domains of identity

development. The full version of the EOM-EIS-2 contains 64 items. The ideological subscale contains 32 items and covers four identity areas, which are occupation, religion, politics, and philosophical lifestyle. The interpersonal subscale comprises 32 items and measures four identity areas, which are friendship, dating, sex roles, and recreation (Adams, 1998). Two items were written to reflect each of the four identity statuses (i.e., identity achievement, moratorium, foreclosure, and diffusion) in each of the eight identity areas. By reading the 64 items, subjects are asked to rate their degree of agreement or disagreement on the each item on a 6-point Likert scale ranging from 1 (Strongly Agree) to 6 (Strongly Disagree).

Scores are calculated by summing item responses after reverse scoring the items. Items rated as Strongly Agree are reversed from 1 to 6; items rated as Strongly Disagree are reversed from 6 to 1, and so forth. Scores are obtained by summing the reverse ratings across identity issues within each identity status. Following this procedure, continuous scores of the four identity statuses (i.e., achievement, moratorium, foreclosure, and diffusion) in the ideological domain and scores of the four identity statuses (i.e., achievement, moratorium, foreclosure, and diffusion) in the interpersonal domain are obtained (Adams, 1998). The EOM-EIS-2 also provides a total identity status score, which is derived from averaging scores across the ideological and interpersonal domains (Berzonsky & Adams, 1999).

The continuous scores can also be converted to identity categories by a standardization procedure. In doing so, each subject's identity status scores from the ideological domain and the interpersonal domain are converted to standard scores. The assignment of each subject on an identity status is based on the highest standard score. The status with the

highest standard score is the subject's classification (Schwartz, 2002, 2004). According to the instrument manual (Adams, 1998), subjects can be classified into each identity status by using appropriate cut-off points. The cut-off point for each subscale is obtained from the mean and standard deviation. Therefore, the cut-off point is unique to each subscale.

Even though it was originally recommended that the cut-off point for each identity status subscale be calculated from the subject mean plus one standard deviation (Adams, 1994), Jones, Akers, and White (1994) found that such procedure produced low percentage of subjects who were classified as pure classification types. After conducting a series of studies, Jones et al. (1994) suggested that a cut-off point of the mean plus one half of a standard deviation was an appropriate alternative. This procedure, albeit less stringent, was endorsed as an acceptable modification without tampering with the theoretical construct of the identity status as measured by the EOM-EIS-2 (Adams, 1994). Therefore, it was adopted for use in the current study.

After a cut-off score for each subscale was obtained, it is possible to categorize a subject into one of the four identity statuses in the ideological and interpersonal domains. Adams (1998, p. 25) outlined three classification rules. These are:

1. *Pure Identity Status Rule* states that subjects scoring above the cut-off point on a single scale, while simultaneously scoring below the cut-off points on the remaining three scales, are categorized as being in that particular identity scale. These subjects are classified as being in the pure identity status type. The four possible categories are pure diffusion, pure foreclosure, pure moratorium, and pure achievement.

2. *Low-Profile Status Rule* states that subjects scoring below the cut-off point on all four scales are considered “low profile moratorium.” This pattern of rating indicates that subjects are undifferentiated in their rating and therefore cannot be placed in a particular status. This rule is to discriminate individuals who are in the pure moratorium status (refer to the pure identity status classification rule above) from those who display an indistinguishable form of moratorium.
3. *Transition Status Rule* states that subjects scoring above the cut-off point in more than one scale are classified as having “transition” status. Subjects in this category are recommended to be placed into the less sophisticated status. Theoretically, identity achievement is the most developmentally advanced status, followed by moratorium, foreclosure, and diffusion (Adams et al., 1979). Following this rule, a subject who is in the “diffusion-foreclosure transition” is to be categorized in the diffusion status.

3.3.2.4 Validity and reliability of the Extended Objective Measure of Ego Identity Status-2.

Since its inception in 1979, the Objective Measure of Ego-Identity Status has been developed and validated extensively. A series of studies have been conducted with samples of university undergraduate, high school, and junior high school students in order to assess its psychometric properties. This section discusses construct validity of the EOM-EIS-2.

3.3.2.4.1 Convergent validity.

Following a revision of the first version of the Extended Objective Measure of Ego-Identity Status (i.e., EOM-EIS-1), Bennion and Adams (1986) conducted a study dedicated specifically to establish the psychometric property of the EOM-EIS-2. Of a particular emphasis was to examine the construct validity of the instrument. Construct validity assesses the extent to which a set of items included in a measure reflects the theoretical construct it intends to measure. This can be achieved by considering the convergent validity and the discriminant validity of a particular measure (Hair et al., 2010).

Convergent validity is defined as the degree to which constructs that are expected to be theoretically related are in fact related empirically. In this light, subscales of a specific construct should share a large common variance (Hair et al., 2010). There are a number of methods to examine convergent validity estimates of the items in a measure. Among the available methods are reliability and factor analysis. These methods will be reported as two indicators of the convergent validity of the EOM-EIS-2 in this section.

Reliability is generally employed to assess the consistency and reproducibility of an instrument over time and across different studies (Cohen, Manion & Morrison, 2002; Field, 2009). One of the most widely used checks of instrument reliability is internal consistency. It measures the consistency among variables within a test and is generally reported using Cronbach's alpha (Hair et al., 2010). Cronbach's alphas of the EOM-EIS-2 reported by Bennion and Adams (1986) ranged from $r = .58$ to $r = .80$ for the eight EOM-EIS-2 subscales in a White American university student sample ($N = 106$). The alphas in the ideological subscales ranged from $r = .62$ to $r = .75$ and the alphas in the interpersonal subscales ranged from $r = .58$ to $r = .80$ (see Table 2).

The split half reliability for a White undergraduate sample ($N = 274$) ranged from $r = .10$ to $r = .68$ for the ideological and interpersonal subscales and $r = .37$ to $r = .64$ for the total identity subscale (Grotevant & Adams, 1984). The four-week test-retest reliability ranged from $r = .59$ to $r = .82$ for the ideological and interpersonal subscales, and $r = .63$ to $r = .83$ for the total identity subscale (Grotevant & Adams, 1984). This indicated adequate stability and internal consistency of all subscales on both the ideological and interpersonal identity measures (Hair et al., 2010).

Table 2: Cronbach's Alphas of the EOM-EIS-2 (N = 106)

Subscale	Cronbach's alpha
Ideological	
Achievement	.62
Moratorium	.75
Foreclosure	.75
Diffusion	.62
Interpersonal	
Achievement	.60
Moratorium	.58
Foreclosure	.80
Diffusion	.64

Note. Adapted from "A revision of the extended version of Objective Measure of Ego Identity Status: An identity instrument for use with late adolescents," by L.D Bennion and G.R. Adams, 1986, *Journal of Adolescent Research*, 1, p. 186. Copyright 1986 by SAGE Publications.

Even though the EOM-EIS-2 was predominantly developed and validated from samples of university undergraduate students, the measure was employed by a number of studies that investigated the identity development of high school students (e.g., Boyes & Chandler, 1992; Jones & Streitmatter, 1987; Klaczynski et al., 1998). O'Connor (1995) reported reliability coefficients of a sample of 8th to 13th grade students and university freshmen ($N = 418$) to be moderate to high. Alpha coefficients ranged across subscales from $r = .65$ to $r = .83$. Cronbach's alpha was $r = .70$ (male) and $r = .74$ (female) in the achievement subscale; $r = .68$ (male) and $r = .67$ (female) in the moratorium subscale; $r = .83$ (male) and $r = .81$ (female) in the foreclosure subscale; and $r = .67$ (male) and $r = .65$ (female) in the diffusion subscale. Jones and Streitmatter (1987) reported alphas of 7th to 12th grade samples ($N = 467$) to be comparable to those validated on undergraduate student samples. Alpha coefficients for the ideology subscales ranged from $r = .53$ to $r = .66$. Alpha coefficients for the interpersonal subscales ranged from $r = .52$ to $r = .66$. Finally, alpha coefficients for the total identity subscales ranged from $r = .68$ to $r = .80$.

Studies examining the identity status of academically gifted high school students using the EOM-EIS-2 have also indicated similar reliability coefficients to those of the normative samples. Internal consistency within a tenth grade academically gifted sample ($N = 50$) reported by Carn-Watkins (1991) ranged from $r = .50$ to $r = .67$ in the ideological subscales and $r = .58$ to $r = .80$ in the interpersonal subscales. Results from these studies not only show congruity with the theoretical construct of the identity status development but also confirm the appropriateness of the instrument for early and middle adolescent samples including the gifted.

In the present study, reliability coefficients of the EOM-EIS-2 were computed. As shown in Table 3, Cronbach's alphas in the ideological subscales ranged from $r = .63$ to $r = .76$. Cronbach's alphas in the interpersonal subscales ranged from $r = .55$ to $r = .80$. Finally, Cronbach's alphas for the total subscales ranged from $r = .67$ to $r = .86$. Alpha coefficients in all subscales were statistically significant ($ps < .001$). The Cronbach's alphas from this study indicated moderate to strong internal consistency between items (Hair et al., 2010) and were comparable to those of the previous studies (e.g., Bennion & Adams, 1986).

Table 3: Cronbach's Alphas of the EOM-EIS-2 from the Present Study (N = 434)

Subscale	Cronbach's alpha
Ideological	
Achievement	.64
Moratorium	.69
Foreclosure	.76
Diffusion	.63
Interpersonal	
Achievement	.64
Moratorium	.64
Foreclosure	.80
Diffusion	.55
Total	
Achievement	.72
Moratorium	.77
Foreclosure	.86
Diffusion	.67

Factor analysis is another method used to indicate the convergent validity of the EOM-EIS-2. Factor analysis is a correlational technique used to “define the underlying structure among the variables in the analysis” (Hair et al., 2010, p. 94). Through factor analysis it is possible to analyze relationships between a large numbers of variables and to cluster variables that have high correlations into distinct sets of variables known as factors. Factors are extracted from a set of measured items by considering the amount of variance due to each factor. Variables are grouped into factors in such a way as to minimize the overall variance. A minimum variance grouping can be determined from a solution to an eigenvalue problem. These groupings are not unique and different eigenvalue solutions can yield different results. Consequently, it is important to perform these groupings with care. The eigenvalues indicate the importance of each component or factor. Factors that have eigenvalues greater than 1 are deemed significant. These factors are retained in the study because they explain a large amount of the variability in a dataset. In contrast, factors that have eigenvalues less than 1 are considered nonsignificant and are to be discarded because they do not explain a significant portion of the variability in a dataset (Field, 2009; Hair et al., 2010).

After a set of factors have been extracted, a single variable can be assigned to a single factor. To do this, the factor loadings of each variable in each factor should be considered. Factor loading allows for the magnitude of relationships of variables contributing to the factor to be measured. A high loading indicates a strong correlation between the variable and the factor, suggesting that the variable is a strong representative of the factor. A low loading, on the other hand, shows a small correlation between the variable and the factor, indicating that the variable is a weak representative of the factor. Factor loadings of ± 0.30 to ± 0.40 are considered minimum thresholds for

interpreting the construct. Apart from identifying significant loadings and determining a factor loading of each variable, communality (h^2) is to be taken into consideration so as to determine the adequacy of explanation of each variable. Communality measures the proportion of the variance that each variable has in common with all other variables in a particular factor. Any variables with communality less than .50 are considered nonsignificant because they have insufficient dependence on each other (Hair et al., 2010).

In order to investigate the convergent validity of the EOM-EIS-2, Berzonsky (1988, cited in Berzonsky & Adams, 1999) conducted a factor analysis of identity statuses using four measures: (1) the EOM-EIS-2, (2) Melgosa's objective measure of occupational status, (3) Berzonsky's measure of strength of identity commitments, and (4) Berzonsky's Identity Style Inventory. Theoretically, four distinct factors, with one factor representing each identity status (i.e., identity achievement, moratorium, foreclosure, and diffusion), should be obtained (Adams, 1998).

Consistent with the theoretical assumption, findings from the factor analysis revealed four distinct factors (see Table 4). *Factor 1*, Identity Achievement, was observed from positive loadings on Berzonky's informational identity style and strong commitments. It also showed negative loadings on the diffused/avoidant identity style and on the ideological diffusion variable. *Factor 2*, Moratorium, had positive loadings on the informational identity style and all three moratorium variables. A negative loading on the commitment index was also observed. *Factor 3*, Foreclosure, was marked by positive loadings on all three foreclosure variables and on normative identity style. *Factor 4*, Identity Diffusion, was defined by positive loadings on the diffused/ avoidant identity style and all three

diffusion variables. In addition, negative loadings on the informational style, commitment index, and occupational identity achievement were obtained.

Variables in each of the four factors had factor loadings greater than .30 and eigenvalues greater than 1, indicating that they explained a significant amount of variance in the construct. The communality (h^2) has been shown to range from .36 to .83, which is considered an acceptable level of explanation of each variable to the construct (Hair et al., 2010). Results from this study signified an existence of convergence among variables that are theoretically related. Therefore, validity of the EOM-EIS-2 scales was empirically supported.

Table 4: Rotated Factor Loadings for the EOM-EIS-2 (Berzonsky & Adams, 1999)

Variables	Factors				h^2
	1 ACH	2 MOR	3 FOR	4 DIFF	
INFO style	.68	.32		-.41	.72
NORM style			.69		.63
DIFF style	-.73			.51	.79
Commitment	.61	-.45		-.45	.83
ACH ideology	.81				.81
ACH interpersonal			.52		.36
ACH occupation	.34			-.57	.56
MOR ideology	-.40	.75			.76
MOR interpersonal		.79			.66
MOR occupation		.56		.56	.65
DIFF ideology	-.79				.75
DIFF interpersonal		.61		.33	.52
DIFF occupation				.78	.48
FOR ideology			.85		.83
FOR interpersonal			.77		.66
FOR occupation			.55		.62
Sum of squares (Eigenvalues)	5.25	2.51	1.70	1.17	
Percentage of variance accounted for by factor	32.8%	15.7%	10.6%	7.3%	

Note. INFO = informational style; NORM = normative style; DIFF = diffuse/avoidant style; ACH = Achievement status; MOR = Moratorium status; DIFF = Diffusion status; FOR = Foreclosure status. h^2 = final communality estimates. Loadings < .30 were not considered to be significant. Adapted from "Reevaluating the Identity Status Paradigm: Still Useful after 35 Years, by M.D. Berzonsky and G.R. Adams, 1999, *Developmental Review*, 19, p. 564. Copyright 1999 Elsevier.

3.3.2.4.2 *Discriminant validity.*

Discriminant validity is used to verify the independence between theoretically unrelated constructs. In other words, it seeks to validate a nonsignificant or negative correlation between constructs that are not theoretically related (Hair et al., 2010). For the EOM-EIS-2, it was anticipated that identity achievement status is negatively correlated with diffusion, foreclosure, and moratorium statuses. A small correlation between diffusion and moratorium and between diffusion and foreclosure was also expected (Bennion & Adams, 1986).

Bennion and Adams (1986) produced a correlation matrix to establish the discriminant validity of the EOM-EIS-2 in the ideological and interpersonal subscales (see Table 5). As expected, identity achievement subscales were either uncorrelated or negatively correlated with the diffusion, foreclosure, and moratorium subscales. This was true for both the ideological and interpersonal identity subscales. In addition, identity diffusion was reported to be positively correlated with moratorium. Diffusion in the ideological identity subscale was correlated with moratorium in the ideological identity subscale ($r = .71, p < .001$). An identical pattern of correlation was evident in the interpersonal subscales where diffusion had a small correlation with moratorium ($r = .32, p < .001$). Findings from the correlation matrix established by Bennion and Adams (1986) were consistent with the theoretical assumption and replicated results from previous studies (e.g., Grotevant & Adams, 1984).

Table 5: A Pearson Correlation Matrix of Identity Status Subscales in the EOM-EIS-2 (N = 106)

	Ideological				Interpersonal		
	MOR	DIFF	FOR	ACH	MOR	DIFF	FOR
Ideological							
Achievement	-.41***	-.34***	.04	.46***	-.11	-.20*	.11
Moratorium		.71	.06	-.30***	.50***	.29***	-.11
Diffusion			.22*	-.36***	.37***	.38***	.02
Foreclosure				-.08	.12	.14	.66***
Interpersonal							
Achievement					-.16*	-.39***	.06
Moratorium						.32***	-.04
Diffusion							-.07

Note. MOR = Moratorium; DIFF = Diffusion; FOR = Foreclosure; ACH = Achievement. Adapted from "A revision of the extended version of Objective Measure of Ego Identity Status: An identity instrument for use with late adolescents," by L.D Bennion and G.R. Adams, 1986, *Journal of Adolescent Research*, 1, p. 187. Copyright 1986 by SAGE Publications.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Apart from determining the discriminant validity, the matrix was also used to examine convergence among subscales of the EOM-EIS-2. Theoretically, it was anticipated that each identity status in the ideological subscale was moderately correlated with its parallel identity status in the interpersonal subscale (e.g., diffusion in the ideological subscale is expected to have a moderate correlation with diffusion in the interpersonal subscale). Such correlations were expected because the ideological and interpersonal domains share an identical set of identity statuses. However, the correlations should not be strong due to the domain differences (Adams, 1998).

In a study aiming to establish validity of the EOM-EIS-2, a consistent pattern of positive correlations among the ideological and interpersonal subscales was reported (Bennion & Adams, 1986). As illustrated in Table 5, there was a moderate correlation between ideological achievement and interpersonal achievement subscales ($r = .46, p < .001$) and between ideological diffusion and interpersonal diffusion subscales ($r = .38, p < .001$). Moderate correlations were also found between ideological moratorium and interpersonal moratorium subscales ($r = .50, p < .001$) and between ideological foreclosure and interpersonal foreclosure subscales ($r = .66, p < .001$). Results from the correlation matrix showed the convergence among subscales of the EOM-EIS-2 and verified the theoretical construct of the identity status.

A Pearson correlation matrix of identity status subscales was produced using data from the present study to determine convergent and discriminant validity. It should reproduce findings from Bennion and Adams's (1986) study. A Pearson correlation matrix of identity status subscales of this study is presented in Table 6. Following Bennion and Adams's (1986) study, it was predicted that identity achievement status was negatively correlated with diffusion, moratorium, and foreclosure statuses. Results from this study indicated that identity achievement in both ideological and interpersonal identity status subscales was either uncorrelated or negatively correlated to diffusion, foreclosure, and moratorium statuses. In the ideological subscales, identity achievement was negatively correlated with moratorium ($r = -.34, p < .001$), diffusion ($r = -.44, p < .001$), and foreclosure ($r = -.18, p < .001$). A similar pattern was evident among interpersonal subscales. The interpersonal achievement subscale was negatively correlated with the interpersonal diffusion subscale ($r = -.33, p < .001$) and the moratorium subscale ($r = -.10, p < .05$). The interpersonal achievement subscale was uncorrelated with the interpersonal

foreclosure subscale ($r = .09, p = .07$). Apart from the aforementioned discriminant validity criterion, theoretical assumption of the EOM-EIS-2 also presumed a positive correlation between diffusion and moratorium statuses and between diffusion and foreclosure statuses (Bennion & Adams, 1986). In the present study, there was a small correlation between the ideological diffusion and moratorium subscales ($r = .35, p < .001$) and between the interpersonal diffusion and moratorium subscales ($r = .15, p < .001$) (see Table 6).

In terms of convergent validity, a theoretical assumption posited a positive correlation between the same status subscales in the interpersonal and ideological domains (Bennion & Adams, 1986). As evident from Table 6, there was a small correlation between ideological achievement and interpersonal achievement subscales ($r = .34, p < .001$) and between ideological diffusion and interpersonal diffusion subscales ($r = .26, p < .001$). A moderate correlation was also apparent between ideological moratorium and interpersonal moratorium subscales ($r = .51, p < .001$) and between ideological foreclosure and interpersonal foreclosure subscales ($r = .64, p < .001$). These small to moderate correlations between the same status subscales in the interpersonal and ideological domains confirmed the convergent validity of the measure. Overall, results from the Pearson correlation matrix obtained from the present study were consistent with the theoretical construct of the identity status framework as measured by the EOM-EIS-2 and validated discriminant and convergence validity established by Bennion and Adams (1986) and Grotevant and Adams (1984).

Table 6: A Pearson Correlation Matrix of Identity Status Subscales in the EOM-EIS-2 from the Present Study (N = 434)

	Ideological				Interpersonal		
	MOR	DIFF	FOR	ACH	MOR	DIFF	FOR
Ideological							
Achievement	-.34***	-.44***	-.18***	.34***	.04	-.17***	-.06
Moratorium		.35***	.14**	-.02	.51***	.18***	.10*
Diffusion			.15**	-.05	.09	.26***	.06
Foreclosure				.08	.13**	.20**	.64***
Interpersonal							
Achievement					-.10*	-.33***	.09
Moratorium						.15**	.13**
Diffusion							.21***

Note. MOR = Moratorium; DIFF = Diffusion; FOR = Foreclosure; ACH = Achievement.

* $p < .05$. ** $p < .01$. *** $p < .001$.

The EOM-EIS-2 is recognized as “a state-of-the-art instrument” to assess adolescents’ identity statuses (Jones & Streitmatter, 1987, p. 649). It has been shown to have good psychometric properties and has been validated with high school students including the gifted. It was shown to have no significant correlation with any of the subscales of the Crowne-Marlow measure of social desirability (Bennion & Adams, 1986). Scores from the EOM-EIS-2 not only classify subjects into one of the four identity statuses but also indicate the degree to which each status is manifested by an individual. This facilitates an in depth investigation of identity status development in two major domains: the ideological and the interpersonal (Bennion & Adams, 1986). In the present study, the continuous scores provided by the EOM-EIS-2 allow the relationship between statuses of identity development and moral reasoning to be examined.

3.4 Sample

There were two sample groups in this study. These two groups were academically gifted adolescent students and students who were not identified as academically gifted.

Students from both sample groups were in school year 9 to year 12, aged between 13 to 17 years.

3.4.1 Academically gifted sample.

The sample of academically gifted students was selected from the database of Australian intellectually gifted students maintained by the Gifted Education Research, Resource and Information Centre (GERRIC) at the University of New South Wales. This database contains information of students who undertook Australian talent search programs, namely the Australian Primary Talent Search (APTS) and the Australian Secondary Schools Educational Talent Search (ASSETS).

Australian talent searches are nationwide off-level testing programs for Australian academically gifted students in primary and secondary levels. The Australian Primary Talent Search (APTS) is designed for intellectually gifted students in year 3 to year 6. Students participating in the APTS take EXPLORE, which is a multiple-choice test originally designed to measure academic achievement of 8th grade students. The Australian Secondary Schools Educational Talent Search (ASSETS) is designed for students enrolled in year 7 to year 9. Students participating in the ASSETS take the ACT Assessment, which is originally used to assess academic achievement of students in grade 11 and 12. Both EXPLORE and the ACT Assessment measure students' aptitude

in four academic areas: English, Mathematics, Reading, and Science Reasoning. They provide information on students' scores and percentile ranks of the four subscales. A percentile rank is a ranking given to students that reflects the results of each of the subtests undertaken for the APTS or the ASSETS in comparison to other academically gifted students who took the test. A composite score and a percentile rank, which represent an estimate of students' overall performance, were also provided.

In order to participate in the Australian talent search programs, students are required to satisfy at least one of the following criteria (Gifted Education Research, Resource and Information Centre, 2008):

- scoring at or above the 95th percentile (IQ 125+) on an individual or group IQ test; or scoring at or above the 95th percentile on a subscale (for example, verbal or performance) of an individual IQ test;
- scoring at or above the 95th percentile on a standardized test of achievement in any academic subject area;
- having gained placement in a full time, self-contained class, or school for academically gifted students, for example, in a selective high school;
- having obtained an academic scholarship;
- having gained a Distinction or High Distinction in the Australian Schools Science or English competitions, or the Australian Primary Mathematics Competition; and
- being referred by teachers as having academic potential to perform at a level well above their grade level in an academic area.

GERRIC talent search database was sought in order to recruit eligible participants. Talent search database contains information regarding demographic data, contact details, and test scores of students participating in talent search programs. In order to recruit students who were of target ages and years in school, the APTS database from the year 2005 to 2006 and the ASSETS database from the year 2004 to 2007 were accessed. APTS 2005 and 2006 databases yielded the information on students who were in year 9 and year 10 (age 13 to 15 years) in 2009 and ASSETS database from the year 2004, 2005, 2006, and 2007 provided information on students who were in year 9, 10, 11, or 12 (age 13 to 17 years) in 2009.

Level of mathematical giftedness and level of verbal giftedness were two variables of interest in the study; therefore, the next step in sample selection involved identifying students based on levels of giftedness in these two academic domains. For the purpose of this study, highly gifted students were identified as those gifted students whose percentile rank in either the mathematics or English subtests of the above-level assessment was between 75 and 100. Moderately gifted students were identified as those students whose percentile rank in either mathematics or English subtests was between 65 and 10. Based on these cut-off points, four groups of sample were derived: (1) highly mathematically-highly verbally gifted, (2) moderately mathematically-highly verbally gifted, (3) moderately mathematically-moderately verbally gifted, and (4) highly mathematically-moderately verbally gifted. The percentile rank interval of 65 to 10 was chosen as a cut-off point for recruiting gifted students in the moderately gifted group so that an adequate number of the highly mathematically-moderately verbally gifted students could be used in the study.

Following the above criteria, it was found that some students took the APTS and subsequently took the ASSETS, resulting in duplicate records. To address this, the most recent test result was used for selection because it was more likely to represent the current aptitude of the students. Upon elimination of duplicate records, 363 students were classified as highly mathematically-highly verbally gifted, 404 students were classified as moderately mathematically-highly verbally gifted, 833 were classified as moderately mathematically-moderately verbally gifted, and 112 were classified as highly mathematically-moderately verbally gifted. Stratified random sampling was employed to reduce the size of the moderately mathematically-moderately verbally gifted group and to equalize the size of samples across the four groups of participants. Stratified random sampling is generally used when a population is divided into a number of subgroups and samples are randomly selected within each subgroup (Gay, Mills & Airasian, 2006). Following this procedure, the final sample size for each subgroup was determined. Table 7 outlines the sample sizes of participants based on four subgroups of the academically gifted sample.

Table 7: Sample Sizes of the Academically Gifted Sample Based on Subgroups

Subgroup	Mathematics	English	no.
	percentile rank	percentile rank	
High mathematics - high verbal	75 - 100	75 - 100	363
Moderate mathematics - high verbal	10 - 65	75 - 100	404
Moderate mathematics - moderate verbal	10 - 65	10 - 65	436
High mathematics - moderate verbal	75 - 100	10 - 65	112
Total			1315

3.4.2 Sample of students who were not identified as gifted.

Students who were not identified as academically gifted were recruited from independent secondary schools in New South Wales, Australia. To recruit participants in this group, teacher nomination was employed. Teachers participating in the study were recruited through the Certificate of Gifted Education (COGE) course. The Certificate of Gifted Education is a professional development program for primary and secondary teachers organized by GERRIC annually. It covers major topics in gifted education: one of which is the identification of gifted students. Teachers in COGE 2009 cohort were approached and informed about objectives and procedures of the study while attending COGE courses at the University of New South Wales. Teachers were informed that participation in the study was voluntary and did not incur extra credits in the COGE course. After a briefing session, they were asked to participate in the study by nominating students who they believed were not intellectually gifted and distributing the questionnaires to the nominated students. Nomination by teachers trained in gifted education was employed because teachers with training in gifted education are better able to differentiate between gifted students and those who are of average ability (Croft, 2003). Teachers who were interested in participating in the study were asked for their contact details for further correspondence.

3.5 Data Collection Procedures

This study employed a written questionnaire survey distributed by post as the data collection procedure. Postal survey method has been recognized as having several

advantages. Apart from being effective in cost, postal surveys allow for studies that collect information from a group of samples which is widely dispersed or for studies that recruit subjects who live in geographically challenging locations (Cohen et al., 2002; Dillman, 1991; Shannon & Bradshaw, 2002). It is also beneficial because subjects are given time to respond thoughtfully to the questionnaire (Kanuk & Berenson, 1975).

Prior to data collection, UNSW Ethics approval had been obtained (see Appendix A). According to the Human Research Ethics Handbook (National Health and Medical Research Council, 2002), it is required that children under the age of 16 be given parental consent in participating in research studies. Given this legal requirement, participants under the age of 16 were considered minors and were given a parental consent form to be signed by parents or guardians. Participants over the age of 16 were not considered minors and were given a participant consent form to complete.

The full version of the DIT and the EOM-EIS-2 were retyped to produce a clean copy and questions regarding demographic information were added to the questionnaire. For the academically gifted participants, a questionnaire and an information package were mailed to each eligible student for self-administration at their home. Each questionnaire package contained a parental consent form (see Appendix B) or a participation consent form (see Appendix C), a questionnaire containing the full version of the DIT and the EOM-EIS-2 (see Appendix D), and a reply paid envelope. Participants were asked to complete the questionnaire at their convenience on a voluntary basis. They were instructed to return the completed questionnaire and a signed consent form within a designated deadline.

Approximately three weeks after the deadline, a follow-up letter was sent to all participants who had not responded to the initial request for participation (see Appendix E). A separate reminder letter was mailed specifically to gifted students who were in the highly mathematically-moderately verbally gifted group (see Appendix F) because only a small number of questionnaires were returned from this group after the first mail-out. The use of follow-up reminder letter has been acknowledged as an effective method to increase survey response rate (e.g., Cavusgil & Elvey-Kirk, 1998; Dillman, 1991; Duncan, 1979; Kanuk & Berenson, 1975; Yammarino, Skinner & Childers, 1991). A minimum of two reminder letters has been recommended to make a substantial increase in response rate (Cohen et al., 2002).

Following the first reminder letter mailings, it was found that some questionnaire packages were undelivered due to invalid postal addresses. The undelivered questionnaire packages were checked against a list of eligible subjects in order to eliminate participants with an invalid address. Accordingly, a second follow-up letter was sent to all subjects who had not responded to the requests for participation (see Appendix G). Attached with the second follow-up letter were a letter of support from the Director of GERRIC (see Appendix H) and an additional set of questionnaire packages. Of 1,315 questionnaire packages that were mailed, a total of 442 questionnaire packages were returned, representing a response rate of 33.6%.

For the group of students who were not identified as academically gifted, nine teachers who initially expressed their interest in assisting in the study were contacted by email and telephone to confirm their interest to participate in the study (see Appendix I). Five teachers confirmed their participation and four teachers withdrew their participation.

Upon confirmation from the five participating teachers, a set of 50 questionnaire packages was sent to each teacher for distribution to students. Each questionnaire package contained a parental consent form (see Appendix J) or a participant consent form (see Appendix K), a questionnaire, and a paid envelope for the student's reply. However, returned questionnaires revealed that students from only three schools had participated in the study. Subsequently, phone calls were made as well as reminder emails sent to the other two teachers who later wished to withdraw from participating in the study. From a total number of 250 questionnaire packages distributed, 51 questionnaire packages were returned from the three schools, representing a response rate of 20.4%. Table 8 displays the numbers of returned questionnaire packages from the academically gifted sample and the sample of students who were not identified as academically gifted.

Table 8: Numbers of Returned Questionnaires by Subgroups

Subgroup	no.
Highly mathematically-highly verbally gifted	128
Moderately mathematically-highly verbally gifted	152
Moderately mathematically-moderately verbally gifted	125
Highly mathematically-moderately verbally gifted	37
Not identified as gifted	51
Total	493

3.6 Preparation for Data Analysis

3.6.1 Data preparation.

The Defining Issues Test was scored according to Rest's DIT Manual (1986). Details of the scoring procedure have been discussed in section 3.3.1.4. A scoring template was created using Microsoft Office Excel software in order to record and calculate each subject's stage scores. The scoring template included details about each subject's age, year in school, gender, Stage 2, Stage 3, Stage 4, Stage 5A, Stage 5B, Stage 6, and postconventional scores. M scores and inconsistency scores were also recorded.

Scoring of the EOM-EIS-2 was based on the scoring manual developed by Adams (1998), which has been explained in detail in section 3.3.2.3. Data from returned questionnaires were entered in a Microsoft Office Excel template. Composite scores and cut-off points were computed for each identity status using the procedure suggested by Jones et al. (1994). Appendix L presents cut-off points for the ideological, interpersonal, and total identity domains of the present study. Materials obtained from participants were coded with numbers in order to maintain confidentiality. Prior to exporting data to the Predictive Analytics SoftWare (PASW) for statistical analysis, questionnaires were randomly checked to ensure the accuracy of data entry.

3.6.2 Exclusion of data.

The DIT manual suggests data checking in order to eliminate invalid questionnaires. Rest (1986) outlined two reliability checks: these are the M (abbreviated for

'Meaningless') score and a consistency check. First, the M statement items are items which were written to sound lofty but do not, in fact, make sense. They function as a reliability check because they detect participants who chose items based on syntactic complexity. If a subject rates and ranks the M items high, it is assumed that the subject does not have adequate test taking ability or does not take the test seriously. Therefore, the protocol is to be discarded. It is recommended that protocols with M score of 8 or higher be eliminated from the analysis (Rest, 1986).

Second, the consistency check addresses the pattern of subjects' ratings and rankings of the items. Rest (1986, section 3, p. 6) described the three parts of the consistency check. Failure to pass any one part results in the protocol being invalidated and eliminated from analysis. The three parts are:

- Part 1: "No story shall have more than 8 inconsistencies on any single story."
A protocol is to be discarded when the number of inconsistencies on any story surpasses eight instances.
- Part 2: "There can be no more than two stories in which there are any inconsistencies." Any subject whose first and second most important item rankings do not match the ratings of the 12 items in more than two stories is to be discarded from the study.
- Part 3: "No more than one story can have more than 9 items rated the same."
If a subject shows insufficient discrimination of the ratings in any one story, it is assumed that he or she may not take the test seriously. Therefore, the protocol is to be eliminated from further analysis.

Of the total number of 493 questionnaires, 20 questionnaires had M scores higher than 8; 13 questionnaires were incomplete (i.e., did not complete six stories, did not rate and/or ranks items); and 26 questionnaires did not pass the reliability checks. After eliminating unusable protocols, the final number of valid questionnaires was 434. The valid questionnaires were used for statistical data analysis. Descriptive statistics of the excluded protocols and the final numbers of valid protocols are presented in Table 9.

Table 9: Number of Protocols Excluded and Number of Valid Questionnaires by Subgroups

Subgroup	M score greater than 8	Incomplete	Inconsistent	Total	no. of valid questionnaires
HM - HE	0 (0%)	3 (2%)	6 (5%)	9/ 128 (7%)	119
MM - HE	2 (1%)	2 (1%)	4 (3%)	8/ 152 (5%)	144
MM - ME	4 (3%)	1 (1%)	11 (9%)	16/ 125 (13%)	109
HM - ME	5 (13%)	1 (3%)	1 (3%)	7/37 (19%)	30
NGT	9 (18%)	6 (12%)	4 (8%)	19/51 (38%)	32
Total	20 (4%)	13 (3%)	26 (5%)	59/493 (12%)	434

Note. HM-HE = Highly mathematically-Highly verbally gifted; MM-HE = Moderately mathematically-Highly verbally gifted; MM-ME = Moderately mathematically-Moderately verbally gifted; HM-ME = Highly mathematically-Moderately verbally gifted; NGT = Not identified as gifted.

3.7 Characteristics of the Sample

Data collected from the administration of the DIT and the EOM-EIS-2 were exported to and analyzed using the Predictive Analytics SoftWare (PASW). Descriptive statistics were generated for the whole sample as well as for the subgroups within the sample.

Table 10 outlines the numbers of gifted and non-identified participants whose responses to the DIT and EOM-EIS-2 were analyzed ($N = 434$). From the total number of 434 participants, 233 were male (54%) and 201 were female (46%). The sample of academically gifted students contained 402 participants with 226 males and 176 females. This represents slightly more male (56%) than female (44%) gifted participants in the study. Of the 32 participants who were not identified as gifted, 7 (22%) were male and 25 (78%) were female.

Among the gifted, 119 were highly mathematically-highly verbally gifted, 144 were moderately mathematically-highly verbally gifted, 109 were moderately mathematically-moderately verbally gifted, and 30 were highly mathematically- moderately verbally gifted. Of the 119 highly mathematically and verbally gifted participants, 57% were male and 43% were female. Of the 144 moderately mathematically-highly verbally gifted participants, 51% were male and 49% were female. Of the 109 moderately mathematically and verbally gifted participants, 61% were male and 39% were female. Of the 30 highly mathematically- moderately verbally gifted participants, 60% were male and 40% were female.

Table 10: Characteristics of Sample Based on Ability and Gender

Gender	Gifted				NGT	Total
	HM-HE	MM-HE	MM-ME	HM-ME		
Male	68	73	67	18	7	233
	(16%)	(17%)	(15%)	(4%)	(2%)	(54%)
Female	51	71	42	12	25	201
	(12%)	(16%)	(10%)	(3%)	(6%)	(46%)
Total	119	144	109	30	32	434
	(27%)	(33%)	(25%)	(7%)	(8%)	(100%)

Note. HM-HE = Highly mathematically-Highly verbally gifted; MM-HE = Moderately mathematically-Highly verbally gifted; MM-ME = Moderately mathematically-Moderately verbally gifted; HM-ME = Highly mathematically-Moderately verbally gifted; NGT = Not identified as gifted.

Table 11 and Table 12 provide breakdowns of sample based on ability, age, and year in school. Table 11 presents information of sample based on age. Eleven per cent of participants surveyed were 13 years of age, 34% were 14 years, 23% were 15 years, 21% were 16 years, and 11% were 17 years. The mean age of the gifted group was 14.8 years old ($SD = 1.15$) and the mean age of the non-identified group was 16 years old ($SD = 0.96$).

Table 12 displays the distribution of sample based on year in school. Participants in this study were in year 9 (31%), year 10 (28%), year 11 (22%), and year 12 (19%).

Table 11: Characteristics of Sample Based on Ability and Age

Characteristics	Gifted				NGT	Total
	HM-HE	MM-HE	MM-ME	HM-ME		
Age 13 years old						
Male	12	10	6	1	0	29
Female	7	8	3	0	0	18
Total	19	18	9	1	0	47
Age 14 years old						
Male	32	29	18	2	1	82
Female	21	28	11	4	2	66
Total	53	57	29	6	3	148
Age 15 years old						
Male	12	18	21	6	1	58
Female	11	14	12	3	3	43
Total	23	32	33	9	4	101
Age 16 years old						
Male	9	12	15	9	4	49
Female	9	12	9	4	8	42
Total	18	24	24	13	12	91
Age 17 years old						
Male	3	4	7	0	1	15
Female	3	9	7	1	12	32
Total	6	13	14	1	13	47

Note. HM-HE = Highly mathematically-Highly verbally gifted; MM-HE = Moderately mathematically-Highly verbally gifted; MM-ME = Moderately mathematically-Moderately verbally gifted; HM-ME = Highly mathematically-Moderately verbally gifted; NGT = Not identified as gifted.

Table 12: Characteristics of Sample Based on Ability and Year in School

Characteristics	Gifted				NGT	Total
	HM-HE	MM-HE	MM-ME	HM-ME		
Year 9						
Male	34	27	13	2	2	78
Female	18	23	11	3	2	57
Total	52	50	24	5	4	135
Year 10						
Male	19	21	20	6	0	66
Female	18	22	9	4	4	57
Total	37	43	29	10	4	123
Year 11						
Male	9	14	21	4	4	52
Female	7	13	11	1	13	45
Total	16	27	32	5	17	97
Year 12						
Male	6	11	13	6	1	37
Female	8	13	11	4	6	42
Total	14	24	24	10	7	79

Note. HM-HE = Highly mathematically-Highly verbally gifted; MM-HE = Moderately mathematically-Highly verbally gifted; MM-ME = Moderately mathematically-Moderately verbally gifted; HM-ME = Highly mathematically-Moderately verbally gifted; NGT = Not identified as gifted.

3.8 Statistical Analysis Methods

In order to analyze data based on the levels of mathematical giftedness and the levels of verbal giftedness, a grouping system was established. The high mathematical giftedness group (M_h) contained students from the highly mathematically-highly verbally gifted group and the highly mathematically-moderately verbally gifted group. The high verbal giftedness group (V_h) included students from the highly mathematically-highly verbally gifted group and the moderately mathematically-highly verbally gifted group. The moderate mathematical giftedness group (M_m) contained students from the moderately mathematically-highly verbally gifted group and the moderately mathematically-moderately verbally gifted group. Finally, the moderate verbal giftedness group (V_m) comprised students from the highly mathematically-moderately verbally gifted group and the moderately mathematically-moderately verbally gifted group. Following this categorization procedure, the V_h group was comprised of 263 students; the V_m group constituted 139 students; the M_h group consisted of 149 students; and the M_m group was made up of 253 students. Figure 6 presents a diagram of the grouping procedure.

Figure 6: A Diagram of Grouping Procedures Based on Levels of Verbal Giftedness and Levels of Mathematical Giftedness.

		Verbal	
		High	Moderate
Mathematical	High	M_h V_h	M_h V_m
	Moderate	V_h M_m	V_m M_m

In terms of statistical methods, data from the DIT were investigated using analysis of variance (ANOVA) to examine the effect of ability on the postconventional scores. In addition, ANOVA was carried out to determine the effect of level of verbal and level of mathematical giftedness on the postconventional scores. Continuous data from the EOM-EIS-2 were analyzed using multivariate analysis of variance (MANOVA). It was employed to examine the effect of ability on the four identity statuses in the ideological, interpersonal, and total domains. In addition, MANOVA was used to investigate the effect of level of verbal giftedness and level of mathematical giftedness on the four identity statuses in the ideological, interpersonal, and total domains. Apart from MANOVA, Pearson's chi-square tests were employed using categorical data from the EMO-EIS-2. This was to examine the effects of ability, level of mathematical giftedness, and level of verbal giftedness on the ideological, interpersonal, and total identity domains. Specifically, it was used to determine possible differences in frequency of identity statuses distribution between the gifted and the non-identified groups, between gifted

adolescents who differed in levels of mathematical giftedness, and between gifted adolescents who differed in levels of verbal giftedness. The investigation of the relationship between moral reasoning and identity statuses was carried out using Pearson's correlation coefficients. Furthermore, ANOVA was used to investigate the difference in postconventional scores between participants who were classified into one of the identity statuses.

3.9 Chapter Summary

This chapter has explained the research design and methods used in the sample selection and data collection of this study. Details about, and the use of, the two instruments, the Defining Issues Test and the Extended Objective Measure of Ego Identity Status-2, were discussed. It described the procedures employed to exclude data which were inconsistent, incomplete, or contained excessive M scores. Statistical methods for data analysis undertaken, including analysis of variance, multivariate analysis of variance, and correlations, were also outlined.

Chapter Four

Results

4.1 Introduction

This chapter reports results from quantitative data analysis in light of the study's aims. These were to (a) compare the moral reasoning and ego identity status of academically gifted adolescents with that of adolescents not identified as academically gifted; (b) compare the moral reasoning and identity status of academically gifted adolescents who differed in their levels of mathematical giftedness; (c) compare the moral reasoning and ego identity status of academically gifted adolescents who differed in their levels of verbal giftedness; and (d) examine relationships between moral reasoning and ego identity status. All statistical analyses were conducted using two-tailed tests with the alpha level set at .05. The analyses were carried out using Predictive Analytics SoftWare (PASW statistics 18.0) for Windows.

4.2 Defining Issues Test Analysis

The Defining Issues Test (DIT) yields the postconventional score, which signifies the relative importance an individual gives to the postconventional stages 5 and 6 of moral reasoning (Rest, 1979). The postconventional score reflects continuous data and was

used as a dependent variable in the analysis. Three of the study's hypotheses can be tested by using the postconventional score provided by the DIT. These hypotheses are:

Hypothesis 1: Gifted adolescents have higher levels of moral reasoning than age peers who have not been identified as gifted.

Hypothesis 2: The moral reasoning levels of gifted adolescents who have a higher level of mathematical ability are higher than gifted adolescents who have a lower level of mathematical ability.

Hypothesis 3: The moral reasoning levels of gifted adolescents who have a higher level of verbal ability are higher than gifted adolescents who have a lower level of verbal ability.

4.2.1 The effect of ability on the DIT postconventional scores.

Hypotheses one anticipated differences in the Postconventional scores between the gifted and non-identified participants. In order to test hypothesis one, an analysis of variance (ANOVA) using a 2 x 2 x 2 (Ability [gifted, non-identified] x Gender [male, female] x Year in school [lower high school, upper high school]) factorial design was conducted. Year in school was chosen as an independent variable instead of age because a number of gifted students participating in this study were accelerated.

Students who had been accelerated and those who had not been accelerated, despite having similar chronological ages, were exposed to different curricula and social experiences. This may influence the understanding of moral issues and the process of identity formation. Considering that the use of age may have a confounding effect on findings, year in school was deemed a more appropriate measure. In addition, Rest et al. (1999c) encouraged the use of education rather than age in analyzing school-age

participants' performance in the DIT. Level of formal education has been found to be a better, more stable predictor of moral reasoning than age across studies (Rest et al., 1999b). For the purpose of this study, participants who were in year 9 and year 10 were placed in the lower high school group and participants who were in year 11 and year 12 were placed in the upper high school group.

Prior to conducting an ANOVA, it is necessary to ensure that ANOVA assumptions are not violated. Two assumptions were assessed. These are (1) the assumption of homogeneity of variances, which can be tested by Levene's test of homogeneity of variance; and (2) the assumption of normality of distribution, which can be assessed using the Shapiro-Wilk test. For this study, Levene's test of homogeneity of variance revealed nonsignificant differences between group variances on the DIT postconventional scores, $F(7, 426) = 1.21, p = .298$. Therefore, the assumption of equality of variance was tenable.

Results from the Shapiro-Wilk test indicated nonsignificant statistics for the gifted group, $W(402) = 0.99, p = .055$, and for the non-identified group, $W(32) = 0.97, p = .432$. It also showed nonsignificant statistics for the male group, $W(233) = 0.99, p = .149$, and for the female group, $W(201) = 0.99, p = .227$. For the year in school variable, results from the Shapiro-Wilk test revealed nonsignificant statistics for year 9, $W(135) = 0.98, p = .091$, year 10, $W(123) = 0.99, p = .234$, year 11, $W(97) = 0.99, p = .394$, and year 12, $W(79) = 0.99, p = .936$. This indicates that the assumption of normality was not significantly violated for the ability, gender, and year in school variables. Therefore, the normality assumption was tenable.

Results from the factorial ANOVA analysis are presented in Table 13. It was evident that only the ability variable had a significant effect on the postconventional scores with a partial eta-squared (η_p^2) of .035. This indicates a small effect size² of ability on the postconventional scores. There was neither a significant effect of gender nor year in school on the postconventional scores. All interactions were nonsignificant, all $F \leq 0.82$, $p \geq .366$.

Table 13: Factorial ANOVA Conducted on the DIT Postconventional Scores

Effect	MS	F^a	p
Ability	2828.07	15.59	.000
Gender	306.19	1.69	.195
Year in school	566.49	3.12	.078
Ability x Gender	26.74	0.15	.701
Ability x Year in school	148.37	0.82	.366
Gender x Year in school	75.24	0.41	.520
Ability x Gender x Year in school	0.065	0.00	.985

^a $df = 7$, Error $df = 426$.

² The interpretation of effect sizes in this study was based on that of Cohen (1977) where partial eta-squared (η_p^2) of .01, .059, and .138 signifies small, medium, and large effect size, respectively.

Owing to the significant main effect of ability on the postconventional scores, a follow up analysis using a simple main effect ANOVA was conducted. This was to examine mean differences between groups in the Postconventional index. As evident from Table 14, results from the simple main effect ANOVA revealed a significant mean difference between the two groups on the postconventional scores. Academically gifted adolescents had a significantly higher mean postconventional score ($M = 38.45$, $SD = 14.40$) than did adolescents not identified as gifted ($M = 28.75$, $SD = 11.86$). This finding supports hypothesis one which states that gifted adolescents have higher levels of moral reasoning than their age peers not identified as gifted. Gender and year in school did not significantly affect performance in moral reasoning.

Table 14: Postconventional Scores of Gifted and Non-Identified Groups

Variable	Gifted ^a			Non-identified ^b			MS	F ^c
	<i>M</i>		95% CI	<i>M</i>		95% CI		
	(<i>SD</i>)	<i>SE</i>		[<i>LL</i> , <i>UL</i>]	(<i>SD</i>)			
Postconventional score	38.45 (14.40)	0.72	37.04, 39.86	28.75 (11.86)	2.10	24.47, 33.02	2790.25	13.78***

Note. CI = confidence interval; LL = lower limit; UL = upper limit.

^a $n = 402$. ^b $n = 32$

^c $df = 1$, Error $df = 432$.

*** $p < .001$.

4.2.2 The effect of levels of mathematical giftedness and levels of verbal giftedness on the DIT postconventional scores.

Hypothesis two and hypothesis three anticipated differences in DIT postconventional scores between academically gifted participants who differed in levels of mathematical giftedness and in levels of verbal giftedness. Both hypotheses were tested using an analysis of variance (ANOVA) with 2 x 2 x 2 x 2 (Level of mathematical giftedness [high, moderate] x Level of verbal giftedness [high, moderate] x Gender [male, female] x Year in school [lower high school, upper high school]) factorial design on the DIT postconventional scores. To ensure that ANOVA assumptions were not violated, Levene's test of the homogeneity of variance and the Shapiro-Wilk test were conducted. Levene's test of the homogeneity of variance revealed that differences between group variances were not significant, $F(15, 386) = 0.90, p = .567$. This indicated that the variances were roughly equal and the assumption was tenable.

In order to test the assumption of normality on the postconventional scores, Shapiro-Wilk tests were carried out on the four independent variables: these were level of mathematical giftedness, level of verbal giftedness, gender, and year in school. Results from the Shapiro-Wilk tests were not statistically significant for the moderate level of mathematical giftedness group, $W(253) = 0.99, p = .424$, and for the high level of mathematical giftedness group, $W(149) = 0.99, p = .148$. Hence, the violation of the normality of distribution assumption for the level of mathematical giftedness variable was not statistically significant.

For the level of verbal giftedness variable, Shapiro-Wilk tests yielded a nonsignificant statistic for the high level of verbal giftedness group, $W(263) = 0.99$, $p = .131$, but a significant statistic for the moderate level of verbal giftedness group, $W(139) = 0.98$, $p = .047$. A possible explanation of this occurrence is that in a large sample a slight deviation from a normal distribution may cause a statistically significant value (Hair, Black, Babin & Anderson, 2010). Due to a significant deviation from normal distribution in the moderate level of verbal giftedness group, interpretation of results from the Shapiro-Wilk tests are to be conducted together with a normal probability plot and a histogram (Field, 2009; Hair et al., 2010). The normal probability plot and normality histogram of the postconventional scores obtained from the moderately verbally gifted group showed a roughly normal distribution. Therefore, the violation of the normality of distribution assumption of this variable was not significant.

In order to assess normality assumption of the gender variable, a Shapiro-Wilk test was also conducted. Nonsignificant statistics for both the male group, $W(226) = 0.99$, $p = .231$, and the female group, $W(176) = 0.99$, $p = .387$, were observed. This suggests that the assumption of normality was tenable. For the year in school variable, results from the Shapiro-Wilk test indicated a nonsignificant statistic for the upper high school level, $W(149) = 0.99$, $p = .414$, indicating that the assumption of normality was not significantly violated. However, the Shapiro-Wilk statistic was significant for the lower high school group, $W(253) = 0.99$, $p = .039$. Given the significant Shapiro-Wilk statistic of the lower high school group, a normal probability plot and a normal histogram were used to further verify results from the Shapiro-Wilk test (Field, 2009). The normal probability plot and the normal histogram revealed an approximately normal distribution of the postconventional scores for the lower high school group.

Results from the factorial ANOVA analysis are presented in Table 15. There were significant main effects of level of mathematical giftedness, level of verbal giftedness, and gender on the postconventional scores. The effect sizes were small, $\eta_p^2 = .015$, $.030$, and $.014$, respectively. Year in school also had a significant effect on the postconventional scores with a medium approaching large effect size, $\eta_p^2 = .105$.

More importantly, there were significant interactions between the level of verbal giftedness and gender and between year in school and gender. These interactions yielded small effect sizes, $\eta_p^2 = .014$ and $.011$, respectively. All other main effects and interactions were not statistically significant, all $F \leq 2.27$, $p \geq .132$.

Table 15: Effects of Level of Mathematical Giftedness, Level of Verbal Giftedness, Gender, and Year in School on DIT Postconventional Scores

Effect	MS	F ^a	p
Level of mathematical giftedness	1009.96	5.80	.016
Level of verbal giftedness	2053.22	11.79	.001
Gender	982.58	5.64	.018
Year in school	7858.23	45.13	.000
Level of mathematical giftedness x Level of verbal giftedness	65.87	0.38	.539
Level of mathematical giftedness x Gender	8.56	0.05	.825
Level of mathematical giftedness x Year in school	396.12	2.27	.132
Level of verbal giftedness x Gender	962.79	5.53	.019
Level of verbal giftedness x Year in school	46.04	0.26	.607
Gender x Year in school	755.31	4.34	.038
Level of mathematical giftedness x Level of verbal giftedness x Gender	3.09	0.02	.894
Level of mathematical giftedness x Level of verbal giftedness x Year in school	9.74	0.06	.813
Level of mathematical giftedness x Gender x Year in school	43.88	0.25	.616
Level of verbal giftedness x Gender x Year in school	175.29	1.01	.316
Level of mathematical giftedness x Level of verbal giftedness x Gender x Year in school	82.29	0.47	.492

^adf = 15, Error df = 386.

The significant main effects of level of mathematical giftedness, level of verbal giftedness, gender, and year in school on moral reasoning warranted further analyses. In doing so, simple main effect ANOVAs were conducted in order to examine mean differences between groups. As illustrated in Table 16, there was a significant difference in the postconventional scores between students who were highly gifted in mathematics and their counterparts who were moderately gifted in mathematics. The size of the effect was small ($\eta_p^2 = .011$). Students who were highly gifted in mathematics ($M = 40.42$, $SD = 14.77$) scored significantly higher on the postconventional index than did students who were moderately gifted in mathematics ($M = 37.29$, $SD = 14.07$).

Results from the simple effect ANOVA also showed a significant difference in the performance of postconventional thinking between adolescents who differed in levels of verbal giftedness (see Table 16). The effect of level of verbal giftedness yielded a small effect size ($\eta_p^2 = .017$). The highly verbally gifted group ($M = 39.80$, $SD = 14.78$) outperformed the moderately verbally gifted group ($M = 35.89$, $SD = 13.31$) in the index of postconventional thinking.

In terms of gender, gifted males and females performed significantly differently on the measure of postconventional thinking (see Table 16). Gifted females ($M = 41.37$, $SD = 15.04$) had a significantly higher mean postconventional score than their male counterpart ($M = 36.18$, $SD = 13.47$). The effect of gender on postconventional thinking was small ($\eta_p^2 = .032$).

Results from the simple main effect ANOVA showed that gifted students in the upper high school level ($M = 43.91$, $SD = 13.39$) scored significantly higher on the index of postconventional thinking than did gifted students in the lower high school level ($M = 35.23$, $SD = 14.01$). The size of the year in school effect was medium ($\eta_p^2 = .085$).

Table 16: Postconventional Scores for the Level of Mathematical Giftedness, Level of Verbal Giftedness, Gender, and Year in School Variables

Variable	<i>n</i>	<i>M</i> (<i>SD</i>)	<i>SE</i>	95% CI [<i>LL</i> , <i>UL</i>]	<i>MS</i>	<i>F</i> ^a	<i>p</i>
Level of mathematical giftedness							
Moderate	253	37.29 (14.07)	0.88	[35.54, 39.03]	923.39	4.94	.035
High	149	40.42 (14.77)	1.21	[38.03, 42.81]			
Level of verbal giftedness							
Moderate	139	35.89 (13.31)	1.13	[33.66, 38.12]	1392.45	6.82	.009
High	263	39.80 (14.78)	0.91	[38.01, 41.60]			
Gender							
Male	226	36.18 (13.47)	0.89	[34.41, 37.94]	2263.18	13.24	.000
Female	176	41.37 (15.04)	1.13	[39.13, 43.60]			
Year in school							
Lower	253	35.23 (14.01)	0.88	[33.50, 37.00]	7070.44	37.20	.000
Upper	149	43.91 (13.39)	1.10	[41.75, 46.08]			

Note. CI = confidence interval; *LL* = lower limit; *UL* = upper limit.

^a*df* = 1, *Error df* = 400.

Apart from significant main effects of level of mathematical giftedness, level of verbal giftedness, gender, and year in school, analysis also showed significant interaction effects. In factorial designs, significant interaction effects are regarded as more crucial for interpreting results than main effects. This is because interaction effects indicate that independent variables have an interactive effect on the dependent variable (Field, 2009). When a significant interaction effect is observed, several statistical procedures can be used to analyze the effect of one independent variable on the dependent variable individually. One of the most widely used techniques is simple main effect ANOVA (Field, 2009). A simple effect analysis allows for mean comparisons to be performed.

In this study, two significant interactions were observed (see Table 15). These were (1) between level of verbal giftedness and gender, and (2) between year in school and gender. Consequently, a simple main effect ANOVA was conducted on each interaction to examine mean differences between groups.

In order to clarify the interaction between level of verbal giftedness and gender, the differences in postconventional scores was analyzed using a simple main effect ANOVA. Results from the simple main effect are presented in Table 17. There was a significant difference in the postconventional scores between gifted female students who differed in levels of verbal giftedness. The difference yielded a medium effect size, $\eta_p^2 = .063$. Based on this finding, female students who were highly gifted in verbal ability ($M = 43.87$, $SD = 14.62$) were more advanced in the development of moral reasoning, having a significantly higher mean postconventional score, than were female students who were moderately gifted in verbal ability ($M = 35.71$, $SD = 14.58$). However, the difference was not statistically significant between gifted male students who differed in levels of verbal

giftedness, suggesting that male adolescents who were highly gifted in verbal ability did not have significantly different scores in postconventional reasoning from male adolescents who were moderately gifted in verbal ability.

Table 17: Postconventional Scores for the Interaction Effect between Level of Verbal Giftedness and Gender

Gender	Level of Verbal Giftedness						MS	F	p
	High ^a			Moderate ^b					
	M		95% CI	M		95% CI			
	(SD)	SE	[LL, UL]	(SD)	SE	[LL, UL]			
Male ^c	36.28		[33.95,	36.00		[33.30,			
	(14.04)	1.18	38.62]	(12.53)	1.36	38.70]	4.25	0.23	.879
Female ^d	43.87		[41.25,	35.71		[31.73,			
	(14.62)	1.32	46.49]	(14.58)	1.98	39.69]	2489.41	11.66	.001

Note. CI = confidence interval; LL = lower limit; UL = upper limit.

^an = 139. ^bn = 263. ^cn = 226. ^dn = 176.

In order to further examine the interaction between year in school and gender, a simple main effect ANOVA was carried out. As displayed in Table 18, there was a significant difference in the postconventional scores between gifted male students who differed in year in school with a medium effect size, $\eta_p^2 = .059$. Gifted male students in the upper high school level ($M = 40.48$, $SD = 11.64$) performed significantly better on the measure of postconventional thinking than did gifted male students in the lower high school level ($M = 33.72$, $SD = 13.85$).

Results from univariate tests also indicated a significant difference in the postconventional scores between gifted female students who differed in year in school with a large effect size, $\eta_p^2 = .124$. Gifted female students who were in the upper level of high school ($M = 48.11$, $SD = 14.27$) outperformed gifted female students who were in the lower level of high school ($M = 37.22$, $SD = 14.03$) on the postconventional index. Overall, intellectually gifted male and female adolescents who were in the upper high school level had more advanced levels of moral reasoning than those in the lower high school level.

Table 18: Postconventional Scores for the Interaction Effect between Year in School and Gender

Gender	Year in school							MS	F
	Lower ^a			Upper ^b					
	M		95% CI	M		95% CI			
	(SD)	SE	[LL, UL]	(SD)	SE	[LL, UL]			
Male ^c	33.72		[31.44,	40.48		[37.93,			
	(13.85)	1.09	36.00]	(11.64)	1.45	43.04]	2387.86	13.92***	
Female ^d	37.22		[34.56,	48.11		[44.63,			
	(14.03)	1.35	39.88]	(14.27)	1.73	51.59]	4921.14	24.67***	

Note. CI = confidence interval; LL = lower limit; UL = upper limit.

^a $n = 253$. ^b $n = 149$. ^c $n = 226$. ^d $n = 176$.

*** $p < .001$.

Hypothesis two and hypothesis three were tested using a series of ANOVAs. It sought to examine the effect of levels of mathematical giftedness and the effect of levels of verbal giftedness on the postconventional scores. Results from ANOVAs revealed a significant main effect of levels of mathematical giftedness on the postconventional scores.

Students who were highly gifted in mathematics had significantly higher scores on the measure of moral reasoning than did students who were moderately gifted in mathematics. Based on this finding, hypothesis two, *the moral reasoning levels of gifted adolescents who have a higher level of mathematical ability are higher than gifted adolescents who have a lower level of mathematical ability*, was supported.

Results from this study also showed a significant interaction effect between level of verbal giftedness and gender on the postconventional scores. Gifted female adolescents who differed in levels of verbal giftedness performed significantly different on the measure of postconventional thinking. Female adolescents who were highly gifted in verbal ability scored significantly higher in the postconventional index than did female adolescents who were moderately gifted in verbal ability. However, gifted males who differed in levels of verbal giftedness did not perform significantly differently on the postconventional index. Consequently, hypothesis three, *the moral reasoning levels of gifted adolescents who have a higher level of verbal ability are higher than gifted adolescents who have a lower level of verbal ability*, was partially supported. Results from this study showed that gender had a joint effect with level of verbal giftedness on postconventional moral reasoning.

Apart from findings relevant to the hypotheses, results from this study revealed an interaction effect between gender and year in school on moral reasoning. Both gifted male and female students who were in the upper high school level performed significantly better on the postconventional index than those who were in the lower high school level.

4.3 Ego Identity Status Analysis

Analyses of ego identity status were conducted using data from the Extended Objective Measure of Ego Identity Status-2 (EOM-EIS-2). The instrument yields categorical data which is used to categorize subjects into one of the identity statuses (i.e., achievement, moratorium, foreclosure, and diffusion). It also provides continuous data which is a sum of scores of each identity status. It reflects the degree to which each identity status is exhibited by an individual. Categorical and continuous data from the EOM-EIS-2 provide information regarding the development of each identity status in the ideological and interpersonal domains. It also yields scores on the total identity domain, which is a composite of the ideological and interpersonal subscales and is an index of the overall identity development.

In this study, there are three hypotheses that can be tested by using continuous and categorical data from the EOM-EIS-2. These hypotheses are:

Hypothesis 4: Gifted adolescents are more advanced in ego identity status than age peers who have not been identified as gifted.

Hypothesis 5: Gifted adolescents who have a higher level of mathematical giftedness are more advanced in ego identity status than gifted adolescents who have a lower level of mathematical giftedness.

Hypothesis 6: Gifted adolescents who have a higher level of verbal giftedness are more advanced in ego identity status than gifted adolescents who have a lower level of verbal giftedness.

4.3.1 The effect of ability on ideological, interpersonal, and total identity.

Hypothesis four investigated possible differences in the development of ideological, interpersonal, and overall identity between gifted adolescents and their age peers not identified as gifted. Apart from the ability variable, gender and year in school were also entered as independent variables. To examine the hypothesis, a multivariate analysis of variance (MANOVA) using a 2 x 2 x 2 (Ability [gifted, non-identified] x Gender [male, female] x Year in school [lower high school, upper high school]) factorial design was carried out. Continuous scores from four identity statuses (i.e., achievement, moratorium, foreclosure, and diffusion) obtained from the EOM-EIS-2 were entered as dependent variables.

Apart from using continuous scores, this study also employed categorical data from the EOM-EIS-2. Specifically, Pearson's chi-square tests (χ^2) were used to examine the discrepancy of the frequency distribution of each identity status manifested by gifted and non-identified participants. Both MANOVA analysis and Pearson's chi-square test were carried out on the ideological, interpersonal, and total identity domains separately.

4.3.1.1 The effect of ability on ideological identity.

Prior to conducting a MANOVA, it is necessary that assumptions be assessed. MANOVA assumptions include equality of variance-covariance and normality of distribution (Hair et al., 2010). The assumption of equality of variance-covariance can be assessed using Box's M test for equality of covariance matrices and Levene's test for homogeneity of

variance. Box's M test is a multivariate test of homoscedasticity, which assesses the equivalence of the overall variance-covariance matrices of the dependent variables between the groups. Levene's test is a univariate test of homoscedasticity, which assesses the homogeneity of variance of each dependent variable separately (Hair et al., 2010). Levene's test is necessary for conducting MANOVAs because it dictates the reliability of the univariate tests and reassures the robustness of results obtained from multivariate tests (Field, 2009). Assumption of normality was assessed by Shapiro-Wilk tests and histograms (Hair et al., 2010). Apart from the aforementioned tests of MANOVA assumption, Bartlett's test for sphericity has been recommended as a test for correlations among all dependent variables (Hair et al., 2010).

Results from Box's M test revealed a nonsignificant statistic ($p = .726$), indicating that there were no significant differences between group variances on the identity status variables collectively. Levene's test of homogeneity of variance revealed nonsignificant differences between groups variances in the ideological diffusion, $F(7, 426) = 1.16, p = .326$; foreclosure, $F(7, 426) = 1.05, p = .397$; moratorium, $F(7, 426) = 0.72, p = .656$; and achievement statuses, $F(7, 426) = 1.95, p = .061$. Therefore, the covariance matrices between the two groups were equal and the assumption of the homogeneity of variance-covariance was tenable for each individual variable separately as well as for the four variables collectively. Bartlett's test for sphericity was significant ($p < .001$), suggesting an existence of intercorrelations among all dependent variables.

In order to assess the assumption of normality, Shapiro-Wilk tests were conducted on the entire sample. As displayed in Table 19, 60% of the identity subscales did not show significant Shapiro-Wilk (W) statistics. This result was confirmed by histograms (see

Appendix M). Histograms showed symmetrical patterns and no evidence of bi-modal distribution. Graphical data revealed a roughly normal distribution in each subscale. Therefore, the assumption of normality was not significantly violated.

Table 19: Normality of Distribution of the EOM-EIS-2 Ideological, Interpersonal, and Total Ego Identity Status Subscales

Subscale	W^a	p
Ideological		
Diffusion	.996	.328
Foreclosure	.982	.000
Moratorium	.995	.159
Achievement	.992	.014
Interpersonal		
Diffusion	.994	.100
Foreclosure	.982	.000
Moratorium	.991	.011
Achievement	.994	.102
Total		
Diffusion	.996	.429
Foreclosure	.987	.001
Moratorium	.994	.086
Achievement	.995	.179

^a $df = 434$.

After MANOVA assumptions were attained, statistical analyses were executed. Results from the MANOVA conducted on the ideological identity subscale are presented in Table 20. Using Pillai-Bartlett multivariate trace criterion (V) as a test of significance, it was revealed that neither did ability, gender, nor year in school have a significant effect on ideological identity. None of the interactions was significant, all $V \leq 0.016$, $F \leq 1.77$, $p \geq .134$. The nonsignificant effect of ability on the ideological identity subscale suggested that gifted adolescents and adolescents not identified as gifted were not significantly different in the development of ideological identity.

Table 20: Effect of Ability, Gender, and Year in School on the Ideological Identity Subscale

Effect	V	F^a	p
Ability	0.015	1.57	.182
Gender	0.011	1.19	.315
Year in school	0.006	0.66	.623
Ability x Gender	0.016	1.77	.134
Ability x Year in school	0.005	0.49	.739
Gender x Year in school	0.005	0.58	.678
Ability x Gender x Year in school	0.002	0.24	.913

^a $df = 4$, Error $df = 423$.

Apart from analysing data using MANOVA, Pearson's chi-square (χ^2) was carried out using categorical data from the EOM-EIS-2 to examine differences in frequency of distribution of ideological identity statuses between gifted and non-identified participants. Categorical data were obtained from summing scores of each identity status and calculating cut-off points to classify participants into one of the identity statuses (i.e., achievement, moratorium, foreclosure, and diffusion) in the ideological, interpersonal, or total identity domain.

As presented in Table 21, results from chi-square test did not find a significant difference in the frequency distribution of identity statuses in the ideological domain between gifted participants and their age peers not identified as gifted. This confirmed findings obtained from MANOVA in that gifted adolescents were not significantly different from their age peers not identified as gifted in the development of ideological identity. Data also showed a pattern of distribution in which the majority of participants from both ability groups were classified in the identity diffusion status, followed by moratorium, foreclosure, and achievement statuses.

Table 21: Percentages of Identity Status Classification of Gifted and Non-Identified Groups in the Ideological Identity Domain

Identity status	Ability		ASR ^a	χ^2 ^b	<i>p</i>
	Non-identified	Gifted			
	(<i>n</i> = 32) <i>n</i> (%)	(<i>n</i> = 402) <i>n</i> (%)			
Diffusion	15 (47)	138 (34)	1.4		
Foreclosure	3 (9)	75 (19)	1.3		
Moratorium	12 (38)	127 (32)	0.7		
Achievement	2 (6)	62 (15)	1.4	4.76	.190

^aAdjusted standardized residuals equal to or higher than 1.96 indicates a level of significance at the 0.05 level.

^b*df* = 3, *N* = 434.

4.3.1.2 The effect of ability on interpersonal identity.

Prior to conducting statistical analysis, assumptions of MANOVA were tested using variables from the interpersonal identity subscale. Box's M test of equality of covariance matrices was not significant ($p = .090$), suggesting that the covariance matrices were equal and that the assumption of equality of covariance matrices was not significantly violated. Levene's test showed that differences between group variances were not significant in the interpersonal diffusion, $F(7, 426) = 0.84$, $p = .557$; foreclosure, $F(7, 426) = 1.68$, $p = .113$; moratorium, $F(7, 426) = 0.98$, $p = .448$; and achievement statuses, $F(7, 426) = 1.19$, $p = .307$. Therefore, the equality of variance assumption of each dependent variable was tenable. Bartlett's test for sphericity was significant ($p < .001$), indicating significant intercorrelations among all dependent variables. The assumption of normality has been reported in detail in section 4.3.1.1. Results from both Shapiro-Wilk

tests (see Table 19) and histograms (see Appendix M) indicated that data were roughly normally distributed and that the assumption of normality was not significantly violated.

Table 22 presents results from MANOVA on the interpersonal identity subscale. There was a significant multivariate effect of ability on interpersonal identity. The ability effect was small, $\eta_p^2 = .025$. Gender and year in school did not have significant effects on the interpersonal identity subscale. None of the interactions was statistically significant, all $V \leq 0.010$, $F \leq 1.08$, $p \geq .368$.

Table 22: Effects of Ability, Gender, and Year in School on the Interpersonal Identity Subscale

Effect	<i>V</i>	<i>F</i> ^a	<i>p</i>
Ability	0.025	2.73	.029
Gender	0.009	0.95	.432
Year in school	0.018	1.98	.097
Ability x Gender	0.010	1.08	.368
Ability x Year in school	0.010	1.05	.382
Gender x Year in school	0.006	0.67	.610
Ability x Gender x Year in school	0.006	0.62	.649

^a*df* = 4, *Error df* = 423.

Given the significant multivariate main effect of ability, analysis from a univariate test was examined. The significant effect of ability was evident in the interpersonal achievement status, $F(1, 426) = 7.18$, $MS = 202.97$, $p = .008$, with a small effect size, $\eta_p^2 = .017$. To examine mean differences between the two groups, a simple main effect ANOVA was carried out.

As depicted in Table 23, results from the main effect ANOVA indicated a significant difference on the interpersonal achievement scores between gifted adolescents and adolescents who were not identified as gifted. Gifted adolescents ($M = 29.30$, $SD = 5.29$) had significantly lower interpersonal achievement scores than did their age peers not identified as gifted ($M = 31.72$, $SD = 5.48$).

Table 23: Interpersonal Achievement Status Scores of Gifted and Non-Identified Groups

	Gifted ^a			Non-identified ^b			F^c	p
	M (SD)	SE	95% CI [LL , UL]	M (SD)	SE	95% CI [LL , UL]		
Interpersonal achievement	29.30 (5.29)	0.26	[28.78, 29.82]	31.72 (5.48)	0.94	[29.88, 33.56]	6.16	.013

Note. CI = confidence interval; LL = lower limit; UL = upper limit.

^a $n = 402$. ^b $n = 32$.

^c $df = 1$, Error $df = 432$.

Pearson's chi-square test was conducted to investigate relationships between ability and interpersonal identity statuses. Table 24 displays results from Pearson's chi-square test. There was a significant difference in the frequency of distribution in the achievement status between gifted adolescents and their age peers not identified as gifted. A significantly greater proportion of participants not identified as gifted (22%) were classified as identity achieved than gifted participants (10%). This finding was consistent with that obtained from the MANOVA. The distribution of moratorium, diffusion, and foreclosure statuses between the gifted and non-identified groups was not significantly different. A majority of both gifted and non-identified participants were performing in the moratorium status (non-identified = 50%, gifted = 39%).

Table 24: Percentages of Ego Identity Status Classification of the Gifted and Non-Identified Groups in the Interpersonal Identity Domain

Identity status	Ability		ASR ^a	χ^2 ^b	<i>p</i>
	Non-identified	Gifted			
	(<i>n</i> = 32) <i>n</i> (%)	(<i>n</i> = 402) <i>n</i> (%)			
Diffusion	6 (19)	130 (32)	1.6		
Foreclosure	3 (9)	76 (19)	1.3		
Moratorium	16 (50)	158 (39)	1.2		
Achievement	7 (22)	38 (10)	2.2	8.48	.037

^aAdjusted standardized residuals equal to or higher than 1.96 indicates a level of significance at the 0.05 level.

^b*df* = 3, *N* = 434.

4.3.1.3 The effect of ability on total identity.

Prior to conducting MANOVA, it is necessary to ensure that MANOVA assumptions are not violated. Box's M test for equality of covariance matrices was not significant ($p = .715$), indicating that the covariance matrices were equal and that the assumption was tenable. Levene's test of homogeneity of variance revealed nonsignificant differences between group variances in the total diffusion, $F(7, 426) = 1.48, p = .174$; foreclosure, $F(7, 426) = 1.19, p = .310$; moratorium, $F(7, 426) = 1.11, p = .353$; and achievement statuses, $F(7, 426) = 0.94, p = .478$. Hence, the assumption of homoscedasticity was met for each variable individually and for the four variables collectively. Bartlett's test for sphericity was significant ($p < .001$), suggesting that intercorrelations among all dependent variables were observed. The Shaprio-Wilk tests (see Table 19) and histograms (see Appendix M) showed roughly normal distributions of the four total identity statuses. Thus, the assumption of normality was not significantly violated.

Results from Pillai's trace (V) are presented in Table 25. Ability, gender, and year in school did not have a significant effect on the total identity score. None of the interactions was significant, all $V \leq 0.014, F \leq 1.54, p \geq .191$. Based on this finding, the overall identity status development of gifted adolescents was not significantly different from that of adolescents who were not identified as gifted. The nonsignificant effect of gender suggested that male and female adolescents did not differ in the development of overall identity status. The lack of significant year in school effect pointed towards a similarity between adolescents in the lower level of high school and those in the upper level of high school in the overall identity formation.

Table 25: Effects of Ability, Gender, and Year in School on the Total Identity Subscale

Effect	V	F ^a	p
Ability	0.008	0.84	.498
Gender	0.007	0.74	.565
Year in school	0.016	1.74	.141
Ability x Gender	0.014	1.54	.191
Ability x Year in school	0.006	0.59	.671
Gender x Year in school	0.006	0.64	.631
Ability x Gender x Year in school	0.003	0.36	.839

^adf = 4, Error df = 423.

To further explore the effect of ability on the total identity domain, Pearson's chi-square test was conducted. As displayed in Table 26, there was no significant association between ability and total identity statuses, showing that a relatively equal proportion of participants from both groups were classified in each identity status. The majority of both groups were classified in the moratorium and diffusion statuses, followed by the foreclosure and achievement statuses. The nonsignificant relationship between ability and total identity statuses supported results obtained from MANOVA.

Table 26: Percentages of Ego Identity Status Classification of the Gifted and Non-Identified Groups in the Total Identity Domain

Identity status	Ability		ASR ^a	χ^2 ^b	<i>p</i>
	Non-identified	Gifted			
	(<i>n</i> = 32) (%)	(<i>n</i> = 402) <i>n</i> (%)			
Diffusion	11 (34)	126 (31)	0.4		
Foreclosure	6 (19)	80 (20)	0.2		
Moratorium	10 (31)	149 (37)	0.7		
Achievement	5 (16)	47 (12)	0.7	0.76	.858

^aAdjusted standardized residuals equal to or higher than 1.96 indicates a level of significance at the 0.05 level.

^b*df* = 3, *N* = 434.

Hypothesis four examined the effect of ability on the development of identity in the ideological, interpersonal, and total domains. Findings from both MANOVA and Pearson's chi-square tests revealed a nonsignificant effect of ability on the ideological and total identity domains. This result suggested a resemblance between gifted adolescents and their age peers of not identified as gifted on the development of ideological and overall identity.

Nonetheless, findings from MANOVA showed a significant effect of ability on the interpersonal identity subscale. Adolescents not identified as gifted had significantly higher interpersonal achievement scores than did gifted adolescents. Results from chi-square test demonstrated a significantly larger percentage of adolescents not identified as gifted being classified as identity achieved than gifted adolescents. The finding that gifted adolescents had lower scores in the interpersonal identity than non-identified age

peers suggested that the gifted group was less advanced in interpersonal identity than did their counterparts not identified as gifted. Consequently, hypothesis four, *gifted adolescents are more advanced in identity status than age peers who have not been identified as gifted*, was not supported.

4.3.2 Additional analyses on the effect of ability on interpersonal identity using domain-specific identity issues.

Apart from using scores from ideological and interpersonal subscales to analyze identity development, it is also possible to use scores from individual identity issues measured in the EOM-EIS-2. The use of domain-specific identities has been recommended in recent literature. This is because it provides in-depth, comprehensive findings regarding the identity development of adolescents in identity issues specific to ideological and interpersonal identity domains (Goossens, 2001; Solomontos-Kountouri & Hurry, 2008). The ideological subscale contains four identity issues, which are occupation, politics, religion, and lifestyle. The interpersonal subscale includes four identity issues, which are friendship, dating, recreation, and gender role (Adams, 1998).

This part sought to further analyze findings obtained from the major analyses presented in section 4.3.1.2. Major analyses indicated a significant effect of ability on the interpersonal identity. To investigate this effect further, a separate MANOVA analysis was conducted on the four identity issues in the interpersonal domain between the gifted and the non-identified groups. Continuous scores of the four interpersonal identity issues (i.e., friendship, dating, recreation, and gender role) were entered as dependent variables and ability as the independent variable.

Prior to conducting MANOVA, tests of assumptions were assessed on dependent variables. Box's M test for equality of covariance matrices showed a nonsignificant value for all identity issues in the interpersonal domain: friendship ($p = .239$), dating ($p = .577$), recreation ($p = .644$), and gender role ($p = .403$). Nonsignificant statistics denoted the equality of the covariance matrices: thus, the assumption was tenable. Levene's test for homogeneity of variance revealed nonsignificant differences between group variances in the interpersonal subscale, all $F(1, 432) \leq 2.69, p \geq .102$. However, Levene's statistics were significant on the dating diffusion status, $F(1, 432) \leq 5.02, p = .026$. Given a large sample size and the presence of homogeneity of variance for all other subscales, data correction procedures were considered unnecessary (Hair et al., 2010). Therefore, the equality of variance assumption of dependent variables was not significantly violated. Bartlett's test of sphericity was significant ($p < .001$), suggesting that all dependent variables were intercorrelated. Normal probability plots and histograms indicated a roughly normal distribution.

Results from MANOVA on the effect of ability on interpersonal identity issues are presented in Table 27. There was a significant multivariate effect of ability on the dating and gender role subscales. The effect sizes were small, $\eta_p^2 = .039$ and $.028$, respectively. Ability did not have a significant effect either on friendship or on recreation subscales.

Table 27: The Effect of Ability on the Interpersonal Identity Issues

Identity issue	<i>V</i>	<i>F</i> ^a	<i>p</i>
Friendship	0.010	1.11	.352
Dating	0.039	4.34	.002
Recreation	0.012	1.27	.282
Gender role	0.028	3.14	.015

^a*df* = 4, *Error df* = 429.

Following the significant multivariate effect of ability on the dating and gender role subscales, findings from univariate tests were checked and one-way ANOVAs conducted to investigate mean differences between groups. There were two dating statuses and one gender role status with statistically significant results (see Table 28).

First, there was a significant result on the dating foreclosure status with a small effect size, $\eta_p^2 = .014$. Results from the one-way ANOVA revealed that gifted adolescents ($M = 2.35$, $SD = 1.05$) scored significantly higher on the dating foreclosure status than did adolescents not identified as gifted ($M = 1.87$, $SD = 0.97$).

Second, there was a significant statistic on the dating moratorium status with a small effect size, $\eta_p^2 = .020$. Gifted adolescents ($M = 3.56$, $SD = 0.90$) had significantly higher dating moratorium scores than did their age peers not identified as gifted ($M = 3.06$, $SD = 0.99$).

In terms of gender role, results from univariate tests indicated a significant effect of gender on the moratorium status with a small effect size, $\eta_p^2 = .009$. Gifted adolescents ($M = 3.14$, $SD = 0.98$) had significantly higher scores on the gender role moratorium status than did their age peers who were not identified as gifted ($M = 2.78$, $SD = 0.98$).

Although the result pertaining the dating achievement status were not statistically significant, it was somewhat close to the pre-determined significant alpha level of .05 ($p = .053$). This suggested that the mean dating achievement score of gifted adolescents ($M = 2.63$, $SD = 1.17$) was somewhat lower than that of the adolescents not identified as gifted ($M = 3.05$, $SD = 1.18$).

Table 28: Interpersonal Identity Issue Status Scores for the Ability Variable

Identity issue status	Ability						MS	F ^a	p
	Non-identified n = 32			Gifted n = 402					
	M (SD)	SE	95% CI [LL, UL]	M (SD)	SE	95% CI [LL, UL]			
Dating foreclosure	1.87 (0.97)	0.17	1.53, 2.22	2.35 (1.05)	0.05	2.24, 2.45	6.57	5.98	.015
Dating moratorium	3.06 (0.99)	0.17	2.71, 3.42	3.56 (0.90)	0.04	3.47, 3.64	7.22	8.77	.003
Dating Achievement	3.05 (1.18)	0.21	2.62, 3.47	2.63 (1.75)	0.06	2.51, 2.74	5.20	3.76	.053
Gender role moratorium	2.78 (0.98)	0.17	2.43, 3.14	3.14 (0.98)	0.05	3.05, 3.24	3.85	3.97	.047

^a $df = 1$, Error $df = 432$.

Analyses in this section added to the major analysis in that there were differences in interpersonal identity development between the gifted and non-identified groups in issues pertaining dating and gender role. In the area of dating, gifted adolescents reported to have a higher degree of foreclosure and moratorium than did those not identified as gifted. Adolescents not identified as gifted were more advanced in dating, reporting a higher degree of exploration and commitment, than gifted adolescents. In terms of gender role, gifted adolescents had significantly higher moratorium scores, displaying a higher degree of exploration, than did their age peers who were not identified as gifted.

4.3.3 Effects of levels of mathematical and levels of verbal giftedness on ideological, interpersonal, and total identity.

Hypothesis five and hypothesis six investigated possible differences in the development of ideological, interpersonal, and overall identity domains between gifted participants who differed in levels of mathematical giftedness and in levels of verbal giftedness. Gender and year in school were also entered as additional independent variables. The hypotheses were tested using a multivariate analysis of variance (MANOVA) with 2 x 2 x 2 x 2 (Level of mathematical giftedness [high, moderate] x Level of verbal giftedness [high, moderate] x Gender [male, female] x Year in school [lower high school, upper high school]) factorial design. Continuous scores from four identity statuses (i.e. achievement, moratorium, foreclosure, and diffusion) were entered as dependent variables.

Apart from MANOVA, Pearson's chi-square tests (χ^2) were conducted using categorical data to explore possible differences in the frequency distribution of identity statuses between gifted adolescents who differed in levels of mathematical giftedness and in levels of verbal giftedness. MANOVA analysis and Pearson's chi-square test were conducted on the ideological, interpersonal, and total identity domains separately.

4.3.3.1 The effect of levels of mathematical and levels of verbal giftedness on ideological identity.

Prior to conducting a MANOVA, tests of assumptions were carried out. Box's M test for equality of covariance matrices showed a nonsignificant value ($p = .499$), indicating that the covariance matrices were equal and that the assumption was tenable. For the univariate test of homoscedasticity, Levene's test for homogeneity of variance revealed nonsignificant differences of group variances in the ideological diffusion, $F(15, 386) = 1.45, p = .120$; moratorium, $F(15, 386) = 0.52, p = .931$; and achievement statuses, $F(15, 386) = 1.37, p = .157$. However, Levene's test revealed a significant statistic on the ideological foreclosure status, $F(15, 386) = 2.01, p = .014$. Given a large sample size and the presence of homoscedasticity on the other three variables, data correction procedures were deemed unnecessary (Hair et al., 2010). Overall, the equality of variance assumption was met for each variable individually as well as for the four dependent variables collectively. Bartlett's test for sphericity was significant ($p < .001$), suggesting an existence of intercorrelations among all dependent variables. The Shapiro-Wilk tests (see Table 19) and histograms (see Appendix M) suggested a roughly

normal distribution of ideological identity scores. Therefore, the assumption of normality was not significantly violated.

As presented in Table 29, there were significant multivariate main effects for level of verbal giftedness, gender, and year in school on the ideological identity subscale. The effects of level of verbal giftedness and gender were small, $\eta_p^2 = .028$ and $.043$, respectively. The effect of year in school was medium, $\eta_p^2 = .062$. The level of mathematical giftedness variable did not have a significant effect on the ideological identity subscale. None of the interactions yielded a statistically significant value, all $V \leq 0.013$, $F \leq 1.24$, $p \geq .293$.

Table 29: Effects of Level of Mathematical Giftedness, Level of Verbal Giftedness, Gender, and Year in School on the Ideological Identity Subscale

Effect	V	F ^a	p
Level of mathematical giftedness	0.008	0.73	.569
Level of verbal giftedness	0.028	2.71	.030
Gender	0.043	4.34	.002
Year in school	0.062	6.28	.000
Level of mathematical giftedness x Level of verbal giftedness	0.010	0.94	.441
Level of mathematical giftedness x Gender	0.010	0.94	.441
Level of mathematical giftedness x Year in school	0.003	0.26	.906
Level of verbal giftedness x Gender	0.001	0.09	.986
Level of verbal giftedness x Year in school	0.013	1.24	.293
Gender x Year in school	0.007	0.68	.608
Level of mathematical giftedness x Level of verbal giftedness x Gender	0.004	0.42	.795
Level of mathematical giftedness x Level of verbal giftedness x Year in school	0.009	0.88	.476
Level of mathematical giftedness x Gender x Year in school	0.012	1.17	.322
Level of verbal giftedness x Gender x Year in school	0.011	1.05	.383
Level of mathematical giftedness x Level of verbal giftedness x Gender x Year in school	0.008	0.79	.535

^adf = 4, Error df = 383.

To further examine the multivariate main effect for the level of verbal giftedness on ideological identity, results from univariate tests were checked and simple main effect ANOVAs conducted in order to explore mean differences between groups. Univariate analysis revealed a significant effect of level of verbal giftedness on the ideological diffusion status, $F(1, 386) = 6.18$, $MS = 246.40$, $p = .013$, $\eta_p^2 = .016$. However, results from a simple main effect ANOVA showed a nonsignificant statistic, but somewhat close to the pre-determined significant alpha level of .05 ($p = .063$, see Table 30). This suggested that highly verbally gifted adolescents ($M = 26.24$, $SD = 6.74$) had somewhat lower scores on the ideological diffusion subscale than moderately verbally gifted adolescents ($M = 27.50$, $SD = 5.81$).

In terms of gender, univariate tests indicated a significant effect of gender on the ideological moratorium status, $F(1, 386) = 10.49$, $MS = 409.82$, $p = .001$, with a small effect size, $\eta_p^2 = .026$. Results from a simple main effect ANOVA revealed that gifted female students ($M = 28.41$, $SD = 6.40$) outperformed their male counterpart ($M = 26.34$, $SD = 6.20$) on the ideological moratorium subscale (see Table 30).

For the year in school variable, univariate analysis indicated a significant effect of year in school on the ideological diffusion status, $F(1, 386) = 11.27$, $MS = 448.94$, $p = .001$, and on the ideological foreclosure status, $F(1, 386) = 15.14$, $MS = 534.47$, $p < .001$. The effect sizes were small, $\eta_p^2 = .028$ and $.038$, respectively. As evident from Table 30, gifted adolescents in the upper high school level had significantly lower ideological diffusion scores ($M = 25.23$, $SD = 6.25$) and lower ideological foreclosure status scores ($M = 16.95$, $SD = 5.70$) than did gifted adolescents in the lower high school level ($M = 27.53$, $SD = 6.43$ and $M = 19.76$, $SD = 6.15$, respectively).

Table 30: Ideological Identity Status Scores for the Level of Verbal Giftedness, Gender, and Year in School Variables

Identity status	Level of verbal giftedness						F^a	p
	Moderate			High				
	$n = 139$			$n = 263$				
	M (SD)	SE	95% CI [LL , UL]	M (SD)	SE	95% CI [LL , UL]		
Ideological diffusion	27.50 (5.81)	0.49	[26.52, 28.47]	26.24 (6.74)	0.42	[25.42, 27.06]	3.47	.063
Identity status	Gender						F^a	p
	Male			Female				
	$n = 226$			$n = 176$				
	M (SD)	SE	95% CI [LL , UL]	M (SD)	SE	95% CI [LL , UL]		
Ideological moratorium	26.34 (6.20)	0.41	[25.53, 27.15]	28.41 (6.40)	0.48	[27.46, 29.37]	10.76	.001
Identity status	Year in school						F^a	p
	Lower			Upper				
	$n = 253$			$n = 149$				
	M (SD)	SE	95% CI [LL , UL]	M (SD)	SE	95% CI [LL , UL]		
Ideological diffusion	27.53 (6.43)	0.40	[26.73, 28.32]	25.23 (6.25)	0.51	[24.22, 26.24]	12.21	.001
Ideological foreclosure	19.76 (6.15)	0.39	[19.00, 20.52]	16.95 (5.70)	0.47	[16.02, 17.87]	20.68	.000

Note. CI = confidence interval; LL = lower limit; UL = upper limit.

^a $df = 1$ Error $df = 401$.

Pearson's chi-square test was conducted using categorical data from the EOM-EIS-2. This was to investigate relationships between ideological identity statuses and independent variables (i.e., level of mathematical giftedness, level of verbal giftedness, gender, and year in school). As illustrated in Table 31, there was no significant relationship between the level of mathematical giftedness variable and identity statuses in the ideological domain. This was supportive of results from the MANOVA. Data revealed a trend that showed a greater number of moderately mathematically gifted adolescents (36%) being classified as in moratorium than highly mathematically gifted adolescents (25%). However, both groups were relatively comparable in the frequency of distribution in the diffusion, foreclosure and achievement statuses.

Table 31: Percentages of Ego Identity Status Classification for the Level of Mathematical Giftedness Variable in the Ideological Identity Domain

Identity status	Level of mathematical giftedness		ASR ^a	χ^2 ^b	p
	Moderate	High			
	(n = 253)	(n = 149)			
	n (%)	n (%)			
Diffusion	81 (32)	57 (38)	1.3		
Foreclosure	44 (17)	31 (21)	0.8		
Moratorium	90 (36)	37 (25)	2.2		
Achievement	38 (15)	24 (16)	0.3	5.15	.161

^aAdjusted standardized residuals equal to or higher than 1.96 indicates a level of significance at the 0.05 level.

^bdf = 3, N = 402.

In terms of the level of verbal giftedness variable, analysis from Pearson's chi-square test did not show significant differences in frequency distribution in identity statuses between students who differed in levels of verbal giftedness (see Table 32). Even though not statistically significant, there was a higher percentage of the moderately verbally gifted group (41%) were classified as identity diffused than the highly verbally gifted group (31%). This trend validates results from MANOVA. A similar pattern of distribution in the foreclosure, moratorium, and achievement statuses between the highly verbally gifted group and the moderately verbally gifted group was evident.

Table 32: Percentages of Ego Identity Status Classification for the Level of Verbal Giftedness Variable in the Ideological Identity Domain

Identity status	Level of verbal giftedness		ASR ^a	χ^2 ^b	<i>p</i>
	Moderate	High			
	(<i>n</i> = 139) <i>n</i> (%)	(<i>n</i> = 263) <i>n</i> (%)			
Diffusion	57 (41)	81 (31)	2.1		
Foreclosure	26 (19)	49 (19)	0.0		
Moratorium	38 (27)	89 (34)	1.3		
Achievement	18 (13)	44 (16)	1.0	4.82	.185

^aAdjusted standardized residuals equal to or higher than 1.96 indicates a level of significance at the 0.05 level.

^b*df* = 3, *N* = 402.

For the gender effect, Pearson's chi-square demonstrated significant associations between gender and ideological identity statuses (see Table 33). Supporting results from MANOVA, male and female gifted adolescents performed significantly differently in the ideological moratorium subscale. A significantly larger proportion of gifted females (41%) were in moratorium than were gifted males (24%) whereas a significantly greater proportion of male adolescents (39%) were classified as diffused in the ideological domain than were female adolescents (29%). There was no significant difference in the frequency of distribution between gifted males and gifted females in the foreclosure and achievement statuses.

Table 33: Percentages of Ego Identity Status Classification of the Gender Variable in the Ideological Identity Domain

Identity status	Gender		ASR ^a	χ^2 ^b	<i>p</i>
	Male	Female			
	(<i>n</i> = 226) <i>n</i> (%)	(<i>n</i> = 176) <i>n</i> (%)			
Diffusion	87 (39)	51 (29)	2.0		
Foreclosure	47 (21)	28 (16)	1.2		
Moratorium	55 (24)	72 (41)	3.5		
Achievement	37 (16)	25 (14)	0.6	12.78	.005

^aAdjusted standardized residuals equal to or higher than 1.96 indicates a level of significance at the 0.05 level.

^b*df* = 3, *N* = 402.

Pearson's chi-square was also undertaken to examine relationships between year in school and identity statuses in the ideological domain. As shown in Table 34, there were a significantly greater percentage of gifted adolescents in the upper high school level (42%) being classified as in moratorium than those in the lower high school level (25%). In contrast, a significantly higher percentage of gifted students in the lower high school level (40%) were classified as diffused than those in the upper high school level (25%). Significant differences in the frequency distribution of the diffusion status between the two groups verified findings from MANOVA. The difference in the frequency of distribution in the foreclosure status was close to the pre-determined significant alpha level of .05. A somewhat larger proportion of gifted students in the lower high school level (21%) were classified as foreclosed than were those in the upper high school level (14%).

Table 34: Percentages of Ego Identity Status Classification of the Year in School Variable in the Ideological Identity Domain

Identity status	Year in school		ASR ^a	χ^2 ^b	<i>p</i>
	Lower (<i>n</i> = 253)	Upper (<i>n</i> = 149)			
Diffusion	101 (40)	37 (25)	3.1		
Foreclosure	54 (21)	21 (14)	1.8		
Moratorium	64 (25)	63 (42)	3.5		
Achievement	34 (14)	28 (19)	1.4	19.17	.000

^aAdjusted standardized residuals equal to or higher than 1.96 indicates a level of significance at the 0.05 level.

^b*df* = 3, *N* = 402.

4.3.3.2 The effect of levels of mathematical and levels of verbal giftedness on interpersonal identity.

A series of tests of MANOVA assumption were conducted on the interpersonal identity subscale. For the assumption of multivariate test of homoscedasticity, Box's M test for equality of covariance matrices was not significant ($p = .333$), suggesting no significant differences between group variances on the four dependent variables collectively.

Levene's test for homogeneity of variance revealed that differences between group variances were not significant in the interpersonal diffusion, $F(15, 386) = 0.98, p = .480$; foreclosure, $F(15, 386) = 1.48, p = .109$; moratorium, $F(15, 386) = 0.79, p = .692$; and achievement statuses, $F(15, 386) = 0.97, p = .489$. Therefore, the covariance matrices were roughly equal and that the assumption was not significantly violated. Bartlett's test for sphericity was significant ($p < .001$), indicating that all dependent variables were correlated. For the assumption of normality, results from the Shapiro-Wilk tests (see Table 19) and histograms (see Appendix M) showed roughly normal distributions. Consequently, the assumption of normality was not significantly violated.

Table 35 displays results from the MANOVA on the interpersonal identity domain. Only the year in school variable had a significant effect on interpersonal identity with a small effect size, $\eta_p^2 = .027$. Neither did level of mathematical giftedness, level of verbal giftedness, nor gender have a significant effect on the interpersonal identity subscale, all $V \leq 0.018, F \leq 1.77, p \geq .133$. None of the interaction effects yielded a statistically significant value, all $V \leq 0.012, F \leq 1.13, p \geq .343$.

Table 35: Effects of Level of Mathematical Giftedness, Level of Verbal Giftedness, Gender, and Year in School on the Interpersonal Identity Subscale

Effect	<i>V</i>	<i>F</i> ^a	<i>p</i>
Level of mathematical giftedness	0.007	0.71	.583
Level of verbal giftedness	0.015	1.47	.209
Gender	0.018	1.77	.133
Year in school	0.027	2.62	.035
Level of mathematical giftedness x Level of verbal giftedness	0.003	0.31	.874
Level of mathematical giftedness x Gender	0.003	0.24	.915
Level of mathematical giftedness x Year in school	0.002	0.23	.922
Level of verbal giftedness x Gender	0.001	0.08	.989
Level of verbal giftedness x Year in school	0.009	0.88	.473
Gender x Year in school	0.006	0.57	.684
Level of mathematical giftedness x Level of verbal giftedness x Gender	0.007	0.63	.644
Level of mathematical giftedness x Level of verbal giftedness x Year in school	0.012	1.13	.343
Level of mathematical giftedness x Gender x Year in school	0.009	0.87	.481
Level of verbal giftedness x Gender x Year in school	0.009	0.84	.500
Level of mathematical giftedness x Level of verbal giftedness x Gender x Year in school	0.004	0.37	.827

^a*df* = 4, *Error df* = 383.

Following the significant multivariate main effect of year in school, univariate analysis was checked to locate identity statuses with a significant value. Results from univariate analysis indicated a significant effect of year in school on the interpersonal foreclosure status, $F(1, 386) = 9.80$, $MS = 348.52$, $p = .002$. The size of the effect was small, $\eta_p^2 = .025$. Consequently, a simple main effect ANOVA was carried out to determine mean differences between groups (see Table 36). Gifted students in the lower high school level ($M = 19.83$, $SD = 5.95$) had significantly higher interpersonal foreclosure scores than did students in the upper high school level ($M = 17.43$, $SD = 5.98$).

Table 36: Simple Main Effect ANOVA on the Interpersonal Foreclosure Status Scores for the Year in School Variable

Identity status	Year in school						<i>F</i> ^a
	Lower			Upper			
	<i>n</i> = 253			<i>n</i> = 149			
	<i>M</i>	95% CI		<i>M</i>	95% CI		
	(<i>SD</i>)	<i>SE</i>	[<i>LL</i> , <i>UL</i>]	(<i>SD</i>)	<i>SE</i>	[<i>LL</i> , <i>UL</i>]	
Interpersonal	19.83		[19.09,	17.43		[16.46,	
foreclosure	(5.95)	0.37	20.57]	(5.98)	0.49	18.40]	15.21***

Note. CI = confidence interval; LL = lower limit; UL = upper limit.

^a $df = 1$ Error $df = 401$.

*** $p < .001$.

Pearson's chi-square test was carried out in order to examine the association between identity statuses in the interpersonal domain and independent variables (i.e., level of mathematical giftedness, level of verbal giftedness, gender, and year in school). Table 37 demonstrates results from chi-square analysis on the level of mathematical giftedness variable. The relationship between level of mathematical giftedness and interpersonal identity was not significant, suggesting a similar pattern of frequency distribution of identity statuses between adolescents who differed in levels of mathematical giftedness. The majority of adolescents in both groups were classified in the moratorium status, followed by the diffusion, foreclosure, and achievement statuses. The nonsignificant effect was consistent with results from MANOVA.

Table 37: Percentages of Ego Identity Status Classification for the Level of Mathematical Giftedness Variable in the Interpersonal Identity Domain

Identity status	Level of mathematical giftedness		ASR ^a	χ^2 ^b	<i>p</i>
	Moderate	High			
	(<i>n</i> = 253)	(<i>n</i> = 149)			
	<i>n</i> (%)	<i>n</i> (%)			
Diffusion	78 (31)	52 (35)	0.8		
Foreclosure	49 (19)	27 (18)	0.3		
Moratorium	100 (40)	58 (39)	0.1		
Achievement	26 (10)	12 (8)	0.7	1.06	.788

^aAdjusted standardized residuals equal to or higher than 1.96 indicates a level of significance at the 0.05 level.

^b*df* = 3, *N* = 402.

Analyses revealed a nonsignificant relationship between level of verbal giftedness and interpersonal identity statuses (see Table 38). The distribution of identity statuses of highly verbal gifted adolescents was not significantly different from that of moderately verbal gifted adolescents. The majority of adolescents in both groups were classified in the moratorium and diffusion statuses, followed by the foreclosure and achievement statuses. The nonsignificant relationship between level of verbal giftedness and interpersonal identity status was supportive of results from MANOVA.

Table 38: Percentages of Ego Identity Status Classification for the Level of Verbal Giftedness Variable in the Interpersonal Identity Domain

Identity status	Level of verbal giftedness		ASR ^a	χ^2 ^b	<i>p</i>
	Moderate	High			
	(<i>n</i> = 139) <i>n</i> (%)	(<i>n</i> = 263) <i>n</i> (%)			
Diffusion	47 (34)	83 (32)	0.5		
Foreclosure	31 (22)	45 (17)	1.3		
Moratorium	51 (37)	107 (41)	0.8		
Achievement	10 (7)	28 (10)	1.1	2.95	.399

^aAdjusted standardized residuals equal to or higher than 1.96 indicates a level of significance at the 0.05 level.

^b*df* = 3, *N* = 402

In terms of gender, results from Pearson's chi-square test supported results from MANOVA in that there was a nonsignificant association between gender and interpersonal identity statuses (see Table 39). This demonstrated that male and female gifted adolescents did not differ in the frequency distribution of identity statuses in the interpersonal domain. Nonetheless, there was likelihood that a greater percentage of males (37%) were classified as diffusion in the interpersonal identity domain than females (27%). Both male and female participants were comparable in the frequency distribution of the foreclosure, moratorium, and achievement statuses.

Table 39: Percentages of Ego Identity Status Classification of the Gender Variable in the Interpersonal Identity Domain

Identity status	Gender		ASR ^a	χ^2 ^b	<i>p</i>
	Male	Female			
	(<i>n</i> = 226) <i>n</i> (%)	(<i>n</i> = 176) <i>n</i> (%)			
Diffusion	83 (37)	47 (27)	2.1		
Foreclosure	44 (19)	32 (18)	0.3		
Moratorium	81 (36)	77 (44)	1.6		
Achievement	18 (8)	20 (11)	1.2	5.94	.114

^aAdjusted standardized residuals equal to or higher than 1.96 indicates a level of significance at the 0.05 level.

^b*df* = 3, *N* = 402.

For the year in school variable, Pearson's chi-square tests revealed statistically significant differences in the distribution of interpersonal identity statuses between gifted adolescents in the lower high school level and those in the upper high school level (see Table 40). A significantly greater percentage of adolescents in the lower high school level (23%) being classified as foreclosed in the interpersonal identity domain than were adolescents in the upper high school level (12%). This result was consistent with that obtained from MANOVA. Although not statistically significant, the differences in the frequency of distribution in the interpersonal moratorium status between adolescents in the upper high school level (45%) and those in the lower high school level (36%) were close to the pre-determined significant alpha level of .05. There was no evidence of significant differences in the frequency distribution of the identity diffusion and achievement statuses between the two groups.

Table 40: Percentages of Ego Identity Status Classification for the Year in School Variable in the Interpersonal Identity Domain

Identity status	Year in school		ASR ^a	χ^2 ^b	<i>p</i>
	Lower (<i>n</i> = 253)	Upper (<i>n</i> = 149)			
Diffusion	81 (32)	49 (33)	0.2		
Foreclosure	58 (23)	18 (12)	2.7		
Moratorium	91 (36)	67 (45)	1.8		
Achievement	23 (9)	15 (10)	0.3	7.89	.049

^aAdjusted standardized residuals equal to or higher than 1.96 indicates a level of significance at the 0.05 level.

^b*df* = 3, *N* = 402.

4.3.3.3 The effect of levels of mathematical and levels of verbal giftedness on total identity.

Prior to conducting a MANOVA analysis on the total identity subscale, assumptions of MANOVA were assessed. Box's M test for equality of covariance matrices was not significant ($p = .400$), indicating that the overall variance-covariance matrices of the dependent variables between the groups were equal and that the assumption of multivariate homoscedasticity was tenable. For the univariate test of homoscedasticity, Levene's test was not significant for the total diffusion, $F(15, 386) = 1.05, p = .401$; foreclosure, $F(15, 386) = 1.51, p = .097$; moratorium, $F(15, 386) = 0.56, p = .87$; and achievement statuses, $F(15, 386) = 0.86, p = .606$. Therefore, the assumption of equivalence of variance was tenable for all four dependent variables separately. Bartlett's test for sphericity was significant ($p < .001$), suggesting that intercorrelations existed among dependent variables. Shapiro-Wilk tests (see Table 19) and histograms (see Appendix M) revealed that data were roughly normally distributed. Therefore, the assumption of normality was not significantly violated.

Results from a factorial MANOVA on the total identity subscale are presented in Table 41. There was a significant main effect of level of verbal giftedness and gender with a small effect size, $\eta_p^2 = .029$ and $.041$, respectively. The effect of year in school was also significant with an effect size approaching medium, $\eta_p^2 = .055$. However, the level of mathematical giftedness variable did not yield a significant effect nor did interactions, all $V \leq 0.014, F \leq 1.32, p \geq .262$.

Table 41: Effects of Level of Mathematical Giftedness, Level of verbal Giftedness, gender, and Year in School on the Total Identity Subscale

Effect	V	F ^a	p
Level of mathematical giftedness	0.006	0.61	.652
Level of verbal giftedness	0.029	2.83	.025
Gender	0.041	4.04	.003
Year in school	0.055	5.52	.000
Level of mathematical giftedness x Level of verbal giftedness	0.008	0.74	.567
Level of mathematical giftedness x Gender	0.007	0.68	.607
Level of mathematical giftedness x Year in school	0.002	0.23	.921
Level of verbal giftedness x Gender	0.000	0.02	.999
Level of verbal giftedness x Year in school	0.012	1.20	.312
Gender x Year in school	0.007	0.66	.623
Level of mathematical giftedness x Level of verbal giftedness x Gender	0.006	0.54	.706
Level of mathematical giftedness x Level of verbal giftedness x Year in school	0.013	1.23	.296
Level of mathematical giftedness x Gender x Year in school	0.014	1.32	.262
Level of verbal giftedness x Gender x Year in school	0.009	0.91	.460
Level of mathematical giftedness x Level of verbal giftedness x Gender x Year in school	0.003	0.28	.889

^adf = 4, Error df = 383.

Following the significant effects of level of verbal giftedness, gender, and year in school, results from univariate tests were verified and simple main effect ANOVAs conducted to determine mean differences. Results from the univariate analysis revealed a significant effect of level of verbal giftedness on the total diffusion status, $F(1, 386) = 9.36$, $MS = 748.22$, $p = .002$, with a small effect size, $\eta_p^2 = .024$. As presented in Table 42, students who were highly gifted in verbal ability ($M = 50.65$, $SD = 9.49$) scored significantly lower on the identity diffusion subscale than did their counterparts who were moderately gifted in verbal ability ($M = 52.73$, $SD = 8.50$).

Findings from univariate tests also indicated a significant effect of gender on the total moratorium scores, $F(1, 386) = 7.10$, $MS = 711.70$, $p = .008$, with a small effect size, $\eta_p^2 = .018$. As seen from Table 42, a simple effect ANOVA revealed that female gifted students ($M = 55.73$, $SD = 10.28$) scored significantly higher on the total moratorium status than did their male counterparts ($M = 52.88$, $SD = 10.00$).

There was also a significant effect of year in school on the total diffusion status, $F(1, 386) = 8.67$, $MS = 692.15$, $p = .003$, and on the total foreclosure status, $F(1, 386) = 15.13$, $MS = 1746.18$, $p < .001$. The effect sizes were small, $\eta_p^2 = .022$ and $.038$, respectively. Results from a simple main effect ANOVA displayed significant mean differences between adolescents in the lower high school level and their counterpart from the upper high school level (see Table 42). Gifted adolescents who were in the upper high school level scored significantly lower on the total diffusion status ($M = 49.58$, $SD = 9.09$) and on the total foreclosure status ($M = 34.38$, $SD = 10.51$) than did gifted adolescents in the lower high school level ($M = 52.42$, $SD = 9.12$ and $M = 39.59$, $SD = 10.94$, respectively).

Table 42: Total Identity Status Scores for the Level of Verbal Giftedness, Gender, and Year in School Variables

Level of verbal giftedness								
Identity status	Moderate <i>n</i> = 139			High <i>n</i> = 263			<i>F</i> ^a	<i>p</i>
	<i>M</i>	95% CI		<i>M</i>	95% CI			
	(<i>SD</i>)	<i>SE</i>	[<i>LL</i> , <i>UL</i>]	(<i>SD</i>)	<i>SE</i>	[<i>LL</i> , <i>UL</i>]		
Total	52.73		[51.30,	50.65		[49.50,		
diffusion	(8.50)	0.72	54.15]	(9.49)	0.58	51.80]	4.67	.031
Gender								
	Male <i>n</i> = 226			Female <i>n</i> = 176				
	<i>M</i>	95% CI		<i>M</i>	95% CI			
	(<i>SD</i>)	<i>SE</i>	[<i>LL</i> , <i>UL</i>]	(<i>SD</i>)	<i>SE</i>	[<i>LL</i> , <i>UL</i>]		
Total	52.88		[51.57,	55.73		[54.20,		
moratorium	(10.00)	0.67	54.20]	(10.28)	0.77	57.26]	7.80	.005
Year in school								
	Lower <i>n</i> = 253			Upper <i>n</i> = 149				
	<i>M</i>	95% CI		<i>M</i>	95% CI			
	(<i>SD</i>)	<i>SE</i>	[<i>LL</i> , <i>UL</i>]	(<i>SD</i>)	<i>SE</i>	[<i>LL</i> , <i>UL</i>]		
Total	52.42		[51.29,	49.58		[48.10,		
diffusion	(9.12)	0.57	53.55]	(9.09)	0.74	51.05]	9.14	.003
Total	39.59		[38.23,	34.38		[32.67,		
foreclosure	(10.94)	0.69	32.67]	(10.51)	0.86	36.08]	21.91	.000

Note. CI = confidence interval; *LL* = lower limit; *UL* = upper limit.

^a*df* = 1 *Error df* = 401.

In order to examine the relationships between identity status in the total domain and independent variables (i.e., level of mathematical giftedness, level of verbal giftedness, gender, and year in school), Pearson's chi-square test was conducted. Table 43 showed that there was no significant association between level of mathematical giftedness and total identity statuses. The majority of both highly mathematically gifted adolescents and the moderately mathematically gifted adolescents were classified in the moratorium status, followed by diffusion, foreclosure, and achievement statuses. The nonsignificant effect of level of mathematical giftedness on total identity was supportive of findings obtained from MANOVA.

Table 43: Percentages of Ego Identity Status Classification for the Level of Mathematical Giftedness Variable in the Total Identity Domain

Identity status	Level of mathematical giftedness		ASR ^a	χ^2 ^b	p
	Moderate	High			
	(n = 253)	(n = 149)			
	n (%)	n (%)			
Diffusion	74 (29)	52 (35)	1.2		
Foreclosure	53 (21)	27 (18)	0.7		
Moratorium	94 (37)	55 (37)	0.0		
Achievement	32 (13)	15 (10)	0.8	1.87	.600

^aAdjusted standardized residuals equal to or higher than 1.96 indicates a level of significance at the 0.05 level.

^bdf = 3, N = 402.

For the level of verbal giftedness variable, Pearson's chi-square did not find a significant relationship with total identity statuses in the total domain (see Table 44). Although not statistically significant, a somewhat larger proportion of highly verbally gifted adolescents (40%) were classified as moratorium than were moderately verbally gifted adolescents (31%). There was likelihood that a greater percentage of moderately verbally gifted students (37%) being classified in the identity diffusion status in the total domain than were highly verbally students (29%). This trend validated findings from MANOVA. Both groups were comparable in the frequency distribution of the foreclosure and achievement statuses.

Table 44: Percentages of Ego Identity Status Classification for the Level of Verbal Giftedness Variable in the Total Identity Domain

Identity status	Level of verbal giftedness		ASR ^a	χ^2 ^b	<i>p</i>
	Moderate	High			
	(<i>n</i> = 139) <i>n</i> (%)	(<i>n</i> = 263) <i>n</i> (%)			
Diffusion	51 (37)	75 (29)	1.7		
Foreclosure	32 (23)	48 (18)	1.1		
Moratorium	43 (31)	106 (40)	1.8		
Achievement	13 (9)	34 (13)	1.1	6.13	.106

^aAdjusted standardized residuals equal to or higher than 1.96 indicates a level of significance at the 0.05 level.

^b*df* = 3, *N* = 402.

In terms of gender, results from Pearson's chi-square test indicated significant associations between gender and total identity statuses (see Table 45). Consistent with findings obtained from MANOVA, a significantly greater proportion of gifted female adolescents were in moratorium (44%) than were male adolescents (32%). On the contrary, a significantly greater percentage of gifted males (38%) were classified as identity diffused than were gifted females (23%). The distribution of male and female participants was not significantly different in the foreclosure and achievement statuses.

Table 45: Percentages of Ego Identity Status Classification of Gender in the Total Identity Domain

Identity status	Gender		ASR ^a	χ^2 ^b	<i>p</i>
	Male	Female			
	(<i>n</i> = 226) <i>n</i> (%)	(<i>n</i> = 176) <i>n</i> (%)			
Diffusion	86 (38)	40 (23)	3.3		
Foreclosure	44 (19)	36 (20)	0.2		
Moratorium	72 (32)	77 (44)	2.4		
Achievement	24 (11)	23 (13)	0.8	11.75	.008

^aAdjusted standardized residuals equal to or higher than 1.96 indicates a level of significance at the 0.05 level.

^b*df* = 3, *N* = 402.

With regard to year in school, results from Pearson's chi-square demonstrated a significant difference in identity status distribution among adolescents in different levels of high school (see Table 46). A significantly larger percentage of gifted adolescents in the upper high school level (47%) were classified as in moratorium than were those in the upper high school level (31%). In contrast, a significantly greater percentage of gifted students in the lower high school level (36%) were classified as identity diffused in the total domain than were adolescents in the upper high school level (23%). This supported results obtained from MANOVA. The frequency distribution of the foreclosure and achievement statuses was not significantly different between gifted adolescents in different levels of year in school.

Table 46: Percentages of Ego Identity Status Classification of the Year in School Variable in the Total Identity Domain

Identity status	Year in school				ASR ^a	χ^2 ^b	<i>p</i>
	Lower	(<i>n</i>	Upper	(<i>n</i>			
	= 253) (%)	<i>n</i>	= 149) <i>n</i> (%)				
Diffusion	92 (36)		34 (23)		2.8		
Foreclosure	55 (22)		5 (17)		1.2		
Moratorium	79 (31)		70 (47)		3.2		
Achievement	27 (11)		20 (13)		0.8	13.35	.004

^aAdjusted standardized residuals equal to or higher than 1.96 indicates a level of significance at the 0.05 level.

^b*df* = 3, *N* = 402.

A series of MANOVAs and Pearson's chi-square tests were conducted in order to test hypothesis five and hypothesis six. Overall, results from this study did not find a significant effect for levels of mathematical giftedness on either the ideological, interpersonal, and overall domains. Neither was there a significant difference in the frequency distribution of identity statuses between adolescents who differed in levels of mathematical giftedness. Students who were highly gifted in mathematics were not significantly different from their counterparts who were moderately gifted in mathematics in the development of identity formation. Even though results from Pearson's chi-square tests revealed a trend that showed a greater proportion of moderately mathematically gifted participants being classified as moratorium in the ideological and total identity domains than highly mathematically gifted participants, the difference was not statistically significant. Based on these findings, hypothesis five, *gifted adolescents who have higher levels of mathematical ability are more advanced in identity status than gifted adolescents who have lower levels of mathematical ability*, was not supported.

For hypothesis six, findings from MANOVAs revealed a significant effect of the level of verbal giftedness variable on the ideological and total diffusion subscales. Adolescents who were moderately verbally gifted had significantly higher ideological and total diffusion scores than did students who were highly verbally gifted. Likewise, even though not statistically significant, results from Pearson's chi-square tests showed a tendency that a greater proportion of moderately verbally gifted adolescents was classified as identity diffused than highly verbally gifted adolescents in the ideological and total identity domains. There was also a likelihood of a greater proportion of highly verbally gifted students being classified as moratorium in the total domain than moderately verbally gifted adolescents. Based on findings from MANOVAs and chi-square tests, adolescents who

were moderately gifted in verbal ability were more likely than their counterparts who were highly gifted in verbal ability to defer the task of identity formation in the ideological and total identity domains. On the contrary, highly verbally gifted adolescents reported a greater degree of self-exploration in the realm of ideological identity than were their counterparts who were moderately gifted in verbal ability. However, findings from MANOVAs and Pearson's chi-square did not find a statistically significant effect of levels of verbal giftedness on the interpersonal identity domain. As such, the development of interpersonal identity of students who were highly verbally gifted did not significantly differ from that of students who were moderately verbally gifted. Consequently, hypothesis six, *gifted adolescents who have higher levels of verbal ability are more advanced in identity status than gifted adolescents who have lower levels of verbal ability*, was partially supported. Adolescents who were highly gifted in verbal ability were not significantly different from their counterparts who were moderately gifted in verbal ability on interpersonal identity. However, significant results favoring highly verbally gifted adolescents were evident in the ideological and total identity domains.

Apart from findings relevant to the hypotheses, this study also found significant effects of gender on the development of identity formation among the gifted. Overall, MANOVAs and Pearson's chi-square tests revealed a significant effect of gender favoring females on the moratorium status in the ideological and total identity domains. In this light, gifted female students were more likely to perceive themselves as engaging in the process of identity exploration than were gifted male students especially in the ideological and overall identity domains. Pearson's chi-square tests indicated a significant difference on the frequency of distribution in the ideological and total identity domains between males and females. A significantly greater percentage of gifted males were classified as

diffused than were females whereas a significantly greater percentage of gifted females were classified in the moratorium status than were males. There was no significant effect for gender on the interpersonal identity domain, indicating that gifted males and females did not differ in the identity development pertaining interpersonal relations.

Findings also demonstrated a significant effect of year in school on the development of identity status in all identity domains. Results from MANOVAs demonstrated that gifted adolescents in the upper high school level scored significantly lower on the foreclosure status and on the diffusion status than did their counterparts in the lower high school level. Finding from Pearson's chi-square tests revealed a significantly greater number of younger gifted adolescents being classified in the foreclosure and diffusion statuses in comparison to older gifted adolescents. Older gifted adolescents, on the other hand, were found to be classified as in moratorium than younger gifted counterparts. Based on this finding, adolescents in the lower high school level were less advanced in identity formation than those in the upper high school level. The former group was more likely to be influenced by social or familial expectations when approaching the task of identity formation than the latter group. In addition, younger students showed greater likelihood to deliberately delay the process of identity exploration than did older students. Appendix N shows means and standard deviations of the EOM-EIS-2 scores for each group based on ability, gender, year in school, level of mathematical giftedness, and level of verbal giftedness.

4.3.4 Additional analyses on the effect of levels of verbal giftedness, gender, and year in school on ideological and interpersonal identity.

This part sought to extend findings obtained from the major analyses presented in section 4.3.3. Major analyses indicated three effects that were statistically significant. These included (a) the significant effect of gender on the ideological identity, and (b) the significant effect of year in school on the ideological and interpersonal identity. In addition, there was an evidence of the effect of levels of verbal giftedness on the ideological identity. This effect approached the pre-determined significant alpha level of .05

To explore these effects further, MANOVA analyses were conducted using continuous scores from domain-specific ideological and interpersonal identity issues provided by the EOM-EIS-2. Ideological subscale comprises four identity issues (i.e., occupation, religion, politics, and lifestyle) and interpersonal subscale is comprised of four identity issues (i.e., friendship, dating, recreation, and gender role).

4.3.4.1 The effect of levels of verbal giftedness on ideological identity issues.

Even though results from the major MANOVA analysis indicated a nonsignificant effect of levels of verbal giftedness on the ideological identity subscale, the statistical value was somewhat close to the pre-determined significant alpha level of .05 ($p = .063$, see section 4.3.3.1, for results from major MANOVA analyses). Therefore, further investigation of such effect was warranted. Analysis in this section examined differences between

adolescents who were highly gifted in verbal ability and those who were moderately gifted in verbal ability in the four issues in the ideological identity domain. A MANOVA analysis was conducted with four ideological identity issues as the dependent variables and level of verbal giftedness as the independent variable.

Tests of MANOVA assumptions were conducted to ensure that the assumptions were not significantly violated. For the multivariate test of homoscedasticity, Box's M test for equality of covariance matrices showed nonsignificant statistics for each ideological identity issue (i.e., occupation [$p = .303$], religion [$p = .317$], politics [$p = .144$], and lifestyle [$p = .806$]). Therefore, the covariance matrices were equal and the assumption was tenable. Results from Levene's test for homogeneity of variance revealed that the differences in group variances were not significant in all ideological identity issues, all $F(1, 400) \leq 3.59, p \geq .059$. Bartlett's test of sphericity was significant ($p < .001$), suggesting that dependent variables were intercorrelated. Normal probability plots and histograms indicated a roughly normal distribution.

Results from MANOVA are presented in Table 47. There were significant multivariate effects of the level of verbal giftedness variable on the religion subscale and on the politics subscale. The effect sizes were small, $\eta_p^2 = .031$ and $.026$, respectively. Level of verbal giftedness did not have a significant effect either on the occupation or the lifestyle subscale.

Table 47: The Effect of Level of Verbal Giftedness on the Ideological Identity Issues

Identity issue	<i>V</i>	<i>F</i> ^a	<i>p</i>
Occupation	0.005	0.49	.746
Religion	0.031	3.16	.014
Politics	0.026	2.63	.034
Lifestyle	0.010	1.03	.392

^a*df* = 4, *Error df* = 397.

To further examine the significant effect of level of verbal giftedness on the religion and politics issues, results from univariate tests were verified and one-way ANOVAs conducted to examine mean differences between groups (see Table 48). For the religion subscale, the significant statistic was evident in the religion achievement status with a small effect size ($\eta_p^2 = .015$). Adolescents who were highly gifted in the verbal ability ($M = 4.42$, $SD = 1.16$) scored significantly higher on the religion achievement status than did adolescents who were moderately gifted in the verbal ability ($M = 4.12$, $SD = 1.16$).

In terms of the politics subscale, there was a significant result on the achievement status with a small effect size ($\eta_p^2 = .011$). The highly verbally gifted group ($M = 4.59$, $SD = 1.00$) performed significantly better on the politics achievement status than did the moderately verbally gifted group ($M = 4.37$, $SD = 1.06$). For the politics diffusion subscale, results from a one-way ANOVA showed a nonsignificant statistic. However, it was somewhat close to the pre-determined significant alpha level of .05 ($p = .053$). Highly verbally gifted students ($M = 3.33$, $SD = 1.39$) had a somewhat lower politics diffusion mean score than did moderately verbally gifted students ($M = 3.60$, $SD = 1.33$).

Table 48: Ideological Identity Issue Status Scores for the Level of Verbal Giftedness Variable

Identity issue statuses	Level of Verbal Giftedness						MS	F ^a	p
	Moderate			High					
	n = 139			n = 263					
	M (SD)	SE	95% CI [LL, UL]	M (SD)	SE	95% CI [LL, UL]			
Religion achievement	4.12 (1.16)	0.10	3.92, 4.31	4.42 (1.16)	0.07	4.28, 4.56	8.06	5.98	.015
Politics achievement	4.37 (1.06)	0.09	4.19, 4.55	4.59 (1.00)	0.06	4.47, 4.72	4.51	4.30	.039
Politics diffusion	3.60 (1.33)	0.11	3.38, 3.83	3.33 (1.39)	0.09	3.16, 3.49	7.10	3.77	.053

^adf = 1, Error df = 400.

4.3.4.2 The effect of gender on ideological identity issues.

Given that MANOVA results from the major analysis revealed a significant effect of gender on the ideological identity subscale (see section 4.3.3.1), it was of interest to investigate differences between gifted male and gifted female adolescents on the ideological identity issues. MANOVA was conducted with four ideological identity issues as the dependent variables and gender as the independent variable.

Tests of MANOVA assumptions were conducted to ensure that the assumptions were not significantly violated. For the multivariate test of homoscedasticity, Box's M test for

equality of covariance matrices showed nonsignificant statistics for each ideological identity issue (i.e., occupation [$p = .731$], religion [$p = .426$], politics [$p = .526$], and lifestyle [$p = .209$]). Therefore, the covariance matrices were equal and the assumption was tenable. Results from Levene's test for homogeneity of variance revealed that the differences in group variances were not significant in all ideological identity issues, all $F(1, 400) \leq 2.41$, $p \geq .121$, except lifestyle moratorium, $F(1, 400) = 4.15$, $p = .042$. Given that the level of significance was not high (i.e., approaching $p = .05$) and that all other Levene's statistics were not significant, the assumption of homogeneity of variance was not significantly violated. Bartlett's test of sphericity was significant ($p < .001$), indicating that dependent variables were intercorrelated. Normal probability plots and histograms demonstrated a roughly normal distribution.

Results from MANOVA are presented in Table 49. There was a significant effect of gender on all of the ideological issue subscales. The effect sizes were small for the religion and lifestyle subscales, $\eta_p^2 = .032$ and $.028$, respectively. The effect sizes of the occupation and politics subscales approached medium, $\eta_p^2 = .056$ and $.054$, respectively.

Table 49: The Effect of Gender on the Ideological Identity Issues

Identity issue	V	F^a	p
Occupation	0.056	5.84	.000
Religion	0.032	3.24	.012
Politics	0.054	5.64	.000
Lifestyle	0.028	2.81	.025

^a $df = 4$, Error $df = 397$.

To further examine results from MANOVA, univariate tests were verified and one-way ANOVAs conducted in order to determine mean differences between groups. As displayed in Table 50, there were five identity issues with significant mean differences and one identity issue with mean differences approaching being significant.

First, there was a significant mean difference between gifted males and females on the occupation diffusion status with a small effect size, $\eta_p^2 = .023$. Gifted male adolescents ($M = 2.85$, $SD = 1.15$) had significantly higher occupation diffusion scores than did gifted female adolescents ($M = 2.51$, $SD = 1.04$).

Second, there was a significant mean difference between gifted males and females on the occupation foreclosure status with a small effect size, $\eta_p^2 = .010$. Gifted male adolescents ($M = 1.78$, $SD = 0.87$) scored significantly higher on the occupation foreclosure status than did gifted female adolescents ($M = 1.60$, $SD = 0.88$).

Third, gifted males and females performed significantly differently on the religion diffusion status with a small effect size, $\eta_p^2 = .010$. The gifted male group ($M = 3.69$, $SD = 1.74$) had significantly higher scores on the religion subscale than did the gifted female group ($M = 3.34$, $SD = 1.75$).

Fourth, there was a significant mean difference between males and females on the religion moratorium status with a small effect size, $\eta_p^2 = .010$. Gifted females ($M = 2.74$, $SD = 1.35$) outperformed gifted males ($M = 2.46$, $SD = 1.35$) on the religion moratorium status.

Finally, there existed a significant mean difference between male and female groups on the politics moratorium status with a small approaching medium effect size, $\eta_p^2 = .042$. Gifted female adolescents ($M = 3.80$, $SD = 1.13$) scored significantly higher on the politics moratorium status than did their male counterparts ($M = 3.31$, $SD = 1.12$).

Table 50: Ideological Identity Issue Status Scores for the Gender Variable

Identity issue status	Gender						<i>MS</i>	<i>F</i> ^a	<i>p</i>
	Male <i>n</i> = 226			Female <i>n</i> = 176					
	<i>M</i> (<i>SD</i>)	<i>SE</i>	95% CI [<i>LL</i> , <i>UL</i>]	<i>M</i> (<i>SD</i>)	<i>SE</i>	95% CI [<i>LL</i> , <i>UL</i>]			
Occupation diffusion	2.85 (1.15)	0.08	2.70, 3.00	2.51 (1.04)	0.08	2.35, 2.66	11.51	9.45	.002
Occupation foreclosure	1.78 (0.87)	0.06	1.66, 1.89	1.60 (0.88)	0.07	1.47, 1.73	3.10	4.06	.044
Religion diffusion	3.69 (1.74)	0.12	3.46, 3.91	3.34 (1.75)	0.13	3.07, 3.60	12.16	4.00	.046
Religion moratorium	2.46 (1.35)	0.09	2.28, 2.64	2.74 (1.35)	0.10	2.53, 2.94	7.52	4.13	.043
Politics moratorium	3.31 (1.12)	0.08	3.15, 3.46	3.80 (1.13)	0.08	3.63, 3.96	23.56	17.73	.000

^adf = 1, Error df = 400.

4.3.4.3 The effect of year in school on ideological and interpersonal identity issues.

Results from the major MANOVA analyses showed significant effects of year in school in both the ideological and interpersonal domains (see section 4.3.3.1). In order to further explore this finding, MANOVA was conducted to investigate differences between gifted adolescents who were in the lower level of high school and those in the upper level of high school on the ideological and interpersonal identity issues. Four ideological identity issues and four interpersonal identity issues were entered as dependent variables and year in school as an independent variable.

Tests of MANOVA assumptions were conducted to ensure that the assumptions were not significantly violated. For the multivariate test of homoscedasticity, Box's M test for equality of covariance matrices showed nonsignificant statistics for all ideological identity issues (i.e., occupation [$p = .308$], religion [$p = .992$], politics [$p = .143$], and lifestyle [$p = .935$]) and all interpersonal identity issues (i.e., friendship [$p = .934$], dating [$p = .104$], recreation [$p = .460$], and gender role [$p = .419$]). Therefore, the covariance matrices were equal and the assumption was tenable. Results from Levene's test for homogeneity of variance in the ideological identity issues revealed that the differences in group variances were not significant, all $F(1, 400) \leq 1.53$, $p \geq .217$, except occupation foreclosure ($p = .003$) and occupation moratorium ($p = .036$). Given the evidence of homoscedasticity of all other identity issues, the assumption was not significantly violated. For the interpersonal identity issues, Levene's statistics revealed that the differences in group variances were not significant, all $F(1, 400) \leq .63$, $p \geq .106$, indicating that the assumption was tenable. Bartlett's test of sphericity was significant ($p < .001$), suggesting that dependent variables were intercorrelated. Normal probability plots and histograms indicated a roughly normal distribution.

Results from the MANOVA are presented in Table 51. There were significant effects of year in school on all of the ideological issue subscales. The effect sizes were small for occupation, religion, and lifestyle, $\eta_p^2 = .032$, $.028$, and $.042$, respectively. The size of the politics effect was medium, $\eta_p^2 = .063$.

MANOVA also revealed a significant effect of year in school on the interpersonal identity issues (see Table 51). Especially, year in school had a significant effect on recreation, friendship, and gender role. The effect sizes for recreation and friendship were small, $\eta_p^2 = .031$ and $.030$, respectively. The effect size of gender role was medium $\eta_p^2 = .058$. Year in school did not have a significant effect on the dating issue.

Table 51: The Effect of Year in School on the Ideological and Interpersonal Identity Issues

Identity issue	V	F ^a	p
Ideological			
Occupation	0.032	3.29	.011
Religion	0.028	2.86	.023
Politics	0.063	6.70	.000
Lifestyle	0.042	4.38	.002
Interpersonal			
Friendship	0.030	3.11	.015
Dating	0.015	1.53	.192
Recreation	0.031	3.17	.014
Gender role	0.058	6.16	.000

^adf = 4, Error df = 397.

In order to further examine results from the MANOVA, results from univariate tests were verified and one-way ANOVAs conducted to investigate mean differences between groups. In terms of the effect of year in school on the ideological identity issues, six statuses yielded significant statistics. Table 52 displays results from one-way ANOVAs.

First, there was a significant mean difference in the occupation diffusion status between adolescents in the lower level of high school and those in the upper high school level with a small effect size, $\eta_p^2 = .019$. Gifted adolescents in the lower high school level ($M = 2.82$, $SD = 1.11$) had significantly higher occupation diffusion scores than did those in the upper high school level ($M = 2.50$, $SD = 1.10$).

Second, there was a significant mean difference in the occupation foreclosure status between the two groups with a small effect size, $\eta_p^2 = .018$. Gifted adolescents in the lower high school level ($M = 1.79$, $SD = 0.93$) scored significantly higher in the occupation foreclosure status than did those in the upper high school level ($M = 1.55$, $SD = 0.77$).

Third, a significant mean difference in the religion foreclosure status between the two groups of year in school was observed with a small effect size, $\eta_p^2 = .019$. Gifted adolescents in the lower high school level ($M = 2.58$, $SD = 1.36$) had significantly higher religion foreclosure scores than did those in the upper high school level ($M = 2.20$, $SD = 1.31$).

Fourth, there was a significant mean difference on the politics diffusion status with a small effect size, $\eta_p^2 = .035$. As seen from Table 52, gifted adolescents in the lower high school level ($M = 3.62$, $SD = 1.38$) had significantly higher politics diffusion scores than did those in the upper high school level ($M = 3.09$, $SD = 1.31$).

Fifth, there was a significant mean difference in the politics foreclosure status with a small effect size, $\eta_p^2 = .036$. Gifted adolescents in the lower high school level ($M = 2.95$, $SD = 1.12$) scored significantly higher in the politics foreclosure status than did those in the upper high school level ($M = 2.52$, $SD = 1.00$).

Lastly, there was a significant mean difference in the lifestyle foreclosure status with a small effect size, $\eta_p^2 = .029$. Gifted adolescents in the lower high school level ($M = 2.56$, $SD = 1.00$) had significantly higher lifestyle foreclosure scores than did those in the upper high school level ($M = 2.21$, $SD = 0.92$).

Table 52: Ideological Identity Issue Status Scores for the Year in School Variable

Identity issue status	Year in school						MS	F ^a	p
	Lower n = 253			Upper n = 149					
	M (SD)	SE	95% CI [LL, UL]	M (SD)	SE	95% CI [LL, UL]			
Occupation diffusion	2.82 (1.11)	0.07	2.68, 2.96	2.50 (1.10)	0.09	2.32, 2.68	9.49	7.76	.006
Occupation foreclosure	1.79 (0.93)	0.06	1.67, 1.90	1.55 (0.77)	0.06	1.42, 1.67	5.47	7.22	.008
Religion foreclosure	2.58 (1.36)	0.08	2.41, 2.75	2.20 (1.31)	0.11	1.99, 2.41	13.76	7.64	.006
Politics diffusion	3.62 (1.38)	0.09	3.45, 3.79	3.09 (1.31)	0.11	2.88, 3.30	26.47	14.44	.000
Politics foreclosure	2.95 (1.12)	0.07	2.81, 3.09	2.52 (1.00)	0.08	2.35, 2.68	17.49	15.02	.000
Lifestyle foreclosure	2.56 (1.00)	0.06	2.44, 2.69	2.21 (0.92)	0.08	2.06, 2.36	11.48	12.08	.001

^adf = 1, Error df = 400.

In terms of interpersonal identity issues, results from the MANOVA indicated significant effects of year in school on three identity issues: these were gender role, friendship, and recreation (see Table 51). Data from univariate tests were verified and one-way ANOVAs conducted in order to investigate mean differences between groups. Results from one-way ANOVAs are presented in Table 53.

There were four identity issues with statistically significant mean differences (see Table 53). First, there was a significant mean difference in the gender role diffusion status between adolescents in the upper level of high school and their counterparts in the lower level of high school with a small effect size, $\eta_p^2 = .022$. Gifted adolescents in the lower high school level ($M = 3.57$, $SD = 0.97$) had significantly higher gender role diffusion scores than did those in the upper high school level ($M = 3.27$, $SD = 0.95$).

Second, there was a significant mean difference in the gender role foreclosure status with a small approaching medium effect size, $\eta_p^2 = .045$. Gifted adolescents in the lower high school level ($M = 2.97$, $SD = 1.06$) scored significantly higher on the gender role foreclosure than did those in the upper high school level ($M = 2.51$, $SD = 0.98$).

Third, there was a significant mean difference in the friendship foreclosure status with a small effect size, $\eta_p^2 = .029$. Gifted adolescents in the lower high school level ($M = 2.51$, $SD = 1.10$) had significantly higher friendship foreclosure scores than did those in the upper high school level ($M = 2.12$, $SD = 1.08$).

Lastly, there was a significant mean difference in the recreation achievement status with a small effect size, $\eta_p^2 = .016$. Gifted adolescents in the lower high school level ($M = 4.81$, $SD = 1.05$) scored significantly higher on the recreation achievement status than did those in the upper high school level ($M = 4.53$, $SD = 1.05$).

Table 53: Interpersonal Issue Status Scores for the Year in School Variable

Identity issue status	Year in school						MS	F ^a	p
	Lower <i>n</i> = 253			Upper <i>n</i> = 149					
	<i>M</i> (<i>SD</i>)	<i>SE</i>	95% CI [<i>LL</i> , <i>UL</i>]	<i>M</i> (<i>SD</i>)	<i>SE</i>	95% CI [<i>LL</i> , <i>UL</i>]			
Gender role diffusion	3.57 (0.97)	0.06	3.45, 3.69	3.27 (0.95)	0.08	3.12, 3.43	8.51	9.13	.003
Gender role foreclosure	2.97 (1.06)	0.07	2.84, 3.10	2.51 (0.98)	0.08	2.35, 2.67	19.82	18.70	.000
Friendship foreclosure	2.51 (1.10)	0.07	2.38, 2.64	2.12 (1.08)	0.09	1.95, 2.30	13.81	12.14	.001
Recreation achievement	4.81 (1.05)	0.07	4.68, 4.94	4.53 (1.05)	0.09	4.36, 4.70	7.46	6.71	.010

^adf = 1, Error df = 400.

Analyses in this section sought to add comprehensive, in-depth findings to hypothesis six. Results from additional analyses extended those from the major analysis in that there were significant effects of the level of verbal giftedness variable on the religion and politics issues. Adolescents who were highly gifted in verbal ability performed significantly better on the measures of politics achievement and religion achievement than their counterparts who were moderately gifted in verbal ability. Based on these findings, highly verbally gifted students showed significantly higher degrees of exploration and commitment in the areas of politics and religion than did moderately verbally gifted students.

Apart from findings relevant to hypotheses, results in this section also substantiated findings concerning the effect of gender on ideological identity. Overall, gifted males were more diffused and foreclosed in the occupation issue than were gifted females. Gifted females perceived themselves to be in moratorium in the areas of religion and politics whereas male adolescents were found to be diffused in the religion subscale. Nonetheless, gifted males reported to be more achieved in the area of lifestyle than their female counterpart.

In terms of year in school, it was evident that gifted adolescents in the lower high school level were more diffused in the occupation and politics issues and more foreclosed in the occupation, religion, and politics issues than those in the upper high school level. In addition, the former group were more diffused and foreclosed in two interpersonal issues, namely gender role and friendship, than were the latter group. However, gifted adolescents in the lower high school level reported to be more advanced in the recreation identity than those in the upper high school level.

4.4 Relationships between Moral Reasoning and Identity Status

This section sought to investigate hypothesis seven: *positive relationships between moral reasoning and identity statuses exist*. In order to test this hypothesis, Pearson's correlation coefficients were calculated between DIT postconventional scores and identity status scores in the ideological, interpersonal, and total domains. Prior to conducting Pearson's correlation coefficients, the assumption of normality is to be assessed (Field, 2009; Hair et al., 2010). The assumption of normality of distribution for both the

postconventional scores and identity status scores has been discussed in the previous sections (see sections 4.2.1 for the distribution of postconventional scores and section 4.3.1.1 for the distribution of identity status scores). Overall, results from the Shapiro-Wilk tests and histograms showed that the assumption of normality was not significantly violated.

Results from a Pearson's correlation matrix are presented in Table 54. In the ideological identity domain, there was a negative correlation between ideological diffusion and the postconventional score ($r = -.22, p < .001$) and between ideological foreclosure and the postconventional score ($r = -.29, p < .001$). In contrast, identity achievement had a small³ but positive correlation with the postconventional score, $r = .15, p = .002$. Ideological moratorium was not significantly correlated with the postconventional score, $r = .06, p = .137, ns$.

In the interpersonal identity domain, Pearson's correlation coefficients showed that interpersonal foreclosure was negatively correlated with the postconventional score ($r = -.15, p = .001$) whereas interpersonal moratorium was positively correlated with the postconventional score ($r = .17, p = .001$). These correlations yielded small effect sizes. Both interpersonal diffusion and interpersonal achievement were not significantly correlated with the postconventional score, $r = -.04, p = .345, ns$ and $r = -.07, p = .128, ns$, respectively.

³ Person's Correlation Coefficient (r) of .10 to .30 signifies a small relationship, .30 to .50 signifies a moderate relationship, and .50 to 1.00 signifies a strong relationship (Cohen, 1988).

In the total identity status domain, Pearson's correlation coefficients revealed a negative correlation between total diffusion and the postconventional score ($r = -.19, p < .001$) and between total foreclosure and the postconventional score ($r = -.24, p < .001$). The moratorium status was found to have a small but positive correlation with the postconventional score ($r = .13, p < .01$) whereas the achievement status was not significantly correlated with the postconventional score ($r = .07, p = .141, ns$).

Taken together, findings from Pearson's correlation coefficients suggested small yet positive correlations between moral reasoning and identity development. Adolescents who were diffused or foreclosed were likely to have lower postconventional scores. This was true for the ideological foreclosure and diffusion statuses, interpersonal foreclosure status, and total diffusion and foreclosure statuses. In contrast, adolescents who were achieved or in moratorium were found to have higher levels of moral reasoning. This was evident in the ideological achievement status, interpersonal moratorium status, and total moratorium status. Based on these findings, hypothesis seven, *positive relationships between moral reasoning and identity statuses exist*, was supported.

Table 54: Pearson's Correlation Coefficients between Postconventional Score and Ego Identity Statuses (N = 434)

Identity domain	Postconventional score
Ideological	
Diffusion	-.22***
Foreclosure	-.29***
Moratorium	.06
Achievement	.15**
Interpersonal	
Diffusion	-.07
Foreclosure	-.15**
Moratorium	.17**
Achievement	-.04
Total	
Diffusion	-.19***
Foreclosure	-.24***
Moratorium	.13**
Achievement	.07

* $p < .05$. ** $p < .01$. *** $p < .001$.

4.4.1 Additional analyses on the relationships between moral reasoning and identity statuses.

Apart from using Pearson's correlation coefficients, it was possible to employ ANOVAs to investigate relationships between identity statuses and moral reasoning. In doing so, the postconventional scores and categorical data from the EOM-EIS-2 were used. The categorical data are derived from summing scores of each identity status and computing cut-off points to classify participants into one of the identity statuses (i.e., achievement, moratorium, foreclosure, and diffusion). Details about the calculation of the cut-of points have been discussed in section 3.3.2.3.

The aim of the analysis in this section was to compare postconventional scores of participants who were classified into different identity statuses. The postconventional score was entered as a dependent variable and four identity statuses in the ideological, interpersonal, and total identity subscales as independent variables. Statistical analysis was conducted on each identity subscale (i.e., ideological, interpersonal, and total) separately.

4.4.1.1 The effect of ideological identity statuses on the DIT postconventional scores.

Prior to conducting an ANOVA, it is important that assumptions be tested. This included Levene's test of homogeneity of variance and Shapiro-Wilk test of normality. Levene's test of homogeneity of variance revealed nonsignificant differences between group variances, $F(3, 430) = 1.18, p = .316$. Therefore, the equality of variance assumption was tenable. Shapiro-Wilk tests were conducted on the postconventional scores of the

ideological diffusion status group, $W(153) = 0.99$, $p = .208$; the foreclosure status group, $W(78) = 0.98$, $p = .326$; the moratorium status group, $W(139) = 0.99$, $p = .424$; and the achievement status group, $W(64) = 0.97$, $p = .202$. The nonsignificant statistics suggested that the distribution of the postconventional scores for the four ideological identity status groups was roughly normal and the assumption was tenable.

A one-way between subjects ANOVA was conducted to examine the effect of ideological identity status on the postconventional scores. Results from the ANOVA showed a significant effect of ideological identity status on the postconventional scores, $F(3, 430) = 12.52$, $MS = 2417.64$, $p < .001$. The effect was of a medium size, $\eta_p^2 = 0.80$.

Consequently, post hoc tests using Hochberg's GT2 were executed to compare the postconventional score of participants who were categorized into different identity statuses in the ideological subscale. Hochberg's test was selected because the sample size of each group was relatively different and the assumption of equality of variance was tenable (Field, 2009).

Post hoc analysis showed four pairs of identity statuses with significantly different postconventional scores. First, there was a significant difference in postconventional scores between adolescents who were in the diffusion status and those in the moratorium status ($SE = 1.63$, $p = .001$). The postconventional scores of adolescents in the moratorium status ($M = 41.03$, $SD = 15.29$) were significantly higher than those of adolescents in the diffusion status ($M = 34.72$, $SD = 13.46$).

Second, a significant difference on the postconventional scores between adolescents who were classified as identity diffused and those classified as identity achieved was observed ($SE = 2.10$, $p < .001$). Identity achievers ($M = 43.86$, $SD = 13.01$) performed significantly better on the index of postconventional moral reasoning than did identity diffused adolescents ($M = 34.72$, $SD = 13.46$).

Third, adolescents who were in the foreclosure status and those in the moratorium status performed significantly differently on the postconventional index ($SE = 1.96$, $p < .001$). Foreclosed adolescents ($M = 32.74$, $SD = 12.73$) had significantly lower postconventional scores than did adolescents who were in the moratorium status ($M = 41.03$, $SD = 15.29$).

Lastly, there was a significant difference on postconventional scores between adolescents who were foreclosed and those who were identity achieved ($SE = 2.34$, $p < .001$). The mean postconventional score of foreclosed adolescents ($M = 32.74$, $SD = 12.73$) was significantly lower than that of identity achieved adolescents ($M = 43.86$, $SD = 13.01$).

Other pairwise comparisons were not statistically significant. Means and standard deviations for the postconventional scores for the four ideological identity status groups are presented in Table 55.

Table 55: Means and Standard Deviations of the Postconventional Scores for the Ideological Identity Statuses

Group	<i>n</i>	<i>M</i>	<i>SD</i>	<i>SE</i>	95% CI	
					<i>LL</i>	<i>UL</i>
Diffusion	153	34.72	13.47	1.09	32.57	36.87
Foreclosure	78	32.74	12.73	1.44	29.87	35.61
Moratorium	139	41.03	15.29	1.30	38.47	43.60
Achievement	64	43.86	13.01	1.63	40.61	47.11

Note. CI = confidence interval; *LL* = lower limit; *UL* = upper limit.

Further, results from Hochberg's GT2 indicated two subsets with statistically similar means. The first subset contained identity diffusion and foreclosure statuses and the second subset contained identity achievement and moratorium statuses. Theoretically, identity achievement and moratorium statuses were considered more developmentally advanced whereas identity diffusion and foreclosure statuses were regarded as less developmentally advanced (Marcia, 1980). This is because both identity achievement and moratorium involve the process of exploration and it is this process that marks advancement in identity formation (Adams, 1998).

The existence of two subsets of identity status led to an examination of the performance of moral reasoning between the less advanced identity group (i.e., identity diffusion and foreclosure) and the more advanced identity group (i.e., identity achievement and moratorium). Mean comparisons were conducted using one-way ANOVAs. Analyses showed a significant difference on the postconventional scores between the less

advanced ideological identity group and the more advanced ideological identity group, $F(1, 432) = 34.63$, $MS = 6698.22$, $p < .001$. The effect was of a medium size, $\eta_p^2 = 0.74$. The postconventional scores of adolescents in the more advanced ideological identity statuses ($n = 203$, $M = 41.92$, $SD = 14.6$, $SE = 0.98$) was significantly higher than those of adolescents in the less advanced ideological identity statuses ($n = 231$, $M = 34.0$, $SD = 13.2$, $SE = 0.91$). This finding suggested positive relationships between identity statuses and moral reasoning. Adolescents in more advanced statuses outperformed their counterparts who were in less advanced statuses on the measure of moral reasoning.

4.4.1.2 The effect of interpersonal identity statuses on the DIT postconventional scores.

Tests of assumptions were carried out prior to conducting an ANOVA. Levene's test of homogeneity of variance revealed nonsignificant differences between group variances, $F(3, 430) = 0.35$, $p = .991$. Therefore, the assumption of homogeneity of variance was not significantly violated. The Shapiro-Wilk test was not significant for the interpersonal diffusion status, $W(136) = 0.98$, $p = .089$; the interpersonal foreclosure status, $W(79) = 0.97$, $p = .104$; the interpersonal moratorium status, $W(174) = 0.99$, $p = .704$; and the interpersonal achievement status, $W(45) = 0.99$, $p = .932$. This indicated that the distribution of each variable was roughly normal and the assumption was tenable.

One-way between subjects ANOVAs were conducted to examine the effect of interpersonal identity status on the postconventional score. It was revealed that interpersonal identity statuses did not have a significant effect on the postconventional

score, $F(3, 430) = 2.36$, $MS = 487.55$, $p = .071$, $\eta_p^2 = .016$. Based on this result, adolescents who were classified in different identity statuses in the interpersonal domain did not perform significantly differently on the measure of moral reasoning. Even though the mean difference was not statistically significant, there was a trend that showed differences in mean postconventional scores between adolescents who were classified into different statuses in the interpersonal identity domain (see Table 56). Adolescents in the achievement and moratorium statuses performed better in the measure of moral reasoning than did foreclosed and identity diffused youths.

Table 56: Means and Standard Deviations of the Postconventional Scores for the Interpersonal Identity Statuses

Group	<i>n</i>	<i>M</i>	<i>SD</i>	<i>SE</i>	95% CI	
					<i>LL</i>	<i>UL</i>
Diffusion	136	37.20	14.53	1.24	34.74	39.67
Foreclosure	79	34.41	14.11	1.59	31.25	37.57
Moratorium	174	39.47	14.42	1.09	37.32	41.63
Achievement	45	38.44	14.14	2.11	34.19	42.69

Note. CI = confidence interval; *LL* = lower limit; *UL* = upper limit.

4.4.1.3 The effect of total identity statuses on the DIT postconventional scores.

To ensure that ANOVA assumptions were not violated, tests of assumptions were conducted. Levene's test of homogeneity of variance revealed nonsignificant differences between group variances, $F(3, 430) = 0.36, p = .781$. Therefore, the assumption of homoscedasticity was not significantly violated. The Shapiro-Wilk test indicated a normal distribution for the identity diffused status, $W(137) = 0.98, p = .098$; the identity foreclosed status, $W(86) = 0.98, p = .187$; the identity moratorium status, $W(159) = 0.99, p = .319$; and the identity achieved status, $W(52) = 0.99, p = .888$. Therefore, the assumption of normality was tenable.

Results from a one-way between subjects ANOVA showed a significant effect of total identity status on the postconventional scores, $F(3, 430) = 7.24, MS = 1446.01, p < .001$. The effect size was small approaching medium, $\eta_p^2 = .048$. Post hoc comparisons using Hochberg's GT2 revealed three pairs with significant mean differences.

First, there was a significant mean difference on the postconventional scores between adolescents who were in the diffusion status and those in the moratorium status ($SE = 1.65, p = .002$). The postconventional scores of identity diffused adolescents ($M = 34.93, SD = 13.59$) was significantly lower than those of moratorium adolescents ($M = 41.01, SD = 14.39$).

Second, adolescents who were in the foreclosure status and those in the moratorium status performed significantly different on the measure of postconventional thinking ($SE = 1.89, p = .002$). Adolescents who were in the moratorium status ($M = 41.01, SD = 14.39$)

outperformed their counterparts who were in the foreclosure status ($M = 34.24$, $SD = 14.17$) on the measure of moral reasoning.

Lastly, a significant difference on the postconventional scores between foreclosed adolescents and achieved adolescents ($SE = 2.48$, $p = .047$) was observed. Identity achievers ($M = 40.87$, $SD = 14.72$) performed significantly better in moral reasoning than did foreclosed adolescents ($M = 34.24$, $SD = 14.16$). Other pairwise comparisons were not statistically significant. Table 57 presents means and standard deviations for the postconventional scores for the four identity status groups.

Table 57: Means and Standard Deviations of the Postconventional Scores for the Total Identity Statuses

Group	<i>n</i>	<i>M</i>	<i>SD</i>	<i>SE</i>	95% CI	
					<i>LL</i>	<i>UL</i>
Diffusion	137	34.93	13.59	1.16	32.64	37.23
Foreclosure	86	34.24	14.17	1.53	31.21	37.28
Moratorium	159	41.01	14.39	1.14	38.75	43.26
Achievement	52	40.87	14.72	2.04	36.77	44.97

Note. CI = confidence interval; *LL* = lower limit; *UL* = upper limit.

Results from Hochberg's test also indicated two subsets with statistically similar means. The first subset included identity diffusion and foreclosure, which were considered less advanced statuses (Adams, 1998). The second subset contained identity achievement and moratorium, which were considered more developmentally advanced statuses (Adams, 1998). The postconventional scores of the two subsets were compared using a one-way ANOVA. The analysis showed a significant difference on the postconventional scores between the less advanced identity group and the more advanced identity group, $F(1, 432) = 21.67$, $MS = 4312.22$, $p < .001$. The postconventional scores of adolescents in the more advanced identity group ($M = 40.97$, $SD = 14.43$, $SE = 0.99$) were significantly higher than those of adolescents in the less advanced identity group ($M = 34.67$, $SD = 13.78$, $SE = 0.92$).

Overall, findings from ANOVA analyses using categorical data from the EOM-EIS-2 and the DIT postconventional scores substantiated findings from Pearson's correlation coefficients in that there was a positive correlation between postconventional moral reasoning and ideological and total identity statuses. Adolescents who were advanced in the development of identity formation (i.e., identity achievement and moratorium) were more likely to perform significantly better on the measure of moral reasoning than those who were less advanced in identity development (i.e., identity diffusion and foreclosure). Even though not statistically significant, there was a trend that showed adolescents in the more advanced statuses in the interpersonal identity domain outperformed those in the less advanced statuses on the measure of postconventional moral reasoning. Consequently, results from this section supported hypothesis seven.

4.5 Chapter Summary

This chapter presented results from statistical analyses conducted on the Defining Issues Test (DIT) and the Extended Objective Measure of Ego Identity Status-2 (EOM-EIS-2) in line with the proposed hypotheses. The analysis of the DIT supported hypothesis one, *gifted adolescents have higher levels of moral reasoning than age peers who have not been identified as gifted*, in that gifted adolescents scored significantly higher than adolescent who were not identified as gifted on the postconventional index.

In consideration of hypothesis two, *the moral reasoning levels of gifted adolescents who have a higher level of mathematical ability are higher than gifted adolescents who have a lower level of mathematical ability*, results from ANOVA revealed a significant main effect of the level of mathematical giftedness on the postconventional scores. Students who were highly gifted in mathematics outperformed those who were moderately gifted in mathematics on the measure of postconventional moral reasoning. Therefore, hypothesis two was supported.

Results pertaining hypothesis three, *the moral reasoning levels of gifted adolescents who have a higher level of verbal ability are higher than gifted adolescents who have a lower level of verbal ability*, indicated an interaction effect between the level of verbal giftedness and gender on moral reasoning. Female adolescents who were highly verbally gifted scored significantly higher on the postconventional index than female adolescents who were moderately verbally gifted. The mean difference, however, was not statistically significant among gifted male adolescents who differed in levels of verbal giftedness.

Given that verbal giftedness and gender interacted on the measure of moral reasoning, hypothesis three was partially supported.

Data from the EOM-EIS-2 was used to test hypothesis four, hypothesis five, and hypothesis six. In light of hypothesis four, *gifted adolescents are more advanced in identity status than age peers who have not been identified as gifted*, findings revealed a nonsignificant effect of ability on the ideological and total identity subscales. This indicated that the development of ideological and overall identity of gifted adolescents was not significantly different from those of their age peers not identified as gifted. Specifically, the majority of both gifted adolescents and their age peers not identified as gifted performed in the moratorium status in both ideological and total identity domains.

Nonetheless, there was a significant difference between gifted adolescents and adolescents not identified as gifted on the interpersonal identity domain. In contrast to the hypothesis, it was revealed that gifted adolescents had significantly lower interpersonal achievement scores than did their age peers not identified as gifted. Furthermore, a significantly greater percentage of the non-identified group was classified in the interpersonal achievement status than the gifted group. This suggested that the non-identified adolescents were more advanced, reporting to be achieved in the interpersonal domain, than gifted counterparts. Additional analyses revealed that the two groups differed in two interpersonal issues, which were dating and gender role. Gifted adolescents had significantly higher scores in the dating foreclosure status, dating moratorium status, and gender role moratorium status than their age peers not identified as gifted. The non-identified group outperformed the gifted group on the dating achievement subscale. Based on these findings, hypothesis four was not supported.

The investigation of the effect of the level of mathematical giftedness and the level of verbal giftedness was relevant to hypothesis five and hypothesis six. Hypothesis five, *gifted adolescents who have a higher level of mathematical ability are more advanced in identity status than gifted adolescents who have a lower level of mathematical ability*, was not supported. Results did not find a significant effect of the level of mathematical giftedness variable on either the ideological, interpersonal, or total identity domain. Adolescents who were highly gifted in mathematics did not significantly differ in the development of identity from their counterparts who were moderately gifted in mathematics.

For hypothesis six, *gifted adolescents who have a higher level of verbal ability are more advanced in ego identity status than gifted adolescents who have a lower level of verbal ability*, results showed a significant effect of the level of verbal giftedness on the total diffusion status. Adolescents who were moderately gifted in verbal ability had significantly higher scores on the overall identity diffusion subscale than did adolescents who were highly gifted in verbal ability. Results also showed that the effect of levels of verbal giftedness on the ideological diffusion status approached the pre-determined significant level. Moderately verbally gifted adolescents had somewhat higher ideological diffusion scores than did highly verbally gifted adolescents. Furthermore, there were somewhat a greater percentage of highly verbally gifted adolescents being categorized as in moratorium than were moderately verbally gifted adolescents.

Additional analyses revealed that the two groups significantly differed in the religion and politics identity issues with results favoring highly verbally gifted adolescents on the two identity issues. Highly verbally gifted students were more achieved in the religion and

politics identities than moderately verbally gifted students. Both groups, however, did not significantly differ in the development of interpersonal identity, where the majority of adolescents from both groups were in the moratorium status. Given the significant effect of levels of verbal ability in the total identity domain and a nonsignificant effect on the interpersonal domain, hypothesis six was partially supported.

The relationship between moral reasoning and identity status was examined in order to test hypothesis seven, *positive relationships between moral reasoning and ego identity status exist*. Analyses were undertaken using two sets of statistical analysis. First, findings from Pearson's correlations pointed towards small but positive relationships between the identity achievement and moratorium statuses and moral reasoning. There was also an evidence of negative relationships between the identity diffusion and foreclosure statuses and moral reasoning. The correlations were small and mostly significant.

Second, findings from ANOVA also revealed a significant difference on the postconventional scores between adolescents who were in the more advanced identity statuses (i.e., identity achievement and moratorium) and those who were in the less advanced identity statuses (i.e., identity diffusion and foreclosure) in the ideological and total identity domains. Adolescents who were classified either in the identity achievement status or in the moratorium status outperformed those who were classified either in the diffusion status or in the foreclosure status on the postconventional index. Even though there was no statistically significant difference between students in the four identity status groups in the interpersonal domain, there was a trend that pointed toward students in the less advanced identity statuses having lower postconventional scores than did those in

the more advanced identity statuses. Given these findings, hypothesis seven was supported.

Apart from findings relevant to hypotheses, the study also indicated the effect of gender and year in school on moral reasoning and identity status development. There was a significant interaction between gender and year in school on moral reasoning. Both gifted males and females who were in the upper level of high school outperformed those in the lower level of high school on the measure of postconventional moral reasoning.

In terms of the effect of gender on identity status development, findings from the study showed a significant gender effect on the ideological and total identity domains. Gifted female adolescents significantly outperformed their male counterpart on the ideological and total moratorium status. In addition, a significantly greater proportion of gifted males were classified as identity diffused whereas a significantly greater proportion of gifted females were classified as moratorium in the ideological and total identity domains. Specifically, gender differences were evident in the occupation, religion, and politics issues with results favoring female participants. There was no significant effect of gender on the interpersonal identity domain.

Results from this study also indicated a significant effect of year in school in the ideological, interpersonal, and overall identity domains. Adolescents in the lower level of high school were found to have significantly higher diffusion scores in the ideological and overall identity domains than did those in the higher level of high school. They also had significantly higher foreclosure scores in the ideological, interpersonal, and overall identity domains. In contrast, results showed a significantly greater proportion of students in the

upper level of high school being categorized in the moratorium status in the ideological and overall identity domains than those in the lower high school level.

Findings from additional analyses using specific identity issues showed significant differences in occupation, religion, politics, lifestyle, gender role, and friendship with results favoring adolescents in the upper level of high school. On the contrary, findings favored adolescents in the lower high school in the recreation issue. Overall, data pointed toward younger adolescents performing in less mature identity statuses and older adolescents performing in more mature statuses. Discussions regarding the results obtained from this study will be described in detail in Chapter Five.

Chapter Five

Discussion

5.1 Introduction

This chapter discusses the results of the study. Findings relevant to each hypothesis are presented. Additional results that emerged from the research are also discussed. Possible interpretations of the findings obtained from this study are addressed in relation to relevant literature and previous research.

5.2 Discussion of Results of Hypothesis One

Hypothesis one posits that gifted adolescents have higher levels of moral reasoning than age peers not identified as being gifted. Results from this study demonstrated a significant effect of ability on postconventional scores. Specifically, the mean postconventional score exhibited by academically gifted adolescents ($M = 42.3$) was significantly higher than that of their age peers not identified as gifted ($M = 28.7$). The significantly higher postconventional scores displayed by gifted adolescents indicated that the development of moral reasoning in gifted adolescents was more advanced than that of their age peers who were not identified as gifted. Based on this result, gifted adolescents in the present study were more likely to utilize the highest, most developed

level of moral reasoning when making a judgment on an ethically conflicting situation. They preferred the universal principle of human rights and justice to laws, social conventions, or personal interests.

The finding that gifted adolescents in the present study performed significantly better on the measure of postconventional thinking than did the normative samples was consistent with that from previous studies (e.g., Chovan & Freeman, 1993; Howard-Hamilton, 1994; Karnes & Brown, 1981; Lee & Olszewski-Kubilius, 2006; Tan-Willman & Gutteridge, 1981). More importantly, findings from the present research validated existing studies conducted with Australian gifted adolescents in that the levels of moral reasoning demonstrated by the gifted were significantly higher than those of their age peers not identified as gifted (e.g., Gross, 2004; O'Leary, 2005).

It is interesting to note that the mean postconventional score of gifted participants in this study was roughly equivalent to the norms of college students provided in the DIT manual (Rest, 1986). This finding supports previous studies that showed gifted secondary school students performed at a level comparable or superior to the average for college students (e.g., Derryberry et al., 2005; Derryberry & Barger, 2008; Howard-Hamilton & Franks, 1995; Sander et al., 1995). It yielded support to Derryberry et al.'s study (2005) which found that college students had significantly higher scores in the less sophisticated schema of personal interest in making a moral judgment whereas the gifted group had significantly higher scores in the most developmentally advanced schema of postconventional thinking in solving moral dilemmas.

Advancement in the moral reasoning of gifted adolescents signifies the influence of intelligence in the development of moral reasoning. As stated by Kohlberg, “morality is an experiential domain that is different from others by its dependence on a person’s capacity to reason” (Arnold, 2000, p. 367). Moral reasoning, similar to other forms of reasoning, requires a certain level of mental maturity to produce reasoning that underlies moral decision-making (Boss, 1994; Jensen, 1998). The ability to *reason* allows an individual to comprehend the nature of social interactions and make judgments in response to complex moral situations. With advanced intellectual abilities, gifted individuals are equipped with the ability to use abstract reasoning to analyze information relevant to moral situations, critically evaluate various possible alternatives, and arrive at a solution corresponding to more developed levels of moral consideration. As such, high intellectual ability enables individuals to approach complex moral problems more proficiently and give moral justifications at a more advanced level (Jensen, 1998; Tannenbaum, 2000).

Advanced moral reasoning exhibited by the gifted in this study may also be explicated in light of personality characteristics related to cognitive development. A study by Ackerman (1997) compared levels of overexcitabilities between gifted high school students and their peers not identified as gifted. Intellectual overexcitability, which refers to a strong desire for knowledge and the ability to use higher order thinking in solving problems, was one of the personality aspects that best distinguished the gifted from their peers not identified as gifted. Findings from this study is consistent with literature that found gifted students possessing cognitive characteristics that facilitate problem solving ability, for examples, advanced analytical ability, inductive thinking, and deductive reasoning (Frasier & Passow, 1994). In a review of literature that synthesized giftedness

and cognitive development, Steiner and Carr (2003) described that gifted students possess advanced intellectual attributes such as processing speed, breadth and depth of knowledge base, effective organization of information, metacognition, and strategic thinking abilities. These characteristics play significant roles in cognitive tasks that require retrieval of information from memory and critical thinking, allowing them to solve complex problems more efficiently (Steiner & Carr, 2003).

When facing with problems, gifted students appeared to prefer complex thinking processes rather than simplistic methods. Their cognitive strategies were more elaborate and complex than those used by students who were of average ability (Kanevsky, 1990; Robinson, 2000). In a study that investigated cognitive attributes to moral reasoning, Derryberry et al., (2005) found that gifted adolescents not only scored significantly higher on the measure of postconventional moral reasoning, openness to experience, and preference for complex explanation than did college students. In fact, results from stepwise regression analyses revealed that the preferences for complex explanation factor was most predictive of moral reasoning scores among the gifted, followed by intelligence as measured by the ACT. Those who have high scores in the measure of preferences for complex explanation tend to favor complex rather simple explanations to describe human interactions and are likely to use analytical thinking to consider various causes in explaining human behaviors (Fletcher, Danilovics, Fernandez, Peterson & Reederm, 1986). Advanced cognitive abilities coupled with the desire to use more complex information processes in approaching moral issues contribute superior moral reasoning ability among the gifted (Derryberry & Barger, 2008).

Even though the moral reasoning of intellectually gifted adolescents in this study was superior to that of their age peers not identified as being gifted, it is important to note that the magnitude of the effect of ability was small approaching medium. This indicates that cognitive ability is a necessary but not sufficient factor for advanced development in moral reasoning. Overall, findings from the present study validated a claim made by Kohlberg (1976, 1984) that moral reasoning is a cognitive-intellectual construct and that cognitive ability is one of the many prerequisites for advanced moral judgment development.

5.3 Discussion of Results of Hypothesis Two

Hypothesis two states that the moral reasoning levels of gifted adolescents who are highly gifted in mathematics are higher than those of gifted adolescents who are moderately gifted in mathematics. Analyses confirmed the hypothesis in that the level of mathematical giftedness was significantly related to the DIT postconventional scores. Adolescents who were highly gifted in mathematics scored significantly higher on the measure of postconventional thinking than did their counterparts who were moderately gifted in mathematics.

Results from this research did not support results of Lee and Olszewski-Kubilius's study (2006) which found no significant correlation between postconventional scores and scores from the SAT-Mathematics subscale. However, it validated previous studies (e.g., Arbuthnot, 1973; Sanders et al., 1995) which demonstrated positive associations between moral reasoning scores and scores from nonverbal tests or mathematical ability

tests. More importantly, it provided empirical support to Derryberry et al.'s (2007) hypothesis regarding the significant role of fluid intelligence as represented by mathematical ability on postconventional moral reasoning. Highly mathematically gifted adolescents in the present study outperformed moderately mathematically gifted counterparts on the index of postconventional moral thinking.

It is possible that the significant associations between mathematical giftedness and moral reasoning were a result of fundamental mental mechanisms shared by mathematical thinking and moral problem solving. Moral reasoning is "an imaginative process of problem solving" (Johnson, 2009, p. 147), where individuals attempt to resolve complex moral dilemmas around issues of human interactions and ethical obligations. Therefore, it is not surprising that the metacognitive processes in mathematical problem solving such as analyzing and synthesizing data using inductive and deductive reasoning, and drawing rational inferences from various sources of information (Woodcock, 1998) are facilitative to the process of moral problem solving. When confronting a moral conflict, individuals are likely to engage in several cognitive tasks that demand logical problem solving. These include identifying components of the moral problem, considering various lines of action, selecting the most appropriate choice of action, and justifying the chosen action based on a complex moral frame of reference (Rest et al., 1999c). With mathematical thinking processes playing a crucial role in strengthening moral problem solving skills, it is conceptually reasonable that gifted adolescents who were highly competent in mathematical ability were more advanced in moral reasoning development than those who were less competent in mathematical ability.

Even though nonverbal intellectual abilities as represented by levels of mathematical giftedness had a significant effect on postconventional moral reasoning, it is important to note that the size of the effect was small. As such, other cognitive, intrapersonal, or environmental factors may have significantly contributed to the ability to make mature moral judgments. For example, preference for complex explanation (Derryberry et al., 2005; Derryberry & Barger, 2008), openness to experience (Dollinger & LaMartina, 1998; Lonky et al., 1984), creative problem solving (Runco, 2009), and critical thinking (Paul & Elder, 2009) have been shown to be influential in the development of moral judgment.

5.4 Discussion of Results of Hypothesis Three

Hypothesis three expects that adolescents who are highly gifted in verbal ability have higher levels of moral reasoning than adolescents who are moderately gifted in verbal ability. Findings from the present research partially supported the hypothesis. A significant interaction between the level of verbal giftedness and gender was observed in the current study. Female adolescents who were highly gifted in verbal ability had significantly higher postconventional scores than did female adolescents who were moderately gifted in verbal ability. However, this effect was not statistically significant for the gifted male group, indicating that male adolescents who differed in levels of verbal giftedness did not perform significantly differently in the postconventional index.

When mean postconventional scores between groups were taken into consideration, the mean postconventional score of highly verbally gifted females ($M = 43.9$) was notably higher than that of moderately verbally gifted females ($M = 35.7$), highly verbally gifted

males ($M = 36.3$), and moderately verbally gifted males ($M = 36.0$). In fact, the mean postconventional score exhibited by highly verbally gifted females not only exceeded the average for the adult population ($M = 40$, Rest & Narvaez, 1994) but also was comparable to the average for college graduate students in business studies ($M = 42.8$, Rest & Narvaez, 1994). This finding did not support Gilligan's (1982) claim that women were less developed on the justice-based moral reasoning than men. Nor was it consistent with studies that found no significant gender difference in the performance on the DIT postconventional index (e.g., Chovan & Freeman, 1993; Howard-Hamilton & Franks, 1995; Karnes & Brown, 1981; Narvaez, 1993; Shoffner, 1996; Walker, 1984).

The finding that female adolescents performed significantly better in the DIT than their male counterparts was consistent with existing studies that found that gifted high school girls were more advanced in postconventional moral reasoning than gifted boys (e.g., Lee & Olszewski-Kubilius, 2006; O'Leary, 2005; Tan-Willman & Gutteridge, 1981). Previous research in the realm of adolescent cognitive development has shown that early and middle adolescent females tend to mature intellectually earlier than their male counterparts (Colom & Lynn, 2004). This may explain the more mature moral reasoning ability among high school females in the present study. According to Rest (1986), the occurrence of gender differences in the ability to make moral judgments is largely influenced by other factors such as intelligence and education. Therefore, the significant interactions between gender and levels of verbal giftedness substantiated Rest's (1986) speculation on the possible confounding effects of other variables on gender differences. Specifically, data from the current study revealed that gender and levels of verbal giftedness had a synergistic role in the development of moral reasoning.

Research in the realm of gender differences in language development has yielded conflicting findings. Nonetheless, a number of studies have substantiated that female students outperformed their male counterparts in general language ability as measured by scholastic achievement tests (e.g., Kuhn & Holling, 2009) and tests of reading comprehension (e.g., Logan & Johnston, 2010). In a study that examined performances of male and female students in tests of language competency, Kramer, Delis, Kaplan, O'Donnell, and Prifitera (1997) found that girls aged between the ages of 5 and 16 years performed significantly better than boys on recall, recognition, and organizational strategies (i.e., semantic clustery and serial clustery). Superior use of reading strategies exhibited by female students might contribute to their language learning efficiency and advancement in reading comprehension. Research pertaining personality characteristics have revealed a pronounced difference in values held by gifted males and females (e.g., Achter et al., 1999; Lubinski & Benbow, 1992). Gifted females reported social values as the most dominant value in life whereas gifted boys appealed to theoretical values (Achter et al., 1999). Regardless of college major (i.e., mathematics/ science, humanities, or others), gifted females rated interpersonal interactions and social issues as the most significant area of interests (Lubinski & Benbow, 1992). With a strong interest in social values and superior language abilities, it is not surprising that female students who are particularly proficient in verbal ability are more competent in a task that requires language information processing and in-depth understanding of social issues such as the DIT.

The influence of levels of verbal giftedness on moral reasoning demonstrated in this study was supportive of previous studies that showed students with high verbal ability performing better in the measure of postconventional moral reasoning than their

counterparts who were less competent in verbal ability (e.g., Derryberry et al., 2005; Sanders et al., 1995; Tirri & Pehkonen, 2002). Results from the current study were also congruent with a recent study by Derryberry et al. (2007) which reported a significant path from crystallized intelligence to the postconventional moral schema.

The association between verbal ability and postconventional moral reasoning has been explained in light of facilitative roles of language competency in completing the DIT. Research in the realm of individual differences has demonstrated relationships between mental representations of information and performance in cognitive tasks. Differences in symbol systems used in a mental task have an influence on the manner in which individuals operate mentally (Sternberg, 1996). Verbally gifted individuals have been found to perform significantly better in tasks that require language proficiency (Benbow & Minor, 1990) and absorption of information presented in word stimuli than those who are less able in verbal ability (Dark & Benbow, 1994). Given that the DIT makes use of written language as a medium to present complex ethical dilemmas, a certain degree of verbal ability is required. Language ability is principal in the process of moral problem solving, especially in comprehending and analyzing complex moral situations, interpreting issue statements, and evaluating moral considerations in response to a moral dilemma presented in the DIT (Derryberry et al., 2005). Individuals with high verbal ability are likely to be more proficient in manipulating linguistic information from a socio-moral context (Thoma, Derryberry & Narvaez, 2009). From this, the significant effect of levels of verbal giftedness on moral reasoning as evident in this study was conceptually validated.

The finding from the current study that both levels of mathematical giftedness and levels of verbal giftedness had significant effects on moral reasoning did not support Sander et al.'s (1995) claim that the DIT is simply a measure of verbal intelligence. In contrast, it verified Rest's (1986) assumption that both verbal and nonverbal intelligence are instrumental in the ability to make mature moral judgments. According to Rest (1986), it is general intelligence that contributes to making mature moral judgments rather than some specific domains of intelligence. This study offered empirical support to Rest's theoretical speculation that there were at least two major facets of general intelligence, namely verbal and mathematical or logical abilities, that influenced the ability to give moral reasoning in a more advanced manner. Both verbal and nonverbal reasoning were found to positively affect the ability to use postconventional schema when approaching the task of moral reasoning as assessed by the DIT.

5.5 Discussion of Results of Hypothesis Four

Hypothesis four states that gifted adolescents are more advanced in identity status (i.e., identity achievement and moratorium) than age peers not identified as being gifted. Findings from MANOVAs revealed nonsignificant effects of ability on the ideological and total identity domains. This indicates that the ideological and overall identity formation of gifted adolescents was not significantly different from that of their age peers not identified as gifted. Supporting findings from MANOVA, results from Pearson's chi-square also showed a nonsignificant difference in the distribution of identity statuses between gifted and non-identified participants in the ideological and total identity domains. Based on

these findings, the development of ideological and total identities between the two groups was not significantly different.

Nonetheless, data from both MANOVA and Pearson's chi-square tests demonstrated a significant difference between the gifted and non-identified groups in the interpersonal identity domain. Specifically, participants who were not identified as gifted scored significantly higher in the interpersonal achievement subscale than did their gifted counterparts, suggesting that the former group perceived themselves as having higher degrees of self-initiated exploration and commitments to values in the realm of interpersonal identity than did the latter group. These findings not only refuted the hypothesis but also contradicted results from previous studies.

Literature has shown young gifted adolescents generally showed an onset of identity development earlier than did their age peers not identified as being gifted (Howard-Hamilton & Frank, 1995; Zuo, 2005). Data from the present research did not support those from Carn-Watkins' (1991) and Shoffner's (1996) studies which found that the majority of gifted high school student were classified in the statuses that encompass identity exploration (i.e., moratorium and achievement) in the ideological and interpersonal domains.

Apart from using scores from global measures of identity development, the present study also used scores obtained from domain-specific identities for data analysis. Recent research using the identity status paradigm has recommended that both domain-specific identities and global identity measures be employed concurrently to provide a thorough representation of an individual's patterns of identity development (Goossens, 2001;

Solomontos-Kountouri & Hurry, 2008). Domain-specific identities were measured in the interpersonal domain in order to further investigate the significant effect of ability on the global measure of interpersonal identity. Results using domain-specific subscales showed that gifted adolescents significantly differed from their age peers not identified as gifted in the areas of dating and gender role.

In terms of dating, findings showed a trend favoring adolescents not identified as gifted on the dating achievement subscale, signifying that they have considered different dating options and have arrived at a dating style that is personally suitable. Gifted adolescents, on the other hand, had significantly higher scores in the dating moratorium and foreclosure statuses than did their age peers not identified as gifted. Higher moratorium scores manifested by gifted adolescents suggested that they were currently in the process of surveying available dating styles but have not yet made a decision on a particular dating preference. High dating foreclosure scores exhibited by gifted adolescents signified that they had made a decision on a preferred dating style, but their dating preferences were influenced by parental expectations.

The finding that gifted adolescents had high scores in both dating foreclosure and dating moratorium statuses was somewhat unexpected given that the two statuses are described as two opposite identity profiles (Adams, 1998). Foreclosure signifies firm commitments derived from parental influences whereas moratorium characterizes self-initiated exploration without making firm commitments to any alternatives. Although this result was conflicting, it may be interpreted in light of a developmental trajectory that gifted adolescents undertake. In order to fulfill the task of identity formation one must embark on a progressive pathway, proceeding from a less advanced status of diffusion or

foreclosure where exploration is absent to a more advanced status of moratorium where self-exploration is present (Waterman, 1982; Waterman et al., 1974). It is possible that high degrees of foreclosure and moratorium played collaborative roles in identity formation among gifted adolescents in this study. While having made temporary commitments to a dating style which conformed to parental expectations (as evident from high foreclosure scores), they concurrently explored other dating styles and critically examined available information relevant to dating relationships (as evident from high moratorium scores). Therefore, high foreclosure and high moratorium scores may represent a transition from premature commitments adopted from significant others to active engagements in identity exploration.

Gifted adolescents in this study showed high degrees of interest in exploring and reflecting on different approaches in dating. Without having made a firm commitment to a dating style, it is possible that gifted adolescents were cautious in dating relationships. This was congruent with literature that found that highly able individuals have a tendency to defer involvements in romantic relationships albeit their interest in intimacy is not different from their counterparts who were not identified as gifted (Halpern, Joyner, Udry & Suchindran, 2000). Even though intimacy is generally associated with a heightened sense of autonomy and emotional security (Neeman, Hunnard & Masten, 1995), involvements in dating relationships among early and middle adolescents have been found to link with several issues such as increased family conflicts (Dowdy & Kilewer, 1998), emotional turmoil (Quatman, Sampson, Robinson & Watson, 2001), and disruption to school work (Furman & Shaffer, 2003). Regardless of gender and school grade, young adolescent students who actively engaged in dating displayed low academic motivation and achievement (Quatman et al., 2001), and had lower aspirations in pursuing tertiary

education (Neeman et al., 1995). Even though intrapersonal factors and the nature of relationships play crucial roles in predicting the effect of romantic relationships on academic achievement and aspirations, it is time and energy invested in dating that distracted young students from focusing their attention to scholastic pursuits (Neemann et al., 1995). It is possible that a lower degree of dating commitments among the gifted is a consequence of the ability to foresee restrictions that follow dating as well as the awareness that achievement in personal goals is a prerequisite for the mature development of intimacy (Furman & Shaffer, 2003). Studies that investigated dating behaviors among young adolescent students posited that those who had high academic aspirations and determined to undertake undergraduate or postgraduate degrees had a tendency to defer involvements in romantic relationships (Csikszentmihalyi, Rathunde & Whalen, 1997; Neemann et al., 1995).

In a study of talent development in gifted high school students, Csikszentmihalyi et al. (1997) found that gifted males and females scored significantly lower on the Sexual Attitudes subscale of the Offer Self-Image Questionnaire than did their counterparts of average ability. This signified that even though gifted students were aware of the biological urge to explore aspects of sexual relations during puberty, they adopted a more conservative approach to romantic relationships and dating. In addition, data from an interview revealed that gifted adolescents were cautious of the possible conflict between investing time and energy in having friends of the opposite sex and investing it in their talent. This resulted in prolonged sexual latency among gifted teenagers (Csikszentmihalyi et al., 1997). Given that gifted and high achieving adolescents are likely to take time to examine issues around dating, they are willing to delay gratifications so as to attain their educational and career goals. In this light, high moratorium scores

exhibited by gifted adolescents in the current study might signify that they have chosen to take their pace to survey dating styles prior to subscribing to a dating preference that is most suitable to their circumstances.

Analyses from domain-specific identities also demonstrated a significant effect of ability on gender role. Gifted adolescents had significantly higher gender role moratorium scores than did their counterparts who were not identified as gifted. This suggested that the gifted group had higher degrees of exploration on the area of gender role attitudes than did the non-identified group. Specifically, they actively engaged in examining and critically evaluating different beliefs about roles, responsibilities, and rights of women and men in a society (Fisher & Arnold, 1994). Previous studies have shown that adolescents not identified as gifted were likely to adopt a gender role identity prescribed by the society (Mills, 1981). Nonetheless, research pertaining gender role identification of gifted adolescents has revealed more complex patterns. Gifted male adolescents preferred undifferentiated gender role identification, showing low preferences for both masculine and feminine identifications (Mills, 1981; Wells, Peltier & Glickauf-Hughes, 1982). Gifted females, on the other hand, favored androgyny by showing a balanced identification with masculine and feminine gender roles (Howard-Hamilton & Franks, 1995; Mendez & Crawford, 2002; Wells et al., 1982). Likewise, research by Csikszentmihalyi et al. (1997) revealed that young gifted males and females were less sex stereotyped, possessing characteristics that are described as feminine (e.g., sentience and understanding) and masculine (e.g., achievement orientation and endurance).

Preferences for an undifferentiated gender role identity among gifted males and the identification with an androgynous gender role among gifted females may explain high moratorium scores exhibited by both gifted males and females in the present study. It is possible that the undifferentiated gender role identification generally displayed by gifted male adolescents related to the high moratorium scores exhibited by the gifted male group. They were acutely involved in examining gender role concepts but have not yet made commitments to a gender role perspective that best describes their beliefs. Likewise, preferences for the androgynous gender role identity among young gifted women may associate with high moratorium scores displayed by gifted females in the current study. Given that gifted females were found to open to gender roles that are not stereotypically defined, they were still in the process of seeking out a gender role concept with which they could identify. Research has shown that moratorium is associated with the personality measure of openness to experience (Clancy & Dollinger, 1993; Tesch & Cameron, 1987), which signifies a strong drive to seek out new experiences, strive for unconventional ideas, and revisit existing values (McCrae & Costa, 1997a, 1997b). According to Csikszentmihalyi et al. (1997), androgyny and openness to experience are two qualities that are complimentary to talent development. While openness to experience provides gifted adolescents with freedom to explore novel challenges, androgyny yields a combination of qualities that are crucial for sustained application of skills. With high degrees of openness to experience and complex gender role paradigms in the 21st century, gifted students in the present study may perceive the issue of gender roles more critically.

It is interesting to note that dating and gender role, which are two identity issues specifically relevant to romantic relationships, were two identity areas where the gifted

group had significantly higher moratorium scores than did the non-identified group. The fact that gifted adolescents reported to be in the process of examining and evaluating values in the areas of dating and gender role may imply that they regarded these issues in a more analytical, thoughtful manner than did their age peers of not identified as gifted. Previous research has found that gifted adolescents, particularly females, face difficulties in deciding between fulfilling personal needs for intimacy and pursuing needs for academic or career aspirations (Reis, 2002). With a tendency to make a careful decision to engage in a romantic relationship, it is possible that gifted adolescents lengthen a period of evaluating available dating styles and gender role values in order to make way for scholarly or vocational pursuits. According to Erikson (1968), gifted individuals are likely to face a prolonged period of psychosocial moratorium, which allows them for partaking in various activities that provide opportunities for role experimentation. More importantly, an extended moratorium period encourages gifted adolescents to reexamine previous identifications, make conscious and thoughtful decisions, and accept values that truly represent their personal preferences (Côté & Levine, 1988).

The pattern of time spent on activities may also explain gifted teenagers' interpersonal identity. While average ability teens spent more time socializing and going out with friends, gifted adolescents spent more time alone doing classwork, thinking, and engaging in structured leisure activities such as arts and hobbies (Csikszentmihalyi et al., 1997). In this light, gifted students tended to enjoy activities that require concentration and solitary whereas their age peers not identified as gifted were more likely to engage in informal social interactions. It might be tempted to conclude that the pattern of time used by gifted teenagers may reflect "immature sexual attitudes" where gifted adolescents appeared to lack opportunities in more interactive social activities typical for teenagers.

However, when data from a self-report questionnaire on social coping were taken into consideration, gifted teenagers reported to strike a balance between socialization and solitude. They participated in social activities when they seek companionship and enjoyed solitary activities when they pursued skill development. In contrast, teenagers who were of average ability were less likely to cope well with solitarily. Based on findings from Csikszentmihalyi et al.'s (1997) study, it appears that gifted teenagers have greater flexibility to decide on time spent on academic tasks and social activities. Similar to gifted teenagers from Csikszentmihalyi et al.'s (1997) research, gifted teenagers in the present study who were talent search students might deliberately choose to invest their time and energy in activities that promote interpersonal and intrapersonal growth such as hobbies and GERRIC holiday programs. Participation in talent search programs and holiday courses designed specifically for gifted students not only provide gifted teenagers with opportunities to develop friendship with like-minded peers but also a chance to satisfy their thrust of knowledge. With strong intrinsic motivation for talent development, these gifted teenagers may have decided to prolong a period of exploring dating styles and gender roles in order to fulfill their flow experience.

One aspect of adolescent identity development is the establishment of interpersonal relations (Erickson, 1968). Young adolescents' ideas and expectations in dating and gender role constitute their interpersonal identity (Erickson, 1968; Marcia, 1994; Orlofsky et al., 1973). The mature understanding of interpersonal identity through moratorium not only leads to identity achievement but also provides an entry to the next psychosocial stage of intimacy (Erikson, 1968). Therefore, the prolonged moratorium exhibited by the gifted may, in fact, have a constructive effect on the development of identity and intimacy.

It is interesting that results from this study did not show significant differences between gifted adolescents and their age peers who were not identified as being gifted in the area of friendship, suggesting that these two groups did not have different perceptions on friendship. Both gifted and non-identified groups reported to have explored the concept of friendship and have developed an understanding of the importance of friendships and reasonable expectations from peers. They have also made commitments to a preferred friendship style and have defined expected qualities in a friend. This finding added to contradictory literature in the realm of friendship and social relations of gifted children and adolescents. It yielded support to studies that found no evidence of poor psychosocial adjustment among the gifted (e.g., Garland & Zigler, 1999; Luthar, Zigler & Goldstein, 1992; Oram, Cornell & Rutemiller, 1995). In contrast, it was inconsistent with previous studies that reported gifted students being more at risk of becoming social outcasts (e.g., Cross, Coleman & Stewart, 1993; Roedell, 1984; Swiatek, 1995).

The contradictory findings in the realm of friendship for gifted individuals may be a function of the different theoretical constructs and instruments employed by each study. The present study adopted a conceptual approach that puts an emphasis on the process of friendship identity formation rather than on gifted adolescents' perceptions on the quality of friendships they have experienced. Even though the findings from the present study did not find a significant difference in perceived self-exploration and commitment between gifted and non-identified adolescents, it added to the existing literature on the development of friendship identity among high school students. A study by Gross (2001) found that gifted children in the primary school level showed more advanced conceptual understandings of friendship and earlier than their age peers not identified as gifted. The finding from the present study suggested that students who were not identified as gifted

were able to catch up with their gifted counterparts in the area of friendship conceptions when they approached the period of adolescence.

It is also important to note that gifted adolescents in the current study did not differ from their age peers not identified as gifted in the realm of occupation identity. Both groups were comparable in the extent to which they explored career choices and made commitments to a vocational path. This finding did not support previous research on the positive influence of giftedness on the early establishment of vocation identity. Specifically, it was not consistent with results from a series of studies conducted within the Study of Mathematically Precocious Youth (SMPY) that indicated advanced career identity in young gifted adolescents (e.g., Achter et al., 1999; Lubinski & Benbow, 2006; Lubinski et al., 1995, 1996, 2001). SMPY research has indicated that gifted individuals typically established their vocation identity at a relatively early age of 13 years and followed through with their educational or vocational choices until they reached the period of late adolescence and adulthood (Lubinski et al., 1995, 1996). However, findings from the present study did not substantiate the SMPY's research on the early commencement of examining career choices. It is important to note that subjects from the SMPY research included those in the top 1% to the top 0.01% in quantitative or verbal reasoning ability (Lubinski & Benbow, 2006.). Even though APTS and ASSETS participants were gifted performing in the top 5% in tests of intellectual ability, it is likely that a few of them were "precocious". Results from the present study did not support previous studies that showed gifted adolescents establishing their occupation identity earlier than did their age peers not identified as gifted.

Findings from this study have added to a small number of existing studies that investigated gifted adolescents' identity formation based on the ego identity status paradigm. Overall, findings from this study did not support previous studies that demonstrated the advancement of gifted adolescents on the ideological and interpersonal identity status development. Both gifted adolescents and their age peers not identified as gifted in the present study did not significantly differ in the task of identity formation in the ideological and total identity domains. More importantly, it was found that adolescents not identified as gifted were more advanced in the interpersonal identity domain, especially in the realm of dating. Gifted adolescents, on the other hand, showed a greater degree of interest in exploring and examining the concept of dating and gender role. This substantiated Erikson's (1968) argument that individuals with high intellectual ability are likely to encounter a prolonged period of psychological moratorium, which results in a delay in making firm commitments to identity options.

5.6 Discussion of Results of Hypothesis Five

Hypothesis five speculates that gifted adolescents who have a higher level of mathematical giftedness are more advanced in identity status than gifted adolescents who have a lower level of mathematical giftedness. Findings from MANOVAs did not find a significant effect of levels of mathematical giftedness in either the ideological, interpersonal, or total identity domains. Based on this finding, gifted adolescents who were highly gifted in mathematics did not significantly differ from those who were moderately gifted in mathematics in the development of identity status. Consistent with findings from MANOVAs, Pearson's chi-square tests showed no significant difference in

the frequency distribution of identity statuses between adolescents who differed in levels of mathematical giftedness. Based on these findings, gifted adolescents who differed in levels of mathematical ability displayed neither different patterns nor degrees of identity status development. Consequently, hypothesis five was not supported.

Literature that specifically investigated associations between mathematical ability and identity statuses based on Erikson's or Marcia's framework was considerably limited and inconclusive. Grotevant and Adams (1984) found small, negligible correlations between the EOM-EIS and the mathematics subtests of the ACT ($r = .16$) and the SAT ($r = .11$). On the contrary, Katebi (1987) did not find a significant effect of the mathematics subtest of the SAT on identity status development. Consistent with Katebi's (1987) study, results from the present study did not reveal a significant effect of levels of mathematical giftedness on either the ideological, interpersonal, or total identity domain.

The nonsignificant effect of levels of mathematical giftedness on identity status is unexpected given that literature has shown that identity achievement relates to the ability to make analytical and rational decisions derived from logical examinations of evidence (Klaczynski et al., 1998). Mathematical thinking which generally involves logical reasoning and rational problem solving was expected to be significantly related to the ability to process identity relevant information. However, the lack of such association might possibly be explained in light of different underlying mental mechanisms between mathematical thinking and identity formation. Mathematical thinking requires schematic thinking which involves logical reasoning and formal problem solving using quantitative concepts and mathematical symbol systems (Ben-Zeev, 1996; Dreyfus, 1991; Mayer & Hegarty, 1996; Rickart, 1996; Sternberg, 1996). The task of identity formation, on the

other hand, is an experiential process that requires constant self-evaluation and exposure to diverse experiences (Adams, 1998; Grotevant, 1987; Marcia, 1980). Identity exploration, which is a process most prominent among high school students, entails socialization processes and interpersonal interactions so as to establish life goals and recognition of potentials (Adams, 1998). It demands that one invests time and energy to explore identity options through various outlets, critically evaluates those options, and arrives at an identity option which is personally meaningful (Marcia, 1980). Even though both mathematical thinking and identity formation require a certain degree of cognitive competence, it is possible that they depend on different sets of cognitive and motivational skills. Mathematical thinking might be more strongly associated with schematic thinking and nonverbal reasoning to solve problems logically (Mayer & Hegarty, 1996; Rickart, 1996) whereas identity formation requires more generic information processing and an intrinsic drive to engage in identity exploration (Adams, 1998).

Apart from explanations relevant to cognitive mechanisms, the absence of the association between identity status and mathematical giftedness can be understood in light of the personality factor. Studies that investigated relationships between personality and identity development have demonstrated a significant contribution of openness to experience on successful identity formation (Berzonsky et al., 1999; Clancy & Dollinger, 1993; Dollinger, 1995; Tesch & Cameron, 1987). Openness to experience relates to heightened intellectual curiosity, open-mindedness, and a tendency to seek adventures and new experiences (McCrae, 1992, 1994; McCrae & Costa, 1987, 1997a, 1997b). However, literature has indicated that openness to experience had nonsignificant or weak correlations with measures of mathematical thinking (Ashton et al., 2000; Bates &

Shieles, 2002; Goff & Ackerman, 1992) and logical reasoning (Batey, Chamorro-Premuzic & Furnham, 2009).

Results from the present study have added to the unfortunately limited amount of research on the role of a specific facet cognitive ability in identity formation. This study has also contributed to the rather scarce and inconclusive findings in regard to the role of mathematical, nonverbal reasoning on Marcia's ego identity status paradigm. The nonsignificant effect of levels of mathematical giftedness on ideological and interpersonal identities was consistent with previous studies (e.g., Berzonsky & Kuk, 2005; Katebi, 1987) that showed no significant associations between mathematical ability and identity statuses. It was speculated that cognitive and personality factors that govern identity development are independent of those that govern mathematical thinking. This might explain the absence of the significant associations between the two constructs that are apparent in the current research.

5.7 Discussion of Results of Hypothesis Six

Hypothesis six states that gifted adolescents who have a higher level of verbal giftedness are more advanced in identity status than gifted adolescents who have a lower level of verbal giftedness. Analyses revealed a significant effect of the level of verbal giftedness in total identity. In addition, there was an effect of the level of verbal giftedness on ideological identity although statistics only approached the pre-determined level of significance. Additional analyses using domain-specific identity issues revealed that adolescents who differed in levels of verbal giftedness performed significantly differently

in the religion and politics subscales. Adolescents who were highly gifted in verbal ability scored significantly higher on the religion achievement status and the politics achievement status than did adolescents who were moderately gifted in the verbal ability. However, levels of verbal giftedness did not have a significant effect on the interpersonal identity domain.

Results from Pearson's chi-square were consistent with those from MANOVAs. Even though not statistically significant, data showed a discrepancy in the frequency distribution of the diffusion status in the ideological and overall identity domains. There were a higher percentage of moderately verbally gifted adolescents being classified as identity diffused than were highly verbally gifted adolescents. Furthermore, although not statistically significant, there was a trend that showed a larger percentage of highly verbally gifted adolescents being classified in the moratorium status than were moderately verbally gifted adolescents. Congruent with results from MANOVAs, there was no significant difference in the frequency distribution of interpersonal identity statuses between adolescents who differed in levels of verbal giftedness. Given that levels of verbal giftedness had a significant effect on total identity and a nonsignificant effect of interpersonal identity, hypothesis six was partially supported.

Results from the present study have added to a small number of available studies that examined the relationships between measures of mathematical ability and ego identity status (e.g., Berzonsky & Kuk, 2005; Grotevant & Adams, 1984; Katebi, 1987). It was consistent with findings from Grotevant and Adams' study (1984) which found small correlations between the EOM-EIS and the ACT English subscale ($r = .14$) and vocabulary scores ($r = .07$). It was also consistent with Katebi's study (1987) that identity

achieved subjects were those with the highest SAT-Verbal scores followed by those who were moratorium, foreclosure, and diffusion.

The significant effect of levels of verbal giftedness may be contributory to personality characteristics correlated with advanced verbal ability. Verbal ability has been found to relate to personality traits that are central to intrapersonal and intellectual growth (Chamorro-Premuzic & Furnham, 2004). Individuals whose strength is in verbal ability have been found to be autonomous, introspective, flexible, unconventional, assertive, open to new experience and ideas, and eager to reevaluate social, political, and religious values (Altus, 1952, 1958; Ashton et al., 2000; Bates & Shieles, 2002; Cattell, 1945; Goff & Ackerman, 1994; Heiss, 1995; McCrae & Costa, 1987; Mills, 1993). Even though those characteristics might put verbally gifted individuals at risk of interpersonal difficulties (Janos & Robinson, 1985), the possession of these traits is related to a success in identity development (Adams et al., 1985; Bourne, 1978a, Marcia, 1980; Orlofsky et al., 1973; Toder & Marcia, 1973; Waterman & Waterman, 1972). Given that identity formation is an individually constructed process (Marcia, 1994), a strong sense of agency exhibited by the verbally gifted may promote active identity exploration, which results in the clarification of one's goals and sense of purpose (Berzonsky, 1989; Schwartz, 2006).

The nature of language and arts learning might also contribute to the development of identity formation. Education in the arts is likely to focus on sensitivity to students' expressions of emotions. It also instigates the pursuit of individuality as a mean for educational and personal progress. The practice of mathematics or science, on the other hand, puts a strong emphasis on logical reasoning and largely involves solitary activities (Csikszentmihalyi et al., 1997). In this light, verbally able students who are encouraged

to be self-expressive and explore their individuality might have received reinforcement to establish their identity to a greater extent than do those who are mathematically able whose line of work involves seeking rational truth and principles (Csikszentmihalyi et al., 1997).

The significant correlations between verbal ability and the intellectual facet of personality such as openness to experience and engagements in intellectual pursuits are theoretically expected. In fact, such relationship is described as reciprocal (Goff & Ackerman, 1992). Individuals who are proficient in verbal ability might be more engaged in intellectual pursuits and exhibit characteristics contributing to intellectual growth. In turn, engagements in intellectual activities and openness to new ideas promote the development of verbal-conceptual ability (Goff & Ackerman, 1992). The symbiotic relationships between verbal ability and traits favoring personal growth may facilitate the process of identity formation. Identity exploration may be influenced by the ability to process information relevant to identity alternatives. Individuals with greater capacity to process information (i.e., high verbal ability) may have an advantage in approaching the task of identity formation more effectively. Furthermore, identity exploration suggests active involvements in the gathering of information and the reexamination of values prior to making commitments to a particular identity value (Marcia, 1980). In this light, personality characteristics exhibited by verbally gifted individuals are influential in the identity exploration process (Clancy & Dollinger, 1993; Tesch & Cameron, 1987) and in using the information-oriented approach to identity formation (Dollinger, 1995).

Results in relation to the nonsignificant effect of the level of verbal giftedness on interpersonal identity were incongruent with previous studies that found unfavorable

impacts of verbal aptitudes on psychosocial adjustment, such as popularity, peer acceptance (Swiatek, 1995), involvement in social activities (Dauber & Benbow, 1990), and depression (Brody & Benbow, 1986). However, it verified studies that found no evidence of significant relationships between advanced mental ability and various measures of psychosocial maturity such as adaptive functioning, socio-emotional competence (Galambos, MacDonald, Naphtali et al., 2005; Neihart, 1999), anxiety (Norman, Ramsay, Martray & Roberts, 1999), and emotional and behavioral problems (Garland & Zigler, 1999). It is important to note that Marcia's framework does not aim to investigate individuals' experiences or expectations regarding friendship, but their self-perceived progress on two reciprocal identity formation mechanisms, namely exploration and commitment (Marcia, 1994). Given that identity status is a unique psychological framework, it is not surprising that findings from the present study were inconsistent with some existing investigations that examined different but potentially related psychosocial aspects.

Results from the recent study shed some light on the relationships between verbal ability and identity exploration. Only a small number of previous studies examined the development of ego identity status for gifted adolescents. More importantly, previous studies did not include domains of giftedness in their analyses. Findings from the present study contributed to literature in that highly verbally gifted adolescents were more advanced in the ideological identity development, reporting to have greater degrees of exploration and commitment in the religion and politics issues, than moderately verbally gifted adolescents. It is possible that some personality traits possessed by the highly verbally gifted group influence a heightened interest to explore ideological values. Given that the task of identity formation is an autonomous process (Montgomery, 2005), traits

such as interests in social issues, openness to unconventional ideas, and independence promote individuals' enthusiasm for identity exploration. This is evident in the present study.

5.8 Discussion of Results of Hypothesis Seven

Hypothesis seven anticipates positive correlations between moral reasoning and identity statuses. Results from Pearson's product-moment correlations supported the hypothesis. There were positive relationships between more advanced identity statuses (i.e., identity achievement and moratorium) and postconventional moral reasoning and negative relationships between less advanced identity statuses (i.e., identity diffusion and foreclosure) and postconventional moral reasoning. The correlations were small and most often significant.

Results from ANOVAs substantiated those obtained from Pearson's correlations. Adolescents in the more advanced identity statuses (i.e., identity achievement and moratorium) outperformed those in the less advanced identity statuses (i.e., identity diffusion and foreclosure) on the measure of postconventional moral reasoning. The differences in the postconventional scores between the two groups were evident in the ideological and total identity domains, but not in the interpersonal identity domain. Overall, findings from both Pearson's correlations and ANOVAs supported hypothesis seven, suggesting that significant relationships between moral reasoning and identity statuses existed.

Findings of the present study shed some light on the inconclusive findings regarding relationships between moral reasoning and identity status. This study has contributed support to studies that reported significant positive associations between the two constructs (e.g., Hult, 1979; Keegan, 1986; Podd, 1972; Rowe & Marcia, 1980; Shoffner, 1996). Specifically, findings from the present study demonstrated that adolescents who were classified either in the identity achievement or moratorium status displayed the highest or the second highest postconventional scores. This supported Marcia's (1980, 1994) assumption of hierarchy of identity statuses which found that identity achievers tended to be the most psychosocially well-adjusted and the most intellectually advanced in comparison to other identity statuses.

Perhaps the most surprising finding from the present study was that foreclosed adolescents had the lowest postconventional scores amongst the four identity statuses, including those in the diffusion status. The finding that foreclosed adolescents were least developed in moral reasoning was not supportive of previous literature that indicated identity diffusers as having the most inferior psychological and intellectual profiles to adolescents in other statuses. The inferior development of moral reasoning among foreclosed adolescents may be understood in light of the relative importance of autonomy on the ability to make mature moral judgments. Foreclosed individuals are described as those who have made premature commitments without active exploration and evaluation of identity options (Marcia, 1994). They showed heightened needs for cognitive closure (Soenens, Duriez & Goossens, 2005), reluctance to scrutinize conventional social, religious, and political beliefs (Berzonsky & Sullivan, 1992), and dependence on external controls or expectations (Soenens, Berzonsky, Vansteenkiste, Beyers & Goossens, 2005). Research in cognitive profiles of identity statuses has indicated that foreclosed

individuals employed the normative orientation style, showing a strong identification with parental values and beliefs when confronting identity information or problems (Berzonsky & Neimeyer, 1994; Berzonsky & Sullivan, 1992). Characteristics possessed by foreclosed individuals are in contrast to those possessed by postconventional thinkers. Those who reason based on the postconventional schema distinguish themselves from personal interests or social norms when confronting a moral dilemma. They tend to acquire and implement the universal principle of justice independent from parental or social pressures (Rest et al., 1999c). The lack of active exploration coupled with a strong need for social approval and unwillingness to explore alternative values may hinder foreclosed individuals in looking beyond social convention when making a moral judgment. As such, it is not surprising that foreclosed individuals are likely to display conventional moral reasoning (Podd, 1972).

That identity diffused adolescents showed more mature moral judgment development than foreclosed adolescents was incongruent with the theoretical assumption. It can be explained in terms of traits exhibited by diffused individuals. Identity diffused individuals are described as lacking an urge to make a firm commitment to any values and beliefs (Muuss, 1996). Nevertheless, research has shown that diffused adolescents, especially those in high school, were willing to pursue a trial and error process while examining identity options (Waterman, 1985). They were also found to have higher degrees of openness to experience than foreclosed individuals (Tesch & Cameron, 1987). By reaching out for and experimenting on unconventional ethical ideals, it is possible that identity diffusers use moral considerations beyond conformity.

It is interesting to note that results from ANOVAs showed a significant effect on postconventional scores only in the ideological identity domain, but not in the interpersonal identity domain. This finding contrasted with that of Shoffner (1996), which found that interpersonal identity was a significant predictor of moral reasoning. However, results from the present study supported Rest's fundamental assumption of the moral schema theory. According to Rest and his colleagues (1999a), postconventional thinking is associated with *macromorality*, which concerns "the formal structure of society as defined by institutions, rules, and roles" (p. 292). It describes human interactions based on political principles or social policy (Crowson et al., 2007; Rest et al., 2000). Ideological identity in the identity status framework consists of one's development of politics and religion identities that involve human interactions in a society-wide, public sphere. Consequently, the significant associations between ideological identity and postconventional thinking corresponded to the theoretical assumption proposed by Rest and his colleagues (Rest et al., 1999a).

Overall, data from the present study shed some light on the inconclusive findings in the realm of associations between moral reasoning and identity status. It verified other studies that demonstrated positive relationships between postconventional thinking and more advanced identity statuses and negative or nonsignificant relationships between postconventional thinking and less advanced identity statuses. It also yielded an interesting finding on the performance in moral reasoning between diffused individuals and foreclosed individuals. The diffused group had significantly higher postconventional scores than did the foreclosed group. Even though theoretical speculation has established that identity diffusers are less developed intellectually and psychosocially than foreclosed individuals, findings from the present study pointed in a different

direction. Exploration with tentative commitment (i.e., identity diffusion) appeared to be preferable in the development of moral judgment than premature commitment without exploration (i.e., foreclosure).

5.9 Discussion of Year in School Variable in Relation to Moral Reasoning

Year in school has been used as one of the additional variables in the study given evidence of the influence of age or year in school on moral reasoning in previous studies. Results from the present study indicated a significant interaction between gender and year in school with medium to large effect sizes. Both gifted males and females who were in the upper level of high school (i.e., years 11 and 12) scored significantly higher on the postconventional index than did their counterparts who were in the lower level of high school (i.e., years 9 and 10). This suggested that, regardless of gender, levels of education had an influential impact on the development of moral reasoning.

The medium to strong relationships between moral reasoning and level of education supported neo-Kohlbergian research that showed that the level of education (or age in school-age samples) is a powerful correlate of the DIT (Rest et al., 1999c). It was also consistent with previous studies that demonstrated a significant effect of education on moral reasoning (e.g., Martin et al., 1977; Narvaez, 1998; Rest et al., 1974, 1997a, 1997b, 1999b). Students with more advanced levels of education favored postconventional moral thinking, performing significantly better on the postconventional index than did students who were of lower levels of education (Martin et al., 1977; Rest et al., 1974; Rest et al., 1997a).

The educational trend evident in the present study also verified results from previous studies that employed gifted adolescent samples. For example, a study by Karnes and Brown (1981) indicated a tendency for gifted early adolescents to have a steady increase in postconventional scores from age nine to age 15. In addition, Tan-Willman and Gutteridge (1981) found a stable increase among gifted adolescent students who participated in a telescoped program. Both male and female students who were in their fourth year of the program performed significantly better on the DIT postconventional index than did their counterparts who were in the third year of the program.

The significant effect of the year in school variable on moral reasoning not only validated the construct validity of the DIT as a measure of moral reasoning but also verified the fundamental theoretical construct of moral judgment. The moral reasoning frameworks by Kohlberg and Rest assume a cognitive-developmental structure. Progress in moral judgment is developmentally sequential where children proceed from the less mature schema of personal interest to the more mature schemas of maintaining norms and postconventional thinking during adolescence and adulthood (Rest et al., 2000).

Changes in moral reasoning are the products of both cognitive maturity and exposure to formal education, especially where cognitive stimuli and social experiences for moral growth are readily available (Kohlberg, 1975, 1984; Turiel, 1998). This is because social experiences and cognitive growth enhance one's knowledge of moral and ethical systems (Gibbs et al., 2007; Swanson & Hill, 1993; Turiel, 1983).

Results from the study added to existing literature in that there was a significant difference in the performance on the DIT of students within the high school level. When approaching moral conflicts, students in the upper level of high school (i.e., years 11 and

12) were more likely to use postconventional schema than those in the lower level of high school (i.e., years 9 and 10). In comparing between students in the lower high school level and those in the upper high school level, results from the present study provided a finer differentiation in moral reasoning development among students within the secondary school level.

5.10 Discussion of Year in School Variable in Relation to Identity Status

Age and level of education have been investigated in previous research pertaining developmental patterns of identity formation (Meeus et al., 2010). In the present study, year in school has emerged as having a significant effect on the development of identity status. Results from Pearson's chi-square tests revealed that a larger percentage of gifted adolescents in the lower high school level (i.e., years 9 and 10) were categorized as identity diffused in the ideological and total domains and foreclosed in the ideological and interpersonal domains. In contrast, a greater percentage of gifted adolescents in the upper high school level (i.e., years 11 and 12) were classified in the more mature identity status of moratorium in the ideological, interpersonal, and total identity domains.

Supporting results from Pearson's chi-square tests, findings from MANOVAs indicated a significant effect of year in school on the ideological, interpersonal, and total identity domains. Adolescents in the lower high school level scored significantly higher on the ideological and total diffusion subscales and on the ideological, interpersonal, and total identity foreclosure subscales than did adolescents in the upper years of high school.

When analyses from domain-specific identity issues were taken into consideration, year in school had a significant effect on identity issues in both the ideological and interpersonal identity domains. Gifted students in the lower high school level had significantly higher diffusion scores in the occupation and politics issues and higher foreclosure scores in the occupation, religion, and lifestyle issues than did their counterparts in the upper high school level. For the interpersonal domain, gifted students in the lower high school level had significantly higher scores in the gender role diffusion and foreclosure statuses and in the friendship foreclosure status than did those in the upper high school level. The only subscale that younger gifted adolescents surpassed older gifted adolescents was the recreation achievement subscale.

The overall trend from this study showed that gifted adolescents in the lower high school level performed in the less developed statuses of foreclosure and diffusion whereas those in the upper high school level performed in the more developed status of moratorium. Based on this finding, identity formation of younger gifted adolescents was less likely to involve exploration of identity options. In fact, they had a greater tendency to adopt ideological values especially those relating to occupation, politics, and religion from parents or significant others than did older gifted adolescents. This trend was also evident in the interpersonal identity areas of gender role and friendship. On the contrary, the development of identity among gifted students in the upper level of high school involved a greater degree of reevaluation of one's existing values and consideration of other alternatives that might suit them personally.

The significant effect of year in school on both ideological and interpersonal identities in the present study was congruent with previous studies that showed significant

associations between school grades/ age and identity status development (e.g., Adams, 1998; Adams & Fitch, 1982; Allison & Schultz, 2001; Archer, 1982; Archer & Waterman, 1983; Katebi, 1987; Kroger, 1995; Kroger et al., 2010; Padilla-Walker, Barry, Carroll, Madsen & Nelson, 2008; Streitmatter, 1993a; Waterman et al., 1974). It also supported findings from longitudinal studies on a steady increased magnitude of the moratorium and identity achievement statuses and a declined proportion of the foreclosure and diffusion statuses during the secondary school level (e.g., Archer & Waterman, 1983; Jones & Streitmatter, 1987; Kroger et al., 2010; Meeus, 1996; Meeus et al., 1999, 2010; Streitmatter, 1993a). More importantly, the finding that adolescents in years 9 and 10 performed at the less mature statuses (i.e., foreclosure and diffusion) and those in years 11 and 12 operated at the more mature status of moratorium supported a theoretical assumption on progressive developmental shifts of identity statuses (Erikson, 1968; Meeus et al., 2010; Waterman, 1982). Specifically, it supported the assumption that individuals progress from identity diffusion to either foreclosure or moratorium, from foreclosure to moratorium, and from moratorium to identity achievement (Waterman, 1982).

Empirical research has consistently shown that adolescents of different stages of cognitive and psychosocial development tend to approach the task of identity formation in qualitatively different ways. Older adolescents are likely to autonomously seek out values and critically assess them based on appropriateness to their sense of self whereas younger adolescents are more prone to be influenced by expectations of parents or peers (Archer, 1982; Archer & Waterman, 1983; Meeus, 1996; Meeus et al., 1999).

Progressive developmental shifts have also been made in reference to cognitive maturity. It has been established that formal operational thinking is a prerequisite for achieving at

the moratorium and achievement statuses (Boyes & Chandler, 1992; Carn-Watkins, 1991; Rowe & Marcia, 1980). Thinking at the formal operational level is relative to systematic introspection, logical problem solving, and intellectual capability to explore and reflect on thoughts rationally (Klaczynski et al., 1998). An absence of the formal operational thinking might contribute to the inferior identity development among younger individuals. Even though younger adolescents might be knowledgeable about available identity options, they might not have adequate intellectual capability to consider possibilities and evaluate identity options with realistic projections into the future (Archer & Waterman, 1983; Waterman, 1982). Without a clear sense of directions, younger adolescents were less likely to progress in the task of identity formation.

It is also possible that younger adolescents purposefully prolonged the process of identity search because they did not feel the urge to establish themselves in some of the ideological identity areas. High school juniors might not feel compelled to explore alternatives and make commitments to vocational choices possibly because they did not feel the time pressure to make a decision concerning a career path. Furthermore, it is likely that younger adolescents who might have limited exposure to information relevant to career choices tend to settle for a career path recommended by significant others, leading to premature commitments (Archer & Waterman, 1983). In contrast, high school seniors who are just about to graduate from the secondary school level might realize the urgency to look for options, make decisions, and plan for their future. With a situational factor dictating the necessity to make a decision, high school seniors are more likely to feel the urge to explore different career paths and make a commitment to a career choice. Therefore, students who were in the upper level of high school had higher scores on the status that embraces identity exploration.

In terms of “political” identity, younger adolescents might not see a need to explore alternatives and make commitments to a specific political viewpoint until they arrive at the voting age. On the contrary, politics may become more relevant to older adolescents who are expected to cast their vote as active members of a society. As adolescents approach the university level, there is a greater likelihood that parental pressures regarding political attitudes become less important. The entrance to adulthood naturally urges late adolescents to make commitments to a political viewpoint autonomously (Goossens, 2001).

Apart from occupation and politics, young gifted adolescents in the current study were likely to be less advanced in the gender role identity. It is possible that younger adolescents intentionally deferred the task of establishing gender role attitudes because such identity area might seem irrelevant or inconsequential to their current psychosocial phase of life. Hence, gender role identity has not been placed as one of the identity areas that require immediate attention. Research has indicated that high school juniors were less advanced in identity domains relating to intimate interpersonal relationships than high school seniors or college students (Thorbecke & Grotevant, 1982).

Results from the present study yielded an interesting finding on the recreation identity of the younger gifted adolescent group. They had higher degrees of exploration in and commitments to leisure activities that they find most personally suitable than did their counterparts in the higher level of high school. Based on this finding, younger gifted adolescents have put a strong emphasis on establishing recreation identity. According to Erikson (1968), leisure activities are major foundations for younger adolescents to uncover interests and establish their preliminary identity. Participations in leisure

activities among young adolescents have been recognized as a crucial transitional pathway from “childhood play” to “adult work” (Shaw, Kleiber, Douglas & Caldwell, 1995). This is because leisure activities provide adolescent students with a greater degree of autonomy and voluntary control over their life choices in comparison to other daily activities (Coatsworth et al., 2005). Challenging and highly structured extracurricular activities, such as performing arts, team sports, and academic clubs, have been found to positively influence self-defining pursuits among early adolescents especially in shaping career interests and interpersonal relations (Eccles, Barber, Stone & Hunt, 2003). Therefore, high recreation achievement scores exhibited by the younger gifted group was not only a necessary pathway to establishing their identity but also a prelude for developing identity in other areas that will become salient in the later course of adolescence. A study of talent development by Csikszentmihalyi et al. (1997) found that gifted ninth and tenth graders were more likely to spend a significant amount of time in structured leisure activities (e.g., arts and hobbies) and perceive such activities as significant to the development of their talents.

In summary, the present study supported previous studies on the significant effect of year in school on ideological and interpersonal identity status development. Gifted adolescents in the lower high school level were more likely to perform in the less developed statuses of diffusion and foreclosure whereas those in the upper high school level were found to be in the more developed status of moratorium. It also validated previous studies (e.g., Meeus et al., 1999, 2010) that middle adolescence is the pinnacle period of progression from statuses that lack identity exploration (i.e., diffusion and foreclosure) to that which involves rigorous surveys of identity options (i.e., moratorium). This supported Erickson’s (1968) theoretical assumption of the developmental nature of

identity formation in which advancing grade level is associated with transitions to more advanced statuses. However, it is important to note that identity formation neither begins nor ceases with adolescence (Marcia, 1980). Rather, "...activity directed toward this goal [identity formation] commences early in life, reaches its ascendancy during adolescence, and continues to be refined during the adult years" (Archer & Waterman, 1983, p. 203).

5.11 Discussion of Gender Variable in Relation to Identity Status

Gender has been employed as an additional independent variable in this study. Analyses from MANOVAs showed a significant effect of gender on ideological and total identity domain. Gifted female adolescents had significantly higher scores in the ideological moratorium and the total moratorium subscales than did their male counterparts. Data from Pearson's chi-square tests revealed that a significantly larger percentage of gifted females were classified in the moratorium status than gifted males whereas a significantly greater percentage of male adolescents were classified in the diffused status than gifted females. Based on these findings, young women tend to be further ahead in the task of ideological identity formation, having explored ideological values more than gifted males. Despite the significant effect of gender on the ideological and total identity domains, results from both MANOVAs and Pearson's chi-square tests did not find a significant effect of gender on the interpersonal identity domain. This indicated that gifted males and females were comparable in the development of identity pertaining interpersonal relations.

Results from the present study were consistent with previous studies that showed differences between male and female high school students on identity status development (Bergh & Erling, 2005; Carn-Watkins, 1991; Cooper & Grotevant, 1987; Jones & Steitmatter, 1987; Meeus et al., 2010; Pearson & Rodgers, 1998; Phillips & Pittman, 2007). In particular, it supported studies that found high school females performing at statuses that encompass exploration (i.e., achievement and moratorium) whereas their male counterparts performing at statuses that lack identity exploration (i.e., diffusion and foreclosure). It was speculated that the earlier onset of physical and intellectual maturity contributed to advanced identity development among adolescent females (Jones & Streitmatter, 1987; Meeus et al., 2010). Recent research has found significant differences in both cognitive and physical maturation between boys and girls. During early and middle adolescence, girls have shown to reach puberty one or two years earlier than boys (Beunen et al., 2000) and were approximately one year ahead than boys in terms of intellectual development (Colom & Lynn, 2004). According to Erikson (1968), the early physical and cognitive maturation stimulates early adolescents to discard child-like behaviors and adopt adult like values. The onset of puberty influences "...the changes in role expectations associated with the concomitant physical development which may provide an impetus for the exploration of new and more mature roles" (Adams, 1998, p. 41). With greater degrees of identity exploration put forth by early intellectual, physical, and psychosocial maturation, young women are likely to exhibit greater progress in identity development especially during early and middle adolescence.

Apart from analyzing results from the global identity measures, the present study also used data from domain-specific identities to observe patterns of identity development of

adolescents more comprehensively. Only a small number of existing studies have examined identity status development using domain-specific identity subscales despite recommendations to integrate specific subscales in the analysis of identity formation based on the ego identity status paradigm (Goossens, 2001). Findings from the present study using domain-specific subscales revealed a significant gender effect on the identity issues of occupation, religion, and politics.

In terms of occupational identity, it was shown that gifted males had significantly higher diffusion and foreclosure scores than did their female counterparts. Higher diffusion scores exhibited by gifted males indicated that they were more likely than their female counterparts to postpone establishing a vocational identity. Even though young gifted men might have undergone periods of identity exploration, they have not yet developed a clear set of career goals. In addition, the finding that gifted male adolescents had significantly higher foreclosure scores than did females suggested that, when commitments to a career choice were made, gifted males tended to adopt a passive approach to vocational identity, choosing a career path validated by identification with significant others especially parents.

That gifted males were more likely to perform in the foreclosure and diffusion statuses in the realm of occupation identity was consistent with previous studies that showed men having higher scores in statuses that lack exploration in vocational choices (Goossens, 2001; Katebi, 1987; Solomontos-Kountouri & Hurry, 2008; Vondracek, Schulenberg, Skorikov, Gillespie & Wahlheim, 1995). It supported findings from Vondracek et al.'s study (1995) that found that male adolescents in grades 7 to 12 had significantly higher scores in the measure of career indecision, need for support, and concern for external

barriers than did their female counterparts. It also verified results from Kerr and Cohn's (2001, cited in Kerr and Sodano, 2003) longitudinal study which revealed that gifted males were generally placed under greater pressures from parents, especially fathers, to follow linear career paths. Consequently, they were more at risk of foreclosing their career choices without exploring other available options. In contrast, gifted females received less parental pressures in their career choices and were encouraged to keep their options open (Kerr & Sodano, 2003).

Research in the realm of gender role and vocational preferences has revealed that gifted females have a greater tendency to adopt an androgynous gender role in career interests than did their male counterparts (Kerr & Nicpon, 2003; Mendez & Crawford, 2002).

Young gifted women were found to be open to a greater number of career choices than boys, showing an interest in male-dominated, female-dominated, and gender-neutral careers (Mendez & Crawford, 2002). On the contrary, gifted boys were found to hold rigid masculine stereotypes, showing preferences only to male-dominated or gender-neutral careers and regarded prestige and high salaries as significant factors in considering an occupation (Kerr & Nicpon, 2003; Mendez & Crawford, 2002). A follow-up study of SMPY participants revealed that gifted male adults in their mid-30s placed a greater emphasis on gaining fame and recognition from their work, obtaining high compensation, and creating products with high impact (Ferriman, Lubinski & Benbow, 2009). By reserving their career choices to those prescribed as conventionally gender appropriate, it is possible that young gifted men felt pressured to conform to gender role expectations, which might put them at risk of foreclosing their vocational choices. In contrast, an androgynous gender role identification exhibited by young gifted women encourages them to be open to various career options.

Another possible explanation of gender differences in career decision making is differences in cognitive functioning between males and females. A review of studies has indicated that gifted females who participated in the SMPY were likely to have balanced intellectual ability (see Halpern, Benbow, Geary, Gur, Hyde & Gerusbacher, 2007, for fuller discussion). That is, their scores on the SAT-M subtest and the SAT-V subtest tended to be relatively equivalent. In contrast, cognitive profiles of gifted males from the SMPY were likely to be tilted to mathematical and visuospatial abilities (Halpern et al., 2007). When enrolment data of programs for the gifted were analyzed, female students enrolled in mathematics and science courses and language courses were in relatively equal proportions. Gifted male students, on the other hand, were six times more likely to enroll in mathematics and science courses than in language courses (Lubinski & Benbow, 1992). That gifted female adolescents having balanced cognitive ability might open doors for a variety of career choices regardless of gender role stereotypes. Even though a larger number of SMPY girls pursued careers that relate to humanities, some of them chose careers that are considered male-dominated (e.g., engineering or physical science). Male students, on the other hand, predominantly chose careers that relate to mathematics and science, which is considered a male-oriented career path (Lubinski & Benbow, 1992).

Previous studies have shown that adolescents who adopted an androgynous perspective had the highest occupation achievement scores and were more liberated from selecting career paths under stereotypical gender role expectations (Grotevant & Thorbecke, 1982; Kirsch, Shore & Kyle, 1976; Wells et al., 1982). In contrast, preferences for sex-typed orientation (i.e., masculinity and femininity) have been found to relate to identity foreclosure, since that behavior often leads to premature commitments to an identity

option (Orlofsky, 1977). This is because gender role identification dictates areas of talents and interests that men and women are likely to be encouraged to pursue. As such, gender roles limit the range of options for both males and females not only in career choice but also in life values (Eccles & Alfeld, 2007). Overall, perceived parental pressures to make an early commitment to a career path and a tendency to adhere to traditional gender role stereotypes may explain a lack of exploration and examination of vocational choices among gifted male adolescents in the current study.

Apart from the effect of gender on occupational identity, results from the present study also displayed significant gender differences in the realm of religion. Gifted females were more advanced in religious identity, having significantly higher religion moratorium scores, than gifted males. High religion moratorium scores exhibited by gifted females indicated an active involvement in considering various religious beliefs in order to arrive at individually appropriate religious values. On the contrary, gifted males had significantly higher religion diffusion scores than did the gifted female group, indicating an absence of exploration and commitments in the realm of religion and a sense of disengagement with religious beliefs among gifted male adolescents.

This result was consistent with previous studies, which pointed to male adolescents being identity diffused and females as moratoria in the realm of religion (Goossens, 2001; Solomontos-Kountouri & Hurry, 2008). In fact, perceptions of religion have been recognized as one of the aspects that mark the difference between male and female identities. Women in general regarded religion as more important, engaged in religious service and activities more often, and were more likely to incorporate religion in daily lives than did men (Donelson, 1999; Graetz & McAllister, 1994; Padilla-Walker et al., 2008). In

contrast, men tended to perceive religion in light of restrictions and supremacy (Donelson, 1999). Among studies that investigated gifted adolescents' perceptions on different values in life, young gifted women had higher scores in the measure of interests in religious and social values whereas their male counterparts perceived religion as the least important value in life (Heiss, 1995; Mills, 1981).

It is interesting to note that even though both gifted males and females in the present study have not yet made commitments to religion, their approach to establishing religious identity was notably different. Young gifted women were more involved in a search for a personally appropriate religious belief system whereas young men tended to discard the exploration of religious values entirely. This might reflect changes in modern Australians' perceptions on religion. There has been a steady increase in the number of people with no religious affiliation and a decrease in mainstream religious influence such as Christianity (Pietsch, Graetz & McAllister, 2010). In fact, statistics have shown that the number of Australians with no religious affiliation rose from 1% in 1961 to 14% in 1981, and 18% in 2006. This emerging trend indicated a declining bond between religion and the general population. Younger Australians have become less involved in religious activities. For example, 52% percent of people aged between 15 and 30 years have never attended church services and only 9% participated in church services at least once a week (Pietsch et al., 2010).

Several factors have been anticipated to influence a decrease in mainstream religious affiliation among young Australians. These include an emergence of agnosticism and atheism (i.e., skeptical views regarding existence of deities), spiritual experiences beyond religion, and engagement in other activities that distract people from attending church

services (Pietsch et al., 2010). Furthermore, multiculturalism is regarded as a factor contributing to an expansion of alternative, non-Christian religions (Pietsch et al., 2010). The existence of alternative religious values and belief systems may strengthen the willingness of young Australians to embrace pluralistic diversity and consider non-mainstream religions. This may explain the finding of young Australian gifted males and females displaying low degrees of commitment in the realm of religion. With increasingly abundant information pertaining to religious beliefs in the Australian society, young individuals may require more time to examine different belief systems prior to making a firm commitment to a religion that best suits their beliefs.

Politics is another ideological identity issue that marked differences between gifted male and female adolescents in the present study. There is a significant gender difference favoring females in the realm of political identity. Specifically, gifted female adolescents scored significantly higher on the politics moratorium subscale than did their male counterparts. This indicates that young women showed a heightened intrinsic drive to explore and define political values relevant to their personal preferences. Results from the present study added to the prevailing issues of gender differences in the realm of adolescent political identity. It did not support findings that showed no significant differences in politics identity between gifted males and females (e.g., Lipovsky, 1987). It also rebutted studies that suggested young men having higher degrees of exploration in political values whereas young women showed higher degrees of premature commitments to a political value without exploration (e.g., Goossens, 2001).

Politics is traditionally considered a male arena. Historically, women were likely to adopt political values from parents due to a limited exposure to the world outside the domestic

realm. Men, on the other hand, were encouraged to discuss different social-political issues, which foster the development of political identity (Pietsch et al., 2010). However, recent research has indicated that involvements in political affairs among men and women have become increasingly comparable over time (Vondracek et al., 1995). A comparable pattern of voting in federal and state elections between Australian men and women has been statistically evident (Pietsch et al., 2010). Moreover, an increasing number of Australian females are pursuing careers in politics (Pietsch et al., 2010).

The decreased gender gap in political participation is believed to be a result of increased equality in educational and occupational opportunities among males and females in modern societies (Baumeister & Muraven, 1996). Education and participation in workforces have been recognized as predictors of political knowledge, political efficacy, and interest in politics (Verba et al., 1997). This is because educational achievement and participation in the workforce provides individuals with a sense of control over their lives and choices despite inherited qualities such as gender or family backgrounds (Baumeister & Muraven, 1996). The heightened sense of control and competency among women might explain their heightened awareness and participation in politics. Results from the present study not only showed a narrower gender gap in politics but also confirmed studies documenting the progressive change in political identity among the female population. There was a propensity for liberalism and active involvements in politics among young Australian gifted women as evident from a greater degree of political engagements through exploration and examination of various political principles.

It is interesting to note that results from the present study were not supportive of Erikson's (1968) notion of "Inner Space", where females are believed to be more advanced in the

interpersonal identity and males are more advanced in the ideological identity. Contrary to Erikson's (1968) assumption, results from the present study demonstrated no significant gender difference in the interpersonal identity domain, indicating that male and female adolescents did not differ in the development of interpersonal identity. More importantly, there was no evidence that supports the argument that men are more advanced in the ideological issues of occupation, religion, and politics than women. Based in these findings, the notion of gender differences in the establishment of identity and intimacy in relation to gender role expectations might not be as common as theoretically anticipated. Since the 1970s, there has been a gradual decrease in traditional gender role attitudes and a significant increase in liberal viewpoints among women (Lubinski & Benbow, 1992; McHugh & Frieze, 1997). Women have increased aspirations for intellectual freedom, vocational ambitions, and gender role egalitarianism (Loo & Thorpe, 1998). Even in the 1960s young gifted females who were either mathematically, verbally, or spatially gifted repelled stereotypical female-oriented careers (e.g., office work). In fact, they perceived such career paths as having an aversive effect on their vocational aspirations (Lubinski & Humphreys, 1990). In this light, it is possible to say that Erikson's theoretical assumption of "Inner Space" should be reconsidered especially in the context of modern Western societies.

Even though the issue of gender differences in identity formation has been a subject of empirical investigations since the 1970s (e.g., Grotevant et al., 1982), findings still yielded conflicting results on male and female identity development. Data from this research shed some light on the prevailing issues regarding the identity status development of gifted adolescent males and females. In particular, it confirmed other findings that female adolescents tended to operate in a more sophisticated identity status of moratorium

whereas their male counterparts performed at the less sophisticated identity statuses of foreclosure and diffusion in the ideological identity domain. This substantiated previous findings that showed that early cognitive and physical maturation hastened the development of identity in female youth (e.g., Erikson, 1968; Jones & Streitmatter, 1987; Meeus et al., 2010).

This study also presented results derived from domain-specific identity subscales of the EOM-EIS-2 which were absent from literature involving gifted adolescents. It added to the literature that gifted male adolescents had higher scores in statuses that lack identity exploration (i.e., foreclosure and diffusion) in the areas of occupation and religion whereas gifted females had significantly higher scores in the more sophisticated identity status of moratorium in the areas of religion and politics than did gifted males. The fact that gifted females were in the process of constructing their ideological identity in various areas concurrently supported Archer's (1985) argument that identity development appeared to be more complicated for young women than for men.

5.12 Chapter Summary

This chapter has presented and discussed results in relation to the study's hypotheses. Specifically, explanations regarding moral reasoning and identity status of adolescents who differed in ability, levels of mathematical giftedness, and levels of verbal giftedness were given. The effects of gender and year in school on moral reasoning and identity development were also discussed. Interpretations of results were made in reference to relevant literature and empirical research.

Chapter Six

Conclusion

6.1 Introduction

Giftedness has been associated with superiority in the intellectual, socioaffective, creative, and physical domains (Gagné, 1995, 2003, 2004b). One of the most established affective characteristics of gifted children and adolescents is advanced moral development (Lovecky, 1997; Silverman, 1994). Research has suggested that gifted adolescents are more likely to use the postconventional level of moral judgment than their age peers or older students who have not been identified as gifted (e.g., Chovan & Freeman, 1993; Derryberry & Barger, 2008; Derryberry et al., 2005; Gross, 2004).

Another facet of psychosocial development for all adolescents including the gifted is identity formation (Coleman & Cross, 2001; Erikson, 1968). There is evidence that gifted adolescents approach the task of identity formation earlier than do their age peers who were not identified as gifted (e.g., Carn-Watkins, 1991; Howard-Hamilton & Frank, 1995; Zuo, 2005). The advancement in identity formation exhibited by gifted adolescents is partially attributed to their superior cognitive abilities (Erikson, 1968).

Existing research tends to regard the gifted population as a homogeneous group.

However, it has long been acknowledged that the gifted population contains numerous subgroups based on levels of giftedness and domains of ability (Gagné, 1995, 2003,

2004b; Lubinski, 2004; Silverman, 1998b). Despite findings that gifted adolescents as a group are advanced in moral judgment and identity formation, there is still a lack of research that takes specific domains of giftedness into account. Consequently, the current study has attempted to lessen the gap by incorporating levels of mathematical giftedness and levels of verbal giftedness as two of the variables in the analysis.

Specifically, it examined whether levels of mathematical giftedness and levels of verbal giftedness played significant roles in the development of moral reasoning and identity formation. It also sought to validate findings from previous studies regarding differences in moral reasoning and identity development between gifted adolescents and their age peers not identified as gifted. In addition, relationships between moral reasoning and identity status were explored. A limited number of studies have examined associations between the two constructs, but they yielded conflicting and inconclusive findings.

An objective paper and pencil measure of moral reasoning, the Defining Issues Test (DIT: Rest, 1986), was employed to assess participants' moral judgments. The self-report of the Extended Measure of Ego Identity Status-2 (EOM-EIS-2: Adams et al., 1989) was used to measure identity status of the participants. The academically gifted students were recruited from students who participated in either the Australian Primary Talent Search (APTS) or the Australian Secondary School Educational Talent Search (ASSETS). The comparison group of students not identified as gifted was recruited from independent secondary schools in New South Wales, Australia, through nomination by their teachers who were trained in gifted education. Participants from both groups were in Years 9, 10, 11, or 12 (aged 13 to 17 years). The final number of valid questionnaires was 434.

This chapter presents key findings of the study. Methodological and theoretical contributions, and practical implications are discussed. In addition, limitations of the study are described. Finally, it addresses recommendations for future research.

6.2 Key Findings

Findings of the study have been discussed in detail in Chapter Five. This section briefly presents major results in light of the study's hypotheses and emerging findings in relation to gender and year in school.

Results have shown that gifted adolescents scored significantly higher on the DIT postconventional index than did their age peers not identified as gifted. Based on this finding, this sample of gifted adolescents had higher levels of moral reasoning than did their age peers not identified as gifted, supporting hypothesis one.

The second finding revealed that highly mathematically gifted students outperformed moderately mathematically gifted students on the DIT postconventional index. The former group was more advanced in moral reasoning than was the latter group, supporting hypothesis two.

Findings showed a significant interaction effect between levels of verbal giftedness and gender on the postconventional scores. Female adolescents who were highly verbally gifted had significantly higher scores on the measure of postconventional moral thinking than did those who were moderately verbally gifted. However, male adolescents who

differed in levels of verbal giftedness did not perform significantly differently on the index of postconventional thinking. Consequently, hypothesis three was partially confirmed.

Findings pertaining to identity status development revealed that gifted adolescents did not significantly differ from their age peers not identified as gifted in the development of ideological and overall identity. In the interpersonal identity domain, students not identified as gifted were more advanced, having significantly higher interpersonal achievement scores, than their gifted counterparts. Therefore, hypothesis four was not supported.

Levels of mathematical giftedness were not found to have a significant effect on ideological, interpersonal, or total identity domain. Gifted adolescents who were highly gifted in mathematics did not significantly differ from their counterparts who were moderately gifted in mathematics in the development of identity status in all identity domains. Therefore, hypothesis five was not supported.

Findings in relation to levels of verbal giftedness revealed a significant effect on total identity, a marginally significant effect on ideological identity, and a nonsignificant effect on interpersonal identity. Consequently, hypothesis six was partially supported.

Analyses indicated that highly verbally gifted students had significantly higher achievement scores in the religion and politics identities than moderately verbally gifted students.

The final key finding was that there were small, positive relationships between more advanced identity statuses (i.e., identity achievement and moratorium) and postconventional moral reasoning. Negative relationships between less advanced identity statuses (i.e., identity diffusion and foreclosure) and postconventional moral reasoning were also found. This confirmed hypothesis seven.

Year in school emerged as having a significant effect on both moral reasoning and identity status. Gifted students in the upper high school level (i.e., years 11 and 12) outperformed their counterparts who were in the lower level of high school (i.e., years 9 and 10) in the measure of moral reasoning.

In terms of identity development, gifted students in the upper level of high school were more advanced than those in the lower level of high school in the ideological, interpersonal, and overall identity domains. The former group was more likely to perform in the more developed status of moratorium whereas the latter group tended to operate in the less developed statuses of foreclosure and diffusion.

Gender was found to have significant effects on the ideological and total identity domains. Gifted female adolescents were found to operate in the more developed status of moratorium whereas their male counterparts were more likely to be in the less developed status of diffusion. However, gifted males and females did not differ in the interpersonal identity domain.

6.3 Methodological Contributions

The present study recruited gifted students who participated in the Australian Talent Search. Information about eligible participants was derived from the Australian Primary Talent Search (APTS) or the Australian Secondary School Educational Talent Search (ASSETS) databases. These databases were the only comprehensive collections of gifted students in Australia. Regardless of the databases' richness, gifted students who participated in the APTS and ASSETS are not well-recognized in research involving young Australian gifted populations. The present study attempted to examine aspects of psychosocial development of gifted students who have been understudied.

The current study devised a grouping procedure based on the Mathematics and English subscales taken from the APTS and ASSETS. Even though the grouping procedure was arbitrary, it was unique and pragmatic. It allowed for the analysis of two key variables, namely levels of mathematical giftedness and levels of verbal giftedness, to be performed.

6.4 Theoretical Contributions

Results from the current research confirmed theoretical constructs and assumptions of both moral reasoning and ego identity status. In addition, the study provided findings on prevailing issues with regard to moral judgment and identity status development of academically gifted adolescents.

The significant effect of year in school in the current study validated Kohlberg's (1976, 1977) and Rest et al.'s (1974, 1997b, 1999a, 1999c) theoretical assumption on the upward developmental shift of moral reasoning. Gifted adolescent students in the upper level of high school (years 11 and 12) had significantly higher postconventional scores than did those in the lower level of high school (years 9 and 10). More importantly, significant differences in the DIT scores between gifted students who differed in levels of high school years provided clear differentiations in moral reasoning development among students in the secondary school level.

This research also revealed significant effects of year in school on both ideological and interpersonal identity domains, validating the theoretical assumption of progressive developmental trajectory in identity development (e.g., Kroger, 2003; Kroger et al., 2010; Meeus et al., 2010). High moratorium scores exhibited by gifted adolescents in the upper level of high school (years 11 and 12) also confirmed the notion that middle to late adolescence is a crucial period for identity formation because it signifies the period where identity exploration generally makes its first appearance (Archer, 1982; Archer & Waterman, 1983).

Research that investigates the influence of specific facets of intelligence on psychosocial development is scarce. The present study contributed to the literature in that both language and mathematical ability were significant factors on performance on the DIT. This validated Rest's (1986) argument that both verbal and nonverbal abilities contribute to the ability to make mature moral judgments.

Data from the study also added to the body of research on the role of domains of giftedness in identity development as conceptualized by Erikson (1968) and Marcia (1980). Literature in the realm of identity development of gifted adolescents was lacking. In particular, a dearth of research has incorporated domains of intelligence in the investigation of identity formation. The current research indicated a significant effect of levels of verbal giftedness on ideological identity. However, levels of mathematical giftedness did not significantly affect identity formation. This finding not only confirmed speculations on the influence of intelligence on identity formation but also suggested the differing effects of specific facets of intelligence on two processes of identity formation, namely exploration and commitment.

6.5 Practical Implications

Results from the present study suggest that both mathematical and verbal abilities play significant roles in postconventional moral reasoning. Therefore, it is possible that verbal and mathematical abilities affect moral reasoning in a different manner. Verbal abilities might assist the process of interpreting and comprehending moral dilemmas whereas mathematical abilities might facilitate the ability to use abstract, logical reasoning in solving moral conflicts. With this in mind, character education should be responsive to students' style of learning.

Gifted students whose strength is in mathematics and nonverbal reasoning need to be trained in moral education in a different way from traditional, indoctrinative approaches such as moral preaching and inculcation of social values and rules (Bebeau et al., 1999;

Kohlberg, 1964; Narvaez, 2006). Moral education that incorporates application of mathematical techniques might be more appropriate for them. Mathematical thinking, especially that which involves a combination of logical thinking (i.e., convergent thinking) and seeking out unexpected possibilities (i.e., divergent thinking), should be adapted in moral education for the gifted (Folsom, 2009). Contemporary mathematical pedagogy has put an emphasis on providing students with an opportunity to explore a broad range of problematic situations especially those with practical implications (Schoenfeld, 1992; Sternberg, 1996). In this light, the adaptation of mathematical thinking skills, such as interpreting abstract information, analyzing data using logical reasoning, and critically evaluating different problem solving methods, should be integrated in character education programs for the mathematically gifted.

Students with strong verbal abilities may benefit from moral training that involves a moral dilemma discourse. A number of studies have confirmed the effectiveness of moral dilemma discussions that are pitched at least one level above students' current moral reasoning level (e.g., Bebeau et al., 1999; Kessler, Ibrahim & Khan, 1986; Kohlberg, 1975; Mills, 1987; Walker, 1982). Apart from the dilemma discussion approach, it is possible that verbally gifted students will gain from analytical reflections on socio-moral issues through debating, writing, listening, and reading tasks (Olszewski-Kubilius & Whalen, 2000; Tannenbaum, 2000). In this light, the analysis of moral or ethical concepts in various literary materials such as case studies, news, films, novels, or plays may be suitable for cultivating verbally able students' moral growth (Mosher & Sullivan, 1976; Pagnin & Andreani, 2000; Puka, 2002).

Moral education based on the cognitive-developmental approach suggests that young individuals, regardless of levels of intellectual ability, be exposed to moral education that encourages critical thinking and reflective reasoning (Kohlberg & Hersh, 1977). In particular, schools should provide an avenue for students to critically examine various moral perspectives and compare their arguments to moral viewpoints that are of more complex conceptual understandings (Kohlberg, 1975).

New South Wales Department of Education and Training in Australia (2004) has established a document, *Values in NSW Public Schools*, which has been used as a guideline for value education in classrooms and school communities. It outlines several universal values that are to be instilled in students, such as justice, fairness, social responsibility, and democracy. Although the policy recommends explicit teaching of values, it has been suggested in moral education research that values be nurtured implicitly in classroom environment as well as in instructional practices (Lickona, 1997). For example, students are to be encouraged to discuss about morally significant events or apply social perspective taking in dealing with other people (Lickona, 1997). More importantly, value and moral education should be incorporated in curriculum regardless of subject areas. Instead of investing time on explicit moral education curriculum, teachers should mine for potential moral education materials in existing school curriculum (see Narvaez, 2006, for discussion). Given that moral reasoning by itself might not necessarily steer moral action, it is important that ethical education cultivate moral sensitivity and moral motivation among students so as to allow them to apply moral considerations to their actions (Narvaez, 2006).

In terms of identity formation, findings from the study showed that male gifted adolescents were likely to postpone the process of career decision making. Furthermore, their career choice was not self-chosen but was strongly influenced by parental expectations. It is possible that male gifted adolescents are more likely to face difficulties in career identity due to perceived gender role expectations and parental pressures (Kerr & Nicpon, 2003; Wells et al., 1982). It is important that male gifted adolescents be encouraged to explore different career opportunities. Interventions should be made available for gifted young men to recognize their strengths, potentials, and possibilities. Critical evaluation of gender role values might also benefit identity formation of gifted male adolescents (Dunnell & Bakken, 1991; Mills, 1981; Waterman, 1989). Extracurricular activities, exposures to experiences beyond classrooms, and appropriate role models have been found to play important roles in shaping the identity development of gifted adolescents (Hébert & Kelly, 2006; Zuo, 2005; Zuo & Tao, 2001). These interventions not only encourage gifted students to experiment with different roles and outlets of talents but also promote a sense of self-efficacy (Hébert & Kelly, 2006).

Findings from the present study have emphasized the importance of character education. Those who were advanced in the task of identity formation were those who were most developed in moral reasoning. Therefore, it is important that both moral reasoning and identity development be encouraged concurrently. Affective curriculum for the gifted should apply higher order thinking to critically examine conventional ways of thinking and to explore alternative identity values (Feldhusen & Kennedy, 1988; Mills, 1987). Character education curricula for the gifted should integrate critical thinking, creative problem solving, effective interpersonal communication, and decision making skills (Folsom, 2009; Gibson & Lander-Brown, 2009; Pagnin & Andreani, 2000; Paul & Elder,

2009). Ethics along with critical thinking and creativity should be instilled in gifted students. Critical and creative thinking without proper ethical considerations may lead to a misuse of a gifted youngster's talents (Paul & Elder, 2009; Tannenbaum, 2000). A number of gifted education professionals have voiced the importance of accelerated classes in social studies and leadership programs, which concentrate on issues pertaining the changing society (Feldhusen & Kennedy, 1988; Lindsay, 1988; Roeper, 1988). Such courses should provide opportunities for gifted students to discuss and explore social and ethical issues in a rigorous and interactive fashion (Folsom, 1998; Passow, 1988).

6.6 Limitations

A number of limitations of the study are acknowledged. The findings should be interpreted with caution. It is important to note that the present study did not employ the most recent version of the DIT (i.e., DIT-2). Although the DIT-2 would have been a more desirable instrument due to its updated dilemmas and comprehensive moral reasoning indices, the use of the DIT-2 was deemed inappropriate in the present study. This is because the mail survey method used in the current study required purchasing a large quantity of question and answer sheets ($N = 1,315$). In addition, the DIT-2 only allows for computer scoring from the Centre of the Study of Ethical Development, the University of Minnesota and University of Alabama. This raised some concerns on time required for transportation of answer sheets as well as expenses involved in such process.

The present study did not include variables related to personality characteristics or social milieu in the theoretical framework. Even though the present study did not focus on these catalysts, but rather on the relationships between intellectual and socio-affective development, it is important to recognize the role of intrapersonal and environmental catalysts in the development of moral reasoning and identity status. For examples, Kohlberg (1984) regarded social perspective taking as one of the prerequisites for mature moral reasoning development and Turiel (1998) believed that exposure to novel social experiences enhances one's understanding of complex sociomoral information. Achievement in identity formation relates to such personality qualities as internal locus of control (Schwartz, 2004), openness to experience (Clancy & Dollinger, 1993), and purposefulness (Schwartz, 2004; Zuo & Tao, 2001). In addition, identity formation is an experiential process that involves both social interactions through imitation and identification as well as dynamic self-examination (Adams, 1998)

In terms of methodological limitations, there were unequal numbers of participants between the gifted and non-identified groups. A small sample size of the comparison group limits the generalizability of results from the study. There were difficulties in liaising with teachers who originally agreed to nominate students who they believed were not academically gifted. Some teachers were transferred to other schools making it difficult to follow up with the request of participation. A number of teachers also withdrew from participating in the study during the data collection phase. In addition, a relatively large number of questionnaires obtained from the comparison group failed the DIT reliability checks resulting in the protocols being discarded. This further reduced the sample size.

The use of gifted students who participated in the Australian Primary School Talent Search (APTS) and the Australian Secondary School Educational Talent Search (ASSETS) may also restrict how generalizable the results from the present study are to the gifted adolescent population. The sample drawn from the APTS and ASSETS was relatively selective. Given the relatively small number of eligible gifted participants in each group, it was not possible to conduct a random selection. Since the study sought to explore psychosocial development of students who differed in levels of mathematical giftedness and verbal giftedness, this sample selection procedure was deemed appropriate.

Another possible limitation involved the fact that this study was not able to collect data from the control group and the gifted group from the same school. In this light, the effect of school environments was not considered.

In terms of data collection procedure, the use of a mail survey method may lead to the participants not taking the test seriously. This was evident particularly from the non-identified group where almost 40% of the protocols did not pass the DIT reliability checks (see section 3.6.2, for further discussion). The majority of invalid protocols were a result of students selecting items that sound lofty but, in fact, are meaningless. This reflected that subjects did not respond to the questions conscientiously or did not have an adequate ability to take the test. Even though the DIT is suitable for individuals with a minimum reading age of 12 years (Rest, 1986), the test might be too challenging for some high school students. Therefore, it is recommended that the administration of the DIT using a face-to-face method (i.e., in a classroom) with more comprehensive instructions is more suitable for high school students than a mail survey method. This is

because students are able to ask for clarification of instructions if needed (Van Blerkom, 2009).

Issues related to the use of the EOM-EIS-2 to assess identity status also emerged. Each item in the EOM-EIS-2 comprises two sentences: one denotes the absence or presence of exploration, and the other denotes the absence or presence of commitment (e.g., “Politics is something that I can never be too sure about because things change so fast. But I think it is important to know what I can politically stand for and believe in”, Adams, 1998, p. 82). A number of participants remarked that they agreed with one sentence in an item, but not the other in the same item. Some participants felt that the two sentences in an item were contradictory and, therefore, gave a different rating for each sentence. This issue needs to be addressed in future research and amendments of the instrument are recommended to minimize confusion.

Lastly, the EOM-EIS-2 is a self-report questionnaire. Even though the instrument was not found to significantly correlate with the Social Desirability Scale (Bennion & Adams, 1986), disadvantages of self-report data collection warrant mentioning. The use of a self-report questionnaire may suffer from the credibility issues (Paulhus & Vazire, 2007). It is possible that responses are biased based on the participants’ subjective interpretations of their identity status development.

6.7 Recommendations for Future Research

Moral development is one of the recurring themes in the field of socioaffective development of gifted individuals (Colangelo, 2003). Over the past decades, a number of studies have confirmed that intelligence has a significant influence on moral reasoning. Nonetheless, empirical investigations that used non-academic domains such as artistic or creative giftedness are absent from literature. Creativity has been speculated as playing a crucial role in reasoning at the postconventional level (Runco, 2009). Therefore, it would be interesting to examine specifically the role of creativity in moral reasoning development.

Findings from the current study suggested a significant effect of levels of mathematical giftedness on moral reasoning and a significant interaction effect between levels of verbal giftedness and gender on moral reasoning. However, it did not examine factors that may mediate such relationships. Further research should be conducted to identify possible cognitive and/or affective variables specific to verbal ability and mathematical thinking that influence the development of moral reasoning.

Research in the realm of gifted adolescents' identity development based on Erikson's theory of ego identity and Marcia's ego identity status paradigm is relatively limited. Much research in the psychosocial development of gifted adolescents put an emphasis on perceptions of gifted adolescents on areas such as peer relations, anxiety, and self-concept. However, existing studies have not adequately captured the extent to which gifted adolescents undergo the two major processes of identity development, namely exploration and commitment. To achieve this, a longitudinal study of identity status development in gifted individuals from early adolescence to adulthood should be

conducted. Interviews as well as objective measures might be used concurrently in order to gain more insights into developmental patterns and other mechanisms that might encourage or discourage identity formation.

Even though results from this study indicated significant associations between verbal ability and ideological identity, such relationships yielded only a small effect size. Further studies might benefit from investigating the impact of intrapersonal factors on identity formation. Personality characteristics such as resilience, motivation, purposefulness, and persistence have been recognized as being facilitative to transferring potentials to performance (Gagné, 2004b; Renzulli, 1978, 2003; Tannenbaum, 1983). However, much research has investigated these characteristics largely in relation to academic achievement (e.g., Rimm, 2003). Only a small number of studies have specifically dedicated to explore relationships between intrapersonal factors and the psychosocial or identity development of gifted adolescents (e.g., Shoffner & Newsome 2001; Zuo & Tao, 2001).

Finally, it would be of great merit to investigate the impact of environmental factors in the development of adolescent identity. As proposed by Gagné (2003, 2008), environmental catalysts such as provisions and milieu influence gifted individuals' innate abilities.

Specific attention should be paid to considering whether different educational experiences such as acceleration, ability grouping, and enrichment programs affect the way in which gifted adolescents approach the task of identity formation. Following research on the impact of educational experiences on psychosocial development (e.g., Gross, 1997a; McCallister, Nash & Meckstroth, 1996; Neihart, 1999; Norman, Ramsay, Roberts & Martray, 2000; Robinson, 2004), it is possible that exposure to certain

educational settings might have different effect on the task of identity formation among adolescent students who are advanced academically.

6.8 Chapter Summary

This chapter discussed methodological and theological contributions as well as the practical implications of the present research. Limitations of this research were described and recommendations for future research in the realm of moral reasoning and identity status development of gifted adolescents were presented.

Reference List

- Abraham, K. G. (1983). The relation between identity status and locus of control among rural high school students. *The Journal of Early Adolescence*, 3(3), 257-264. doi: 10.1177/0272431683033008
- Abrom, K. I. (1985). Social giftedness and its relationship with intellectual giftedness. In J. Freeman (Ed.), *The psychology of gifted children: Perspectives on development and education* (pp. 201 - 218). New York: John Wiley & Sons.
- Achter, J. A., Lubinski, D., & Benbow, C. P. (1996). Multipotentiality among the intellectually gifted: "It was never there and already it's vanishing". *Journal of Counseling Psychology*, 43(1), 65-76.
- Achter, J. A., Lubinski, D., Benbow, C. P., & Eftekhari-Sanjani, H. (1999). Assessing vocational preferences among gifted adolescents adds incremental validity of abilities: A discriminant analysis of educational outcomes over a 10-year interval. *Journal of Educational Psychology*, 91(4), 777-786.
- Ackerman, C. M. (1997). Identifying gifted adolescents using personality characteristics: Dabrowski's overexcitabilities. *Roeper Review* 19 (4), 229-236.
- Ackerman, P. L. (2000). Domain-Specific Knowledge as the "Dark Matter" of Adult Intelligence. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 55(2), P69-P84. doi: 10.1093/geronb/55.2.P69
- Ackerman, P. L., & Beier, M. E. (2003). Intelligence, Personality, and Interests in the Career Choice Process. *Journal of Career Assessment*, 11(2), 205-218. doi: 10.1177/1069072703011002006

- Ackerman, P. L., & Goff, M. (1994). Typical intellectual engagement and personality: Reply to Rocklin (1994). *Journal of Educational Psychology, 86*(1), 150-153. doi: 10.1037/0022-0663.86.1.150
- Adams, G. R. (1994). Revised classification criteria for the Extended Objective Measure of Ego Identity Status: A rejoinder. *Journal of Adolescence, 17*(6), 551-556. doi: 10.1006/jado.1994.1048
- Adams, G. R. (1998). *The Objective Measure of Ego Identity Status: A reference manual*. University of Guelph. Ontario, Canada. Retrieved 3 March 2008 from http://www.uoguelph.ca/~gadams/OMEIS_manual.pdf
- Adams, G. R., & Fitch, S. A. (1982). Ego stage and identity status development: A cross-sequential analysis. *Journal of Personality and Social Psychology, 43*(3), 574-583. doi: 10.1037/0022-3514.43.3.574
- Adams, G. R., Bennion, L., & Huh, K. (1989). *Objective measure of ego identity status: A reference manual*. Utah State University, Logan, UT.
- Adams, G. R., Ryan, J. H., Hoffman, J. J., Dobson, W. R., & Nielsen, E. C. (1984). Ego identity status, conformity behavior, and personality in late adolescence. *Journal of Personality and Social Psychology, 47*(5), 1091-1104. doi: 10.1037/0022-3514.47.5.1091
- Adams, G. R., Shea, J., & Fitch, S. A. (1979). Toward the development of an objective assessment of ego-identity status. *Journal of Youth and Adolescence, 8*(2), 223-237. doi: 10.1007/bf02087622
- Adams, G., & Shea, J. (1979). The relationship between identity status, locus of control, and ego development. *Journal of Youth and Adolescence, 8*(1), 81-89. doi:

10.1007/bf02139142

Allison, B. N., & Schultz, J. B. (Fall, 2001). Interpersonal identity formation during early adolescence. *Adolescence*, 36 (143), 509-523.

Altus, W. D. (1952). Personality correlates of Q-L variability on the ACE. *Journal of Consulting Psychology*, 16(4), 284-291. doi: 10.1037/h0054284

Altus, W. D. (1958). Q-L variability, MMPI responses, and college males. *Journal of Consulting Psychology*, 22(5), 367-371. doi: 10.1037/h0043299

Anastasi, A. (1986). Intelligence as a quality of behavior In R. J. Sternberg & D. K. Detterman (Eds.), *What is intelligence? Contemporary viewpoints on its nature and definition* (pp. 19-22). New Jersey: Ablex Publishing Corporation.

Andreani, O. D., & Pagnin, A. (1992). Moral reasoning in gifted adolescents: Cognitive level and social values. *European Journal for High Ability*, 3, 105 - 114. doi: 10.1080/0937445920030111

Andreani, O. D., & Pagnin, A. (1993a). Moral judgment in creative and talented adolescents. *Creativity Research Journal*, 6(1-2), 45 - 63. doi: 10.1080/10400419309534465

Andreani, O. D., & Pagnin, A. (1993b). Nurturing the moral development of the gifted. In K. A. Heller, F. J. Monks & A. H. Passow (Eds.), *International handbook of research and development of giftedness and talent* (pp. 483 - 539). Oxford: Pergamon Press.

- Arbuthnot, J. (1973). Relations between maturity of moral judgment and measures of cognitive abilities. *Psychological Reports*, 33, 945 - 946.
- Archer, S. L. (1982). The lower age boundaries of identity development. *Child Development*, 53(6), 1551-1556. Retrieved from <http://www.jstor.org/stable/1130083>.
- Archer, S. L. (1989). The status of identity: Reflections on the need for intervention. *Journal of Adolescence*, 12(4), 345-359. doi: 10.1016/0140-1971(89)90059-6
- Archer, S. L., & Waterman, A. S. (1983). Identity in early adolescence: A developmental perspective. *The Journal of Early Adolescence*, 3(3), 203-214. doi: 10.1177/0272431683033003
- Armon, C., & Dawson, T. L. (1997). Developmental trajectories in moral reasoning across the life span. *Journal of Moral Education*, 26(4), 433-453.
- Arnold, M. L. (2000). Stage, sequence, and sequels: Changing conceptions of morality, post-Kohlberg. *Educational Psychology Review*, 12(4), 365 - 383. doi: 10.1023/A:1009026230018
- Arvey, R. D., Bouchard, T.J., Carroll, J.B. & 49 other signatories. (1994, Tuesday, December 13). Mainstream science on intelligence, *The Wall Street Journal* p. 379.
- Ashton, M. C., Lee, K., Vernon, P. A., & Jang, K. L. (2000). Fluid intelligence, crystallized intelligence, and the openness/intellect factor. *Journal of Research in Personality*, 34(2), 198-207. doi: 10.1006/jrpe.1999.2276

Assouline, S. G. (2003). Psychological and educational assessment of gifted children. In N. Colangelo & G. A. Davis (Eds.), *Handbook of gifted education* (Vol. 124 - 145). Boston: Allyn and Bacon.

Assouline, S. G., & Lupkowski-Shoplik, A. (1991). Talent searches: A model for the discovery and development of academic talent. In N. Colangelo & G. A. Davis (Eds.), *Handbook of gifted education* (2 ed., pp. 170-179). Boston: Allyn and Bacon.

Assouline, S. G., & Lupkowski-Shoplik, A. (2005). *Developing math talent: A guide for educating gifted and advanced learners*. Waco, Texas: Prufrock Press.

Bartlett, F. C. (1932). *Remembering: A study in experimental and social psychology*. Cambridge; New York: Cambridge University Press.

Bates, T. C., & Shieles, A. (2002). Crystallized intelligence as a product of speed and drive for experience: The relationship of inspection time and openness to g and Gc. *Intelligence*, 31(3), 275-287. doi: 10.1016/s0160-2896(02)00176-9

Batey, M., Chamorro-Premuzic, T., & Furnham, A. (2009). Intelligence and personality as predictors of divergent thinking: The role of general, fluid and crystallized intelligence. *Thinking Skills and Creativity*, 4(1), 60-69. doi: 10.1016/j.tsc.2009.01.002

Baumeister, R. F., & Muraven, M. (1996). Identity as adaptation to social, cultural, and historical context. *Journal of Adolescence*, 19(5), 405-416. doi: 10.1006/jado.1996.0039

Baumrind, D. (1986). Sex differences in moral reasoning: Response to Walker's (1984) conclusion that there are none. *Child Development*, 57, 511 - 521. Retrieved from

<http://www.jstor.org/stable/1130606>.

- Bebeau, M. J., Rest, J. R., & Narvaez, D. (1999). Beyond the promise: A perspective on research in moral education. *Educational Researcher*, 28(4), 18-26. doi: 10.3102/0013189X028004018
- Benbow, C. P., & Minor, L. L. (1990). Cognitive profiles of verbally and mathematically precocious students: Implications for identification of the gifted. *Gifted Child Quarterly*, 34(1), 21-26. doi: 10.1177/001698629003400105
- Bennion, L. D., & Adams, G. R. (1986). A revision of the extended version of the objective measure of ego identity status: An identity instrument for use with late adolescents. *Journal of Adolescent Research*, 1(2), 183-197. doi: 10.1177/074355488612005
- Ben-Zeev, T. (1996). When erroneous mathematical thinking is just as "correct": The oxymoron of rational errors. In R. J. Sternberg & T. Ben-Zeev (Eds.), *The nature of mathematical thinking* (pp. 55-79). New Jersey: Lawrence Erlbaum Associates.
- Bergh, S., & Erling, A. (2005). Adolescent identity formation: A Swedish study of identity status using the EOM-EIS-II. *Adolescence*, 40(158), 377 - 396.
- Berkowitz, L. (1964). *The development of motives and values in the child*. New York: Basic Books.
- Berzonsky, M. D. (1989). Identity style. *Journal of Adolescent Research*, 4(3), 268-282. doi: 10.1177/074355488943002
- Berzonsky, M. D. (1994). Self-Identity: The relationship between process and content. *Journal of Research in Personality*, 28(4), 453-460. doi: 10.1006/jrpe.1994.1032

- Berzonsky, M. D. (2003). Identity style and well-being: Does commitment matter? *Identity: An International Journal of Theory and Research*, 3(2), 131-142. doi: 10.1207/s1532706xid030203
- Berzonsky, M. D., & Adams, G. R. (1999). Reevaluating the identity status paradigm: still useful after 35 years. *Developmental Review*, 19(4), 557-590. doi: 10.1006/drev.1999.0495
- Berzonsky, M. D., & Kuk, L. S. (2005). Identity style, psychosocial maturity, and academic performance. *Personality and Individual Differences*, 39(1), 235-247. doi: 10.1016/j.paid.2005.01.010
- Berzonsky, M. D., & Neimeyer, G. J. (1994). Ego identity status and identity processing orientation: The moderating role of commitment. *Journal of Research in Personality*, 28(4), 425-435. doi: 10.1006/jrpe.1994.1030
- Berzonsky, M. D., & Sullivan, C. (1992). Social-cognitive aspects of identity style. *Journal of Adolescent Research*, 7(2), 140-155. doi: 10.1177/074355489272002
- Berzonsky, M. D., Nurmi, J. E., Kinney, A., & Tammi, K. (1999). Identity processing style and cognitive attributional strategies: Similarities and difference across different contexts. *European Journal of Personality*, 13(2), 105-120. doi: 10.1002/(sici)1099-0984(199903/04)13:2<105::aid-per325>3.0.co;2-h
- Beunen, G., Thomis, M., Maes, H. H., Loos, R., Malina, R. M., Claessens, A. L., & Vlietinck, R. (2000). Genetic variance of adolescent growth in stature. *Annals of Human Biology*, 27(2), 173-186. doi: 10.1080/030144600282280
- Beyers, W., & Seiffge-Krenke, I. (2010). Does identity precede intimacy? Testing Erikson's theory on romantic development in emerging adults of the 21st century.

Journal of Adolescent Research, 25(3), 387-415. doi:
10.1177/0743558410361370

Bilsker, D., & Marcia, J. E. (1991). Adaptive regression and ego identity. *Journal of Adolescence*, 14(1), 75-84. doi: 10.1016/0140-1971(91)90046-t

Boehm, L. (1962). The development of conscience: A comparison of American children of different mental and socioeconomic levels. *Child Development*, 33(3), 575 - 590. Retrieved from <http://www.jstor.org/stable/1126658>.

Boehm, L. (1966). Moral judgment: A cultural and sub-cultural comparison with some of Piaget's research conclusions. *International Journal of Psychology*, 1, 143-150. doi: 10.1080/00207596608247120

Boom, J., Brugman, D., & van der Heijden, P. G. M. (2001). Hierarchical structure of moral stage assessed by a sorting task. *Child Development*, 72(2), 535 - 548. doi: 10.1111/1467-8624.00295

Boss, J. A. (1994). The anatomy of moral intelligence. *Educational Theory*, 44 (4), 399-416. doi: 10.1111/j.1741-5446.1994.00399.x

Bourne, E. (1978a). The state of research on ego identity: A review and appraisal Part I *Journal of Youth and Adolescence*, 7(3), 223-251. doi: 10.1007/bf01537976

Bourne, E. (1978b). The state of research on ego identity: A review and appraisal Part II. *Journal of Youth and Adolescence*, 7(4), 371-392. doi: 10.1007/bf01537806

Boyes, M. C., & Chandler, M. (1992). Cognitive development, epistemic doubt, and identity formation in adolescence. *Journal of Youth and Adolescence*, 21(3), 277-304. doi: 10.1007/bf01537019

- Brand, C. R., Constaes, D., & Kane, H. (2003). Why ignore the *g* factor - Historical considerations. In H. Nyborg (Ed.), *The scientific study of general intelligence: Tribute to Arthur R. Jensen* (pp. 503 - 529). Oxford: Elsevier Science.
- Brody, L., & Benbow, C. (1986). Social and emotional adjustment of adolescents extremely talented in verbal or mathematical reasoning. *Journal of Youth and Adolescence*, 15(1), 1-18. doi: 10.1007/bf02140780
- Cantrell, C. C. (1999). *The relationship between psychological type and the level of moral reasoning among gifted children and adolescents*. (Unpublished doctoral dissertation), University of South Carolina, Columbia.
- Carn-Watkins, A. (1991). *Identity status and its relationship to family characteristics among academically gifted adolescents*. (Unpublished doctoral dissertation) UMI No. 9128959, Northwestern University, Illinois.
- Carroll, J. B. (1986). What is intelligence? In R. J. Sternberg & D. K. Detterman (Eds.), *What is intelligence? Contemporary viewpoints on its nature and definition* (pp. 51- 54). New Jersey: Ablex Publishing Corporation.
- Carroll, J. B. (1993). *Human cognitive abilities: A survey of factor-analytic studies*. Cambridge: Cambridge University Press.
- Carroll, J. B. (1996). Mathematical abilities: Some results from factor analysis. In R. J. Sternberg & T. Ben-Zeev (Eds.), *The nature of mathematical thinking* (pp. 3-26). New Jersey: Lawrence Erlbaum Associates.
- Carroll, J. B. (1998). Human cognitive abilities: A critique. In J. J. McArdle & R. W. Woodcock (Eds.), *Human cognitive abilities in theory and practice* (pp. 5-28). New Jersey: Lawrence Erlbaum Associates.

- Carroll, J. B. (2003). The higher-stratum structure of cognitive abilities: Current evidence supports g and about ten broad factors In H. Nyborg (Ed.), *The scientific study of general intelligence: Tribute to Arthur R. Jensen* (pp. 5 -21). Oxford: Elsevier Science.
- Cattell, R. B. (1945). Personality traits associated with abilities. II: With verbal and mathematical abilities. *Journal of Educational Psychology*, 36(8), 475-486. doi: 10.1037/h0054618
- Cattell, R. B. (1963). Theory of fluid and crystallized intelligence: A critical experiment. *Journal of Educational Psychology*, 54(1), 1-22. doi: 10.1037/h0046743
- Cattell, R. B. (1998). Where is intelligence? Some answers from the Triadic Theory. In J. J. McArdle & R. W. Woodcock (Eds.), *Human cognitive abilities in theory and practice* (pp. 29-38). New Jersey: Lawrence Erlbaum Associates.
- Cattell, R. B., & Horn, J. L. (1978). A check on the theory of fluid and crystallized intelligence with description of new subtest designs. *Journal of Educational Measurement*, 15(3), 139-164. doi: 10.1111/j.1745-3984.1978.tb00065.x
- Cauble, M. A. (1976). Formal operations, ego identity, and principled morality: Are they related? *Development Psychology*, 12(4), 363-364. doi: 10.1037/0012-1649.12.4.363
- Cavusgil, S. T., & Elvey-Kirk, L. A. (1998). Mail survey response behavior: A conceptualization of motivating factors and an empirical study. *European Journal of Marketing*, 32(11/12), 1165 - 1192. doi: 10.1108/03090569810243776
- Chamorro-Premuzic, T., & Furnham, A. (2004). A possible model for understanding the personality-intelligence interface. *British Journal of Psychology*, 95(2), 249-264.

doi: 10.1348/000712604773952458

- Chovan, W., & Freeman, N. L. (1993). Moral reasoning and personality components in gifted and average students. *Perceptual and Motor Skills*, 77(3, Pt 2), 1297-1298.
- Clancy, S. M., & Dollinger, S. J. (1993). Identity, self, and personality: I. Identity status and the five-factor model of personality. *Journal of Research on Adolescence*, 3(3), 227-245. doi: 10.1207/s15327795jra0303_2
- Clark, B. (1983). *Growing up gifted: Developing the potential of children at home and at school* (2 ed.). Columbus: Charles E. Merrill Publishing Company.
- Coatsworth, J. D., Sharp, E. H., Palen, L.-A., Darling, N., Cumsille, P., & Marta, E. (2005). Exploring adolescent self-defining leisure activities and identity experiences across three countries. *International Journal of Behavioral Development*, 29(5), 361-370. doi: 10.1177/01650250500166972
- Cohen, J. (1977). *Statistical power analysis for the behavioral sciences*. New York: Academic Press.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2 ed.). Hillsdale: Lawrence Erlbaum Associates.
- Cohen, L., Manion, L., & Morrison, K. (2002). *Research methods in education* (5 ed.). London: RoutledgeFalmer.
- Cohn, S. J. (1981). What is giftedness? A multidimensional approach. In A. H. Kramer (Ed.), *Gifted children: Challenging their potential: new perspectives & alternatives* (pp. 33-45). New York: Trillium Press for World Council for Gifted and Talented Children.

- Cohn, S. J. (1991). Talent Searches. In N. Colangelo & G. A. Davis (Eds.), *Handbook of gifted education* (pp. 166 - 177). Boston: Allyn and Bacon.
- Colangelo, N. (2003). Counseling gifted students. In N. Colangelo & G. A. Davis (Eds.), *Handbook of Gifted Education* (pp. 373 - 387). Boston: Allyn and Bacon.
- Colby, A., & Kohlberg, L. (1984). Invariant sequence and internal consistency in moral judgment stages. In W. M. Kurtines & J. L. Gewirtz (Eds.), *Morality, moral behavior, and moral development* (pp. 41 - 51). New York: John Wiley & Sons.
- Colby, A., & Kohlberg, L. (1987a). *The measurement of moral judgment: Theoretical foundations and research validation* (Vol. 1). Cambridge: Cambridge University Press.
- Colby, A., & Kohlberg, L. (1987b). *The measurement of moral judgment: Standard issue scoring manual*. (Vol. 2). Cambridge: Cambridge University Press.
- Colby, A., Kohlberg, L., Gibbs, J., Lieberman, M., Fischer, K., & Saltzstein, H. D. (1983). A longitudinal study of moral judgment. *Monographs of the Society for Research in Child Development*, 48(1/2), 1-124. Retrieved from <http://www.jstor.org/stable/1165935>.
- Coleman, L. J., & Cross, T. L. (2001). *Being gifted in school: An introduction to development, guidance, and teaching*. Waco, TX: Prufrock Press
- Coleman, L. J., & Sanders, M. D. (1993). Understanding the needs of gifted students. *The Journal of Secondary Gifted Education*, Fall, 22 - 25.
- Colom, R., & Lynn, R. (2004). Testing the developmental theory of sex differences in intelligence on 12-18 year olds. *Personality and Individual Differences*, 36(1), 75-

82. doi: 10.1016/s0191-8869(03)00053-9

Cooper, C., & Grotevant, H. (1987). Gender issues in the interface of family experience and adolescents' friendship and dating identity. *Journal of Youth and Adolescence*, 16(3), 247-264. doi: 10.1007/bf02139093

Côté, J. E., & Levine, C. (1988). A critical examination of the ego identity status paradigm. *Developmental Review*, 8(2), 147-184. doi: 10.1016/0273-2297(88)90002-0

Craig-Bray, L., & Adams, G. R. (1986). Different methodologies in the assessment of identity: Congruence between self-report and interview technique? *Journal of Youth and Adolescence*, 15(3), 191 - 204. doi: 10.1007/BF02139122

Cramer, P. (2000). Development of identity: gender makes a difference. *Journal of Research in Personality*, 34(1), 42-72. doi: 10.1006/jrpe.1999.2270

Croft, L. (2003). Teachers of the gifted: Gifted teachers. In N. Colangelo & G. A. Davis (Eds.), *Handbook of Gifted Education* (3rd ed ed., pp. 558-571). Boston: Allyn & Bacon.

Cross, H. J., & Allen, J. G. (1970). Ego identity status, adjustment, and academic achievement. *Journal of Consulting and Clinical Psychology*, 34(2), 288. doi: 10.1037/h0029044

Cross, T. L. (2001). Gifted children and Erikson's theory of psychosocial development. *Gifted Child Today*, 24 (1), 54-55,61. doi: 10.4219/gct-2000-522

Cross, T. L., Coleman, L. J., & Stewart, R. A. (1993). The social cognition of gifted adolescents: An exploration of the stigma of giftedness paradigm. *Roeper Review*,

16(1), 37-40. doi: 10.1080/02783199309553532

Crowson, H. M., DeBacker, T. K., & Thoma, S. J. (2007). Are DIT scores empirically distinct from measures of political identification and intellectual ability? A test using post-9/11 data. *British Journal of Developmental Psychology*, 25, 197 - 211. doi: 10.1348/026151006X103627

Csikszentmihalyi, M., Rathunde, K., & Whalen, S. (1997). *Talented Teenagers: The Roots of Success and Failure*. Cambridge: Cambridge University Press.

Dabrowski, K. (1964). *Positive disintegration*. Boston: Little, Brown and Company.

Dark, V. J., & Benbow, C. P. (1994). Type of stimulus mediates the relationship between working-memory performance and type of precocity. *Intelligence*, 19(3), 337-357. doi: 10.1016/0160-2896(94)90006-x

Dauber, S. L., & Benbow, C. P. (1990). Aspects of personality and peer relations of extremely talented adolescents. *Gifted Child Quarterly*, 34(1), 10-14. doi: 10.1177/001698629003400103

Davis, G. A., & Rimm, S. B. (1994). *Education of the gifted and talented* (3 ed.). Boston: Allyn and Bacon.

Department of Education and Children's Services, Government of South Australia. (2010). *Gifted and talented children and students policy*. Retrieved 15 May 2010, from <http://www.decs.sa.gov.au/docs/documents/1/GiftedChildrenandStudents.pdf>.

Department of Education and Early Childhood Development, State Government of Victoria. (2006). *Gifted and high potential students*. Retrieved 26 September

2010, from

<http://www.education.vic.gov.au/studentlearning/programs/gifted/highpotential/default.htm>.

Department of Education and Training, Government of New South Wales. (2004). *Policy and implementation strategies for the education of gifted and talented students*.

Retrieved 19 January 2009, from

<http://www.curriculumsupport.education.nsw.gov.au/policies/gats/assets/pdf/polsuappid.pdf>.

Department of Education and Training, Government of New South Wales. (2004). *Values in NSW Public Schools*. Retrieved 12 January 2012, from

https://www.det.nsw.edu.au/policies/student_serv/student_welfare/valu_scool/pd_05131_Values.pdf.

Department of Education and Training, Government of the Australian Capital Territory.

(2008). *Gifted and talented students*. Retrieved 7 January 2009, from

http://www.det.act.gov.au/__data/assets/pdf_file/0020/31952/GAT_Policy.pdf.

Department of Education and Training, Government of Western Australia. (2011). *Gifted and talented guidelines*. Retrieved 29 July 2011, from

<http://www.det.wa.edu.au/policies/detcms/policy-planning-and-accountability/policies-framework/web-references/gifted-and-talented-guidelines.en?oid=SiteProxy-id-3766865>.

Department of Education and Training, Northern Territory Government of Australia. (2006).

Policy for the education of gifted students in the Northern Territory. Retrieved 4

July 2010, from

http://www.det.nt.gov.au/__data/assets/pdf_file/0006/699/GiftedEducPolicy.pdf

- Derryberry, P. W., Jones, K. L., Grieve, F. G., & Barger, B. (2007). Assessing the relationship among Defining Issues Test scores and crystallized and fluid intellectual indices. *Journal of Moral Education*, 36(4), 475 - 496. doi: 10.1080/03057240701688036
- Derryberry, W. P., & Barger, B. (2008). Do contributors to intellect explain the moral judgment abilities of gifted youth? *Gifted Child Quarterly*, 52(4), 340-352 doi: 10.1177/0016986208321806
- Derryberry, W. P., & Thoma, S. J. (2005). Moral judgment, self-understanding, and moral actions: The role of multiple construct. *Merrill-Palmer Quarterly*, 51(1), 67 - 92. doi: 10.1353/mpq.2005.0005
- Derryberry, W. P., Wilson, T., Snyder, H., Norman, T., & Barger, B. (2005). Moral judgment developmental differences between gifted youth and college students. *Journal of Secondary Gifted Education*, 17(1), 6 - 19. doi: 10.4219/jsge-2005-392
- Detterman, D. K., & Daniel, M. H. (1989). Correlations of mental tests with each other and with cognitive variables are highest for low IQ groups. *Intelligence*, 13(4), 349-359. doi: 10.1016/s0160-2896(89)80007-8
- Diessner, R. (1983). The relationship between cognitive abilities and moral development in intellectually gifted children. *Gifted Child Today*, May/June, 15 - 17.
- Dillman, D. A. (1991). The design and administration of mail surveys. *Annual Review of Sociology*, 17(1), 225-249. doi: 10.1146/annurev.so.17.080191.001301
- Dollinger, S. J., & LaMartina, A. K. (1998). A note on moral reasoning and the five-factor model. *Journal of Social Behavior & Personality*, 13(2), 349-358.

- Dollinger, S. M. C. (1995). Identity styles and the five-factor model of personality. *Journal of Research in Personality*, 29(4), 475-479. doi: 10.1006/jrpe.1995.1028
- Donelson, E. (1999). Psychology of religion and adolescents in the United States: past to present. *Journal of Adolescence*, 22(2), 187-204. doi: 10.1006/jado.1999.0212
- Dowdy, B. B., & Kliever, W. (1998). Dating, parent-adolescent conflict, and behavioral autonomy. *Journal of Youth and Adolescence*, 27(4), 473-492. doi: 10.1023/a:1022852102847
- Dreyfus, T. (1991). Advanced mathematical thinking processes. In D. O. Tall (Ed.), *Advanced mathematical thinking* (pp. 25 - 41). Norwell, Massachusetts: Kluwer Academic Publishers.
- Duncan, W. J. (1979). Mail questionnaires in survey research: A review of response inducement techniques. *Journal of Management*, 5(1), 39-55. doi: 10.1177/014920637900500103
- Dunnell, P. A., & Bakken, L. (1991). Gifted high school students' attitudes toward careers and sex roles. *Roeper Review: A Journal on Gifted Education*, 13(4), 198-202. doi: 10.1080/02783199109553358
- Duska, R. F., & Whelan, M. (1975). *Moral development: A guide to Piaget and Kohlberg*. New York: Paulist Press.
- Eccles, J. S., & Alfeld, C. (2007). Not you! Not here! Not now! In R. K. Silberelsen & R. M. Lerner (Eds.), *Approaches to positive youth development* (pp. 133-156). Los Angeles: Sage Publications.

- Eccles, J. S., Barber, B. L., Stone, M., & Hunt, J. (2003). Extracurricular activities and adolescent development. *Journal of Social Issues*, 59(4), 865-889. doi: 10.1046/j.0022-4537.2003.00095.x
- Elm, D. R., & Weber, J. (1994). Measuring moral judgment: The Moral Judgment Interview or the Defining Issues Test? *Journal of Business Ethics*, 13(5), 341-355. doi: 10.1007/bf00871762
- Enright, R., Lapsley, D., & Olson, L. (1985). Moral judgment and social cognitive developmental research program In S. Modgil & C. Modgil (Eds.), *Lawrence Kohlberg: Consensus and controversy* (pp. 313 - 324). Philadelphia: The Falmer Press.
- Erikson, E. H. (1968). *Identity: Youth and crisis*. London: Faber and Faber.
- Ewen, R. B. (1993). *An introduction to theories of personality*. New Jersey: Lawrence Erlbaum Associates.
- Feldhusen, J. F. (1986). A conception of giftedness. In J. Sternberg & J. E. Davidson (Eds.), *Conceptions of giftedness* (pp. 112 - 127). New York: Cambridge University Press.
- Feldhusen, J. F. (1998). Identification and assessment of talented learners. In J. VanTassel-Baska (Ed.), *Excellence in educating gifted and talented learner* (pp. 193 - 209). Denver: Love Publishing.
- Feldhusen, J. F., & Kennedy, D. M. (1988). Preparing gifted youth for leadership roles in a rapid changing society. *Roeper Review*, 10(4), 226 - 230. doi: 10.1080/02783198809553135

- Ferriman, K., Lubinski, D., & Benbow, C. P. (2009). Work preferences, life values, and personal views of top math/science graduate students and the profoundly gifted: Developmental changes and gender differences during emerging adulthood and parenthood. *Journal of Personality and Social Psychology; Journal of Personality and Social Psychology*, 97(3), 517-532. doi: 10.1037/a0016030
- Ferriman, K., Smeets, S., Lubinski, D., & Benbow, C. P. (2010). Beyond the threshold hypothesis: even among the gifted and top math/science graduate students, cognitive abilities, vocational interests, and lifestyle preferences matter for career choice, performance, and persistence. *Current Directions in Psychological Science*, 19, 346-351. Retrieved from http://www.vanderbilt.edu/peabody/smpy/Ferriman_2010.pdf
- Fiedler, E. D. (1998). Denial of anger/ denial of self: Dealing with the dilemmas. *Roeper Review*, 20(1), 158 - 161. doi: 10.1080/02783199809553883
- Field, A. (2009). *Discovering statistics using SPSS*. Los Angeles: SAGE Publication.
- Fischer, E., & Arnold, S. J. (1994). Sex, gender identity, gender role attitudes, and consumer behavior. *Psychology and Marketing*, 11(2), 163-182. doi: 10.1002/mar.4220110206
- Fletcher, G. J. O., Danilovics, P., Fernandez, G., Peterson, D., & Reeder, G. D. (1986). Attributional complexity: An individual differences measure. *Journal of Personality and Social Psychology; Journal of Personality and Social Psychology*, 51(4), 875-884. doi: 10.1037/0022-3514.51.4.875
- Folsom, C. (1998). From a distance: Joining the mind and moral character. *Roeper Review*, 20(4), 265-270.

- Folsom, C. (2009). Teaching for Intellectual and Emotional Learning (TIEL): Bringing thinking and moral-ethical learning into classrooms. In D. Ambrose & T. Cross (Eds.), *Morality, ethics, and gifted minds* (pp. 285 - 300). New York: Springer.
- Frankena, W. (1988). Hare on moral weakness and the definition of morality. *Ethics*, 98(4), 779-792. Retrieved from <http://www.jstor.org/stable/2380897>
- Frankena, W. K. (1966). The concept of morality. *The Journal of Philosophy*, 63(21), 688-696. Retrieved from <http://www.jstor.org/stable/2024163>
- Frasier, M. M., & Passow, A. H. (1994). Towards a New Paradigm for Identifying Talent Potential. Research Monograph 94112. Connecticut: NRC/GT, University of Connecticut. Retrieved 28 January 2012, from http://eric.ed.gov/ERICWebPortal/search/detailmini.jsp?_nfpb=true&_ERICExtSearch_SearchValue_0=ED388020&ERICExtSearch_SearchType_0=no&accno=ED388020
- Furman, W., & Schaffer, L. (2003). The role of romantic relationships in adolescent development. In P. Florsheim (Ed.), *Adolescent romantic relations and sexual behavior: Theory, research, and practical implications*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Furnham, A., Monsen, J., & Ahmetoglu, G. (2009). Typical intellectual engagement, Big Five personality traits, approaches to learning and cognitive ability predictors of academic performance. *British Journal of Educational Psychology*, 79, 769-782.
- Gagné, F. (1985). Giftedness and talent: Reexamining a reexamination of the definitions. *Gifted Child Quarterly*, 29(3), 103-112. doi: 10.1177/001698628502900302
- Gagné, F. (1995). From giftedness to talent: A developmental model and its impact on

the language of the field. *Roeper Review*, 18(2), 103-111. doi:
10.1080/02783199509553709

Gagné, F. (1998). A proposal for subcategories within gifted or talented populations. *Gifted Child Quarterly*, 42(2), 87-95. doi: 10.1177/001698629804200203

Gagné, F. (2003). Transforming gifts into talents: The DMGT as a developmental theory. In N. Colangelo & G. A. Davis (Eds.), *Handbook of gifted education* (pp. 60 - 74). Boston: Allyn and Bacon.

Gagné, F. (2004a). An imperative, but, alas, improbable consensus! *Roeper Review*, 27(1), 12.

Gagné, F. (2004b). Transforming gifts into talents: The DMGT as a developmental theory. *High Ability Studies*, 15(2), 119-147. doi: 10.1080/1359813042000314682

Gagné, F. (2008). Building gifts into talents: Overview of the DMGT. Retrieved 6 January, 2011, from www.sfu.ca/~kanevsky/428/Gagne.pdf

Galambos, N. L., MacDonald, S. W. S., Naphtali, C., Cohen, A.-L., & de Frias, C. M. (2005). Cognitive performance differentiates selected aspects of psychosocial maturity in adolescence. *Developmental Neuropsychology*, 28(1), 473-492. doi: 10.1207/s15326942dn2801_2

Garland, A. F., & Zigler, E. (1999). Emotional and behavioral problems among highly intellectually gifted youth. *Roeper Review*, 22(1), 41-44. doi: 10.1080/02783199909553996

Garmon, L. C., Basinger, K. S., Gregg, V. R., & Gibbs, J. C. (1996). Gender differences in stage and expression of moral judgment. *Merrill-Palmer Quarterly: Journal of*

Developmental Psychology, 42(3), 418-437.

Garrett, H. E. (1946). A developmental theory of intelligence. *American Psychologist*, 1(9), 372-378. doi: 10.1037/h0056380

Gay, L. R., Mills, G. E., & Aisasian, P. (2006). *Educational research: Competencies for analysis and applications* (8 ed.). New Jersey: Pearson Prentice Hall.

Gibbs, J. C., Basinger, K. S., Grime, R. L., & Snarey, J. R. (2007). Moral judgment development across cultures: Revisiting Kohlberg's universality claims. *Developmental Review*, 27(4), 443-500. doi: 10.1016/j.dr.2007.04.001

Gibson, K. L., & Lander-Brown, M. (2009). Moral development in preparing gifted students for global citizenship. In D. Ambrose & T. Cross (Eds.), *Morality, ethics, and gifted minds* (pp. 301 - 312). New York: Springer.

Gifted Education Research, Resource and Information Centre. (2008). *Australian Talent Search*. Retrieved 20 May 2008, from <http://gerric.arts.unsw.edu.au/talent/about.html>

Gilligan, C. (1982). *In a different voice: Psychological theory and women's development*. Cambridge: Harvard University Press.

Gilligan, C., & Attanucci, J. (1988). Two moral orientations: Gender differences and similarities. *Merrill-Palmer Quarterly*, 34(3), 223-237.

Goff, M., & Ackerman, P. L. (1992). Personality-intelligence relations: Assessment of typical intellectual engagement. *Journal of Educational Psychology*, 84(4), 537-552. doi: 10.1037/0022-0663.84.4.537

- Goossens, L. U. C. (2001). Global versus domain-specific statuses in identity research: a comparison of two self-report measures. *Journal of Adolescence*, 24(6), 681-699. doi: 10.1006/jado.2001.0438
- Gottfredson, L. S. (1998). The general intelligence factor. *Scientific American*. Retrieved from <http://www.psych.utoronto.ca/users/reingold/courses/intelligence/cache/1198gottfred.html>
- Gottfredson, L. S. (2003). The science and politics of intelligence in gifted education. In N. C. G. A. Davis (Ed.), *Handbook of gifted education* (3rd ed., pp. 24-43). Boston: Allyn and Bacon.
- Graetz, B., & McAllister, I. (1994). *Dimensions of Australian society* (2 ed.). Melbourne, Australia: Palgrave Macmillan.
- Grant, J. E., Weiner, A., & Rushton, J. P. (1976). Moral judgment and generosity in children. *Psychological Reports*, 39, 451 - 454. doi: 10.2466/pr0.1976.39.2.451
- Greeno, C. G., & Maccoby, E. E. (1986). How Different Is the "Different Voice"? *Signs*, 11(2), 310-316. Retrieved from <http://www.jstor.org/stable/3174052>
- Gross, M. U. (1989). The pursuit of excellence or the search for intimacy? The forced-choice dilemma of gifted youth. *Roeper Review: A Journal on Gifted Education*, 11(4), 189-194. doi: 10.1080/02783198909553207
- Gross, M. U. M. (1997a). How ability grouping turns big fish into little fish—or does it? Of optical illusions and optimal environments. *Australasian Journal of Gifted Education*, 6(3), 18 - 30.

- Gross, M. U. M. (1997b). To group or not to group: Is that the question? *Gifted child Quarterly*, 98, 25-29.
- Gross, M. U. M. (1998a). Issues in assessing the highly gifted. *Understanding Our Gifted*, 10(2), 4 - 8.
- Gross, M. U. M. (1998b). The "Me" behind the mask: Intellectually gifted students and the search for identity. *Roeper Review*, 20(1), 167-175.
- Gross, M. U. M. (2001). *"Play Partner" or "Sure Shelter"? Why gifted children prefer older friends*. Paper presented at the 4th Australasian International Conference on the Education of Gifted Students, Melbourne, Australia.
http://www.hoagiesgifted.org/play_partner.htm
- Gross, M. U. M. (2004). *Exceptionally gifted children* (2 ed.). New York: RoutledgeFalmer.
- Gross, M. U. M. (2005). Understanding giftedness (Module 1). *Gifted and talent education: professional development package for teachers*. Sydney: Australian Department of Education, Science and Training; Gifted Education Research, Resource and Information Centre (GERRIC), The University of New South Wales.
- Grotevant, H. D. (1987). Toward a process model of identity formation. *Journal of Adolescent Research*, 2(3), 203-222. doi: 10.1177/074355488723003
- Grotevant, H. D., & Adams, G. R. (1984). Development of an objective measure to assess ego identity in adolescence: Validation and replication. *Journal of Youth and Adolescence*, 13(5), 419-438. doi: 10.1007/bf02088639
- Grotevant, H. D., Thorbecke, W., & Meyer, M. L. (1982). An extension of Marcia's identity

status interview into the interpersonal domain. *Journal of Youth and Adolescence*, 11(1), 33-47. doi: 10.1007/bf01537815

Gustafsson, J. E. (1984). A unified model for the structure of intellectual abilities. *Intelligence*, 8, 179-203. doi: 10.1016/0160-2896(84)90008-4

Haan, N., Langer, J., & Kohlberg, L. (1976). Family patterns of moral reasoning. *Child Development*, 47(4), 1204 - 1206. Retrieved from <http://www.jstor.org/stable/1128466>.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate data analysis: A global perspective* (7 ed.). New Jersey: Pearson Prentice Hall.

Halpern, C. T., Joyner, K., Udry, J. R., & Suchindran, C. (2000). Smart teens don't have sex (or kiss much either). *The Journal of Adolescent Health*, 26(3), 213-225. Retrieved from <http://linkinghub.elsevier.com/retrieve/pii/S1054139X99000610?showall=true>.

Halpern, D. F., Benbow, C. P., Geary, D. C., Gur, R. C., Hyde, J. S., & Gernsbacher, M. A. (2007). The Science of Sex Differences in Science and Mathematics. *Psychological Science in the Public Interest*, 8(1), 1-51. doi: 10.1111/j.1529-1006.2007.00032.x

Hardy, S. A., & Carlo, G. (2005). Identity as a source of motivation. *Human Development*, 48, 232 - 256. doi: 10.1159/000086859

Harren, V. A. (1979). A model of career decision making for college students. *Journal of Vocational Behavior*, 14(2), 119-133. doi: 10.1016/0001-8791(79)90065-4

- Harris, S., Mussen, P., & Rutherford, E. (1976). Some cognitive, behavioral, and personality correlates of maturity of moral judgment. *The Journal of Genetic Psychology: Research and Theory on Human Development*, 128, 123-135.
- Hébert, T. P., & Kelly, K. R. (2006). Identity and career development in gifted students. In F. A. Dixon & S. M. Moon (Eds.), *The handbook of secondary gifted education* (pp. 35 - 63). Waco, Texas: Prufrock Press.
- Heiss, R. (1995). *Personality and interests of gifted adolescents: Differences by gender and domain*. (Unpublished doctoral dissertation), Iowa State University, Iowa.
- Heller, K. A. (2004). Identification of gifted and talented students. *Psychology Science*, 46(3), 302 - 323. Retrieved from http://cps-site.ddg307.tamtam.nl/documents/Identification_of_Gifted_and_Talented_students.pdf
- Hoffman, M. L. (1979). Development of moral thought, feeling, and behavior. *American Psychologist*, 34(10), 958 - 966. doi: 10.1037/0003-066X.34.10.958
- Hogan, R., Viernstein, M., McGinn, P., Bohannon, W., & Daurio, S. (1977). Verbal giftedness and sociopolitical intelligence: Terman revisited. *Journal of Youth and Adolescence*, 6(2), 107-116. doi: 10.1007/bf02139078
- Hollingworth, L. S. (1942). *Children above 180 I Q : Stanford-Binet origin and development*. New York: Arno Press.
- Howard-Hamilton, M. F. (1994). An assessment of moral development in gifted adolescents. *Roeper Review*, 17(1), 57 - 59.
- Howard-Hamilton, M., & Franks, B. A. (1995). Gifted adolescents: Psychological behaviors, values, and developmental implications. *Roeper Review*, 17(3), 186-

191. doi: 10.1080/02783199509553656

Hult, R. E. (1979). The relationship between ego identity status and moral reasoning in university women. *The Journal of Psychology*, 103, 203 - 207.

Jaffee, S., & Hyde, J. S. (2000). Gender differences in moral orientation: A meta-analysis. *Psychological Bulletin*, 126(5), 703-726. doi: 10.1037/0033-2909.126.5.703

Janos, P. M., & Robinson, N. M. (1985). Psychosocial development in intellectually gifted children. In F. D. H. M. O'Brien (Ed.), *The gifted and talented: Developmental perspectives* (pp. 149 - 195). Washington DC: American Psychological Association.

Jensen, A. R. (1986). Intelligence: "Definition," measurement, and future research. In R. J. Sternberg & D. K. Detterman (Eds.), *What is intelligence? Contemporary viewpoints on its nature and definition* (pp. 109 - 112). New Jersey: Ablex Publishing Corporation.

Jensen, A. R. (1992). Spearman's hypothesis: Methodology and evidence. *Multivariate Behavioral Research*, 27(2), 225 - 233.

Jensen, A. R. (1998). *The g factor: The science of mental ability*. London: Praeger.

Johnson, M. (2009). What cognitive science brings to ethics. In D. Ambrose & T. Cross (Eds.), *Morality, ethics, and gifted minds* (pp. 147-150). New York: Springer.

Jones, R. M., & Streitmatter, J. L. (1987). Validity and reliability of the EOM-EIS for early adolescents. *Adolescence*, 22(87), 647 - 659.

- Jones, R. M., Akers, J. F., & White, J. M. (1994). Revised classification criteria for the Extended Objective Measure of Ego Identity Status (EOMEIS). *Journal of Adolescence*, 17(6), 533-549. doi: 10.1006/jado.1994.1047
- Kane, H. D., & Brand, C. R. (2006). The variable importance of general intelligence (g) in the cognitive abilities of children and adolescents. *Educational Psychology*, 26(6), 751 - 767. Retrieved from <http://www.informaworld.com/smpp/content~content=a762377953~db=all~order=page>.
- Kane, H. D., Oakland, T. D., & Brand, C. R. (2006). Differentiation at higher levels of cognitive ability: Evidence from the United States. *The Journal of Genetic Psychology*, 167(3), 327. doi: 10.3200/GNTP.167.3.327-341
- Kanevsky, L. (1990). Pursuing qualitative differences in the flexible use of problem-solving strategy by young children. *Journal for the Education of the Gifted*, 13(2), 115-140.
- Kanuk, L., & Berenson, C. (1975). Mail surveys and response rates: A literature review. *Journal of Marketing Research*, 12(4), 440-453. Retrieved from <http://www.jstor.org/stable/3151093>.
- Karnes, F. A., & Brown, K. E. (1981). Moral development and the gifted: An initial investigation. *Roeper Review*, 3, 6 - 13. doi: 10.1080/02783198109552540
- Katebi, S. S. (1987). *Sex differences in identity status among high school adolescents*. (Unpublished doctoral dissertation), The Claremont Graduate School, Claremont, California.

- Keegan, P. M. (1986). *Relationships among ego identity status, moral development and future time perspective in late adolescence*. (Unpublished doctoral dissertation), Boston University, Boston.
- Kerr, B., & Nicpon, M. F. (2003). Gender and giftedness. In N. Colangelo & G. A. Davis (Eds.), *Handbook of gifted education* (pp. 493 - 505). Boston: Allyn and Bacon.
- Kerr, B., & Sodano, S. (2003). Career assessment with intellectually gifted students. *Journal of Career Assessment*, 11(2), 168-186. doi: 10.1177/1069072703011002004
- Kessler, G. R., Ibrahim, F. A., & Kahn, H. (1986). Character development in adolescents. *Adolescence*, 21(81), 1-9.
- Kidwell, J. S., Dunham, R. M., Bacho, R. A., Pastorino, E., & Portes, P. R. (1995). Adolescent identity exploration: A test of Erikson's theory of transitional crisis. *Adolescence*, 30(120), 785.
- Kirsch, P. A., Shore, M. F., & Kyle, D. G. (1976). Ideology and personality: Aspects of identity formation in adolescents with strong attitudes toward sex-role equalitarianism. *Journal of Youth and Adolescence*, 5(4), 387-401. doi: 10.1007/bf01577251
- Klaczynski, P. A., Fauth, J. M., & Swanger, A. (1998). Adolescent identity: rational vs. Experiential processing, formal operations, and critical thinking beliefs. *Journal of Youth and Adolescence*, 27(2), 185-207. doi: 10.1023/a:1021663712950
- Kohlberg, L. (1964). Development of moral character and moral ideology. In M. L. H. L. W. Hoffman (Ed.), *Review of child development research* (pp. 383 - 431). Chicago: University of Chicago Press.

- Kohlberg, L. (1969). Stage and sequence: the cognitive-developmental approach to socialization. In D. Gosun (Ed.), *Handbook of socialization theory and research* (pp. 349-480). New York: Rand MacNaUy.
- Kohlberg, L. (1975). The cognitive-developmental approach to moral education. *The Phi Delta Kappan*, 56(10), 670-677. Retrieved from <http://www.jstor.org/stable/20298084>.
- Kohlberg, L. (1976). Moral stages and moralization. In T. Lickona (Ed.), *Moral development and behavior: Theory, research, and social issues* (pp. 31 - 53). New York: Holt, Rinehart and Winston.
- Kohlberg, L. (1984). *The psychology of moral development: The nature and validity of moral stages*. New York: Harper & Row
- Kohlberg, L. (1985). A current statement on some theoretical issues. In S. M. C. Modgil (Ed.), *Lawrence Kohlberg: Consensus and controversy* (pp. 485 - 546). London: The Falmer Press.
- Kohlberg, L., & Candee, D. (1984). The relationship of moral judgment to moral action *The psychology of moral development: The nature and validity of moral stages* (pp. 498 - 581). New York: Harper & Row.
- Kohlberg, L., & Hersh, R. H. (1977). Moral development: A review of the theory. *Theory into practice*, 16(2), 53-59. doi: 10.1080/00405847709542675
- Kramer, J. H., Delis, D. C., Kaplan, E., O'Donnell, L., & Prifitera, A. (1997). Developmental sex differences in verbal learning. *Neuropsychology; Neuropsychology*, 11(4), 577-584. doi: 10.1037/0894-4105.11.4.577

- Krettenauer, T. (2005). The role of epistemic cognition in adolescent identity formation: Further evidence. *Journal of Youth and Adolescence*, 34(3), 185-198. doi: 10.1007/s10964-005-4300-9
- Kroger, J. (1989). *Identity in adolescence: The balance between self and other*. London: Routledge.
- Kroger, J. (1995). The differentiation of "firm" and "developmental" foreclosure identity statuses. *Journal of Adolescent Research*, 10(3), 317-337. doi: 10.1177/0743554895103002
- Kroger, J. (1997). Gender and identity: The intersection of structure, content, and context. *Sex Roles*, 36(11), 747-770. doi: 10.1023/a:1025627206676
- Kroger, J. (2000). Ego identity status research in the new millennium. *International Journal of Behavioral Development*, 24(2), 145-148. doi: 10.1080/016502500383250
- Kroger, J. (2003). Identity development during adolescence. In G. R. Adams & M. D. Berzonsky (Eds.), *Blackwell Handbook of Adolescence* (pp. 205 - 226). Oxford: Blackwell Publishing.
- Kroger, J., Martinussen, M., & Marcia, J. E. (2010). Identity status change during adolescence and young adulthood: A meta-analysis. *Journal of Adolescence*, 33(5), 683-698. doi: 10.1016/j.adolescence.2009.11.002
- Kuhn, J.-T., & Holling, H. (2009). Gender, reasoning ability, and scholastic achievement: A multilevel mediation analysis. *Learning and Individual Differences*, 19(2), 229-233. doi: 10.1016/j.lindif.2008.11.007

- Lawrence, J. (1977). Moral judgment intervention studies using the Defining Issues Test *Development in judging moral issues: A summary of research using the Defining Issues Test*. (pp. 39 -54). Minneapolis: Minnesota University
- Lee, S.-Y., & Olszewski-Kubilius, P. (2006). The emotional intelligence, moral judgment, and leadership of academically gifted adolescents. *Journal for the Education of the Gifted*, 30(1), 29 - 67. doi: 10.4219/jeg-2006-251
- Legree, P. J., Pifer, M. E., & Grafton, F. C. (1996). Correlations among cognitive abilities are lower for higher ability groups. *Intelligence*, 23(1), 45-57. doi: 10.1016/s0160-2896(96)80005-5
- Lewis, A. E. (2007). *The moral judgment of gifted adolescents*. (Unpublished doctoral dissertation), The University of Minnesota, Minnesota.
- Lewis, C. L. (1982). *The relationship of moral development and cognitive development within gifted students examined in the light of the variables of sex, socioeconomic status, and age*. (Unpublished doctoral dissertation), Temple University, Pennsylvania.
- Lickona, T. (1976). Critical issues in the study of moral development and behavior: Theory, research, and social issues. In T. Lickona (Ed.), *Moral development and behavior* (pp. 3-27). New York: Holt, Rinehart and Winston.
- Lickona, T. (1997). Educating for character: A comprehensive approach. In A. Molnar (Ed.), *The construction of children's character* (pp. 45–62). Chicago: University of Chicago Press.
- Lindsay, B. (1988). A lamp for diogenes: Leadership giftedness and moral education. *Roeper Review*, 11(1), 8-11.

- Lipovsky, J. A. (1987). *Ego identity status in gifted/academically talented high school students: relationship to sex and academic performance* (Unpublished doctoral dissertation), University of Florida, Florida.
- Lohman, D. F. (2005). The role of nonverbal ability tests in identifying academically gifted students: An aptitude perspective. *Gifted Child Quarterly*, 49(2), 111-138. doi: 10.1177/001698620504900203
- Logan, S., & Johnston, R. (2010). Investigating gender differences in reading. *Educational Review*, 62(2), 175-187. doi: 10.1080/00131911003637006
- Lonky, E., Kaus, C. R., & Roodin, P. A. (1984). Life experience and mode of coping: Relation to moral judgment in adulthood. *Developmental Psychology*, 20(6), 1159-1167. doi: 10.1037/0012-1649.20.6.1159
- Loo, R., & Thorpe, K. (1998). Attitudes toward women's roles in society: A replication after 20 years. *Sex Roles*, 39(11), 903-912. doi: 10.1023/a:1018832823010
- Lovecky, D. V. (1994a). Exceptionally gifted children: different minds. *Roeper Review*, 17(2), 116 - 120. Retrieved from http://www.gifteddevelopment.com/PDF_files/exceptgt.pdf.
- Lovecky, D. V. (1994b). The moral gifted child in a violent world. *Understanding Our Gifted*, January/ February, 3.
- Lovecky, D. V. (1997). Identity development in gifted children: Moral sensitivity. *Roeper Review*, 20(2), 90 - 95. Retrieved from <http://www.positivedisintegration.com/Lovecky1997.pdf>.

- Lubinski, D. (2004). Introduction to the special section on cognitive abilities: 100 years after spearman's (1904) "general intelligence,' objectively determined and measured". *Journal of Personality and Social Psychology*, 86(1), 96-111. doi: 10.1037/0022-3514.86.1.96
- Lubinski, D. (2009). Exceptional cognitive ability: The phenotype. *Behavior Genetics*, 39(4), 350-358. doi: 10.1007/s10519-009-9273-0
- Lubinski, D., & Benbow, C. P. (1992). Gender differences in abilities and preferences among the gifted: Implications for the math/science pipeline. *Current Directions in Psychological Science*, 1(2), 61-66. doi: 10.1111/1467-8721.ep11509746
- Lubinski, D., & Benbow, C. P. (2006). Study of Mathematically Precocious Youth after 35 years: Uncovering antecedents for the development of math-science expertise. *Perspectives on Psychological Science*, 1(4), 316-345. doi: 10.1111/j.1745-6916.2006.00019.x
- Lubinski, D., & Humphreys, L. G. (1990). A broadly based analysis of mathematical giftedness. *Intelligence*, 14(3), 327-355. doi: 10.1016/0160-2896(90)90022-I
- Lubinski, D., Benbow, C. P., & Ryan, J. (1995). Stability of vocational interests among the intellectually gifted from adolescence to adulthood: A 15-year longitudinal study. *Journal of Applied Psychology*, 80(1), 196-200. doi: 10.1037/0021-9010.80.1.196
- Lubinski, D., Schmidt, D. B., & Benbow, C. P. (1996). A 20-year stability analysis of the study of values for intellectually gifted individuals from adolescence to adulthood. *Journal of Applied Psychology*, 81(4), 443-451. doi: 10.1037/0021-9010.81.4.443
- Lubinski, D., Webb, R. M., Morelock, M. J., & Benbow, C. P. (2001). Top 1 in 10,000: A 10-year follow-up of the profoundly gifted. *Journal of Applied Psychology*, 86(4),

718-729. doi: 10.1037/0021-9010.86.4.718

Lupkowski-Shoplik, A., Benbow, C. P., Assouline, S. G., & Brody, L. E. (2003). Talent search: Meeting the needs of academically talented youth. In N. Colangelo & G. A. Davis (Eds.), *Handbook of gifted education* (pp. 204 - 218). Boston: Allyn and Bacon.

Luthar, S. S., Zigler, E., & Goldstein, D. (1992). Psychosocial adjustment among intellectually gifted adolescents: the role of cognitive-developmental and experiential factors. *Journal of Child Psychology and Psychiatry*, 33(2), 361-375. doi: 10.1111/j.1469-7610.1992.tb00872.x

Lyons, N. P. (1983). Two perspectives: On self, relationships, and morality. *Harvard Educational Review*, 53(2), 125-145.

Marcia, J. E. (1966). Development and validation of ego-identity status. *Journal of Personality and Social Psychology*, 3(5), 551-558. doi: 10.1037/h0023281

Marcia, J. E. (1967). Ego identity status: relationship to change in self-esteem, "general maladjustment," and authoritarianism. *Journal of Personality*, 35(1), 118-133. doi: 10.1111/j.1467-6494.1967.tb01419.x

Marcia, J. E. (1980). Identity in adolescence. In J. Adelson (Ed.), *Handbook of adolescent psychology* (pp. 159 - 187). New York: John Wiley & Sons.

Marcia, J. E. (1994). Ego identity and object relations. In J. M. Masling & R. F. Bornstein (Eds.), *Empirical Perspectives on Object Relations Theory* (pp. 59 - 103). Washington DC: APA.

- Marcia, J. E., & Friedman, M. L. (1970). Ego identity status in college women. *Journal of Personality*, 38(2), 249-263. doi: 10.1111/j.1467-6494.1970.tb00007.x
- Marland, S. P. (1972). *Education of the gifted and talented: Report to the Congress of the United States by the U.S. Commissioners of Education*. Washington, DC: U.S. Government Printing Office.
- Martin, R. M., Shafto, M., & Vandeinse, W. (1977). The reliability, validity, and design of the Defining Issues Test. *Developmental Psychology*, 13(5), 460-468. doi: 10.1037/0012-1649.13.5.460
- Matteson, D. (1977). Exploration and commitment: Sex differences and methodological problems in the use of identity status categories. *Journal of Youth and Adolescence*, 6(4), 353-374. doi: 10.1007/bf02139239
- Mayer, R. E., & Hegarty, M. (1996). The process of understanding mathematical problems. In R. J. Sternberg & T. Ben-Zeev (Eds.), *The nature of mathematical thinking* (pp. 29 - 54). New Jersey: Lawrence Erlbaum Associates.
- McCallister, C., Nash, W. R., & Meckstroth, E. (1996). The social competence of gifted children: Experiments and experience. *Roeper Review*, 18(4), 273 - 276. doi: 10.1080/02783199609553758
- McCrae, R. R. (1987). Creativity, divergent thinking, and openness to experience. *Journal of Personality and Social Psychology*, 52(6), 1258-1265. doi: 10.1037/0022-3514.52.6.1258
- McCrae, R. R. (1992). *Openness to experience as a basic dimension of personality*. Paper presented at the Annual Convention of the American Psychological Association (100th), Washington, DC.

<http://www.eric.ed.gov/PDFS/ED351630.pdf>

McCrae, R. R. (1994). Openness to experience: Expanding the boundaries of factor V. *European Journal of Personality*, 8(4), 251-272. doi: 10.1002/per.2410080404

McCrae, R. R., & Costa, J. P. T. (1997a). Conceptions and correlates of openness to experience. In R. Hogan, J. A. Johnson & S. R. Briggs (Eds.), *Handbook of personality psychology* (pp. 826 - 842). San Diego: Academic Press.

McCrae, R. R., & Costa, P. T. (1987). Validation of the five-factor model of personality across instruments and observers. *Journal of Personality and Social Psychology*, 52(1), 81-90. doi: 10.1037/0022-3514.52.1.81

McCrae, R. R., & Costa, P. T., Jr. (1997b). Personality trait structure as a human universal. *American Psychologist*, 52(5), 509-516. doi: 10.1037/0003-066x.52.5.509

McHugh, M. C., & Frieze, I. H. (1997). The measurement of gender-role attitudes a review and commentary. *Psychology of Women Quarterly*, 21(1), 1-16. doi: 10.1111/j.1471-6402.1997.tb00097.x

Meeus, W. (1996). Studies on identity development in adolescence: An overview of research and some new data. *Journal of Youth and Adolescence*, 25(5), 569-598. doi: 10.1007/bf01537355

Meeus, W., Iedema, J., Helsen, M., & Vollebergh, W. (1999). Patterns of adolescent identity development: Review of literature and longitudinal analysis. *Developmental Review*, 19(4), 419-461. doi: 10.1006/drev.1999.0483

- Meeus, W., Van De Schoot, R., Keijsers, L., Schwartz, S. J., & Branje, S. (2010). On the progression and stability of adolescent identity formation: A five-wave longitudinal study in early-to-middle and middle-to-late adolescence. *Child Development*, 81(5), 1565-1581. doi: 10.1111/j.1467-8624.2010.01492.x
- Mendez, L. M. R., & Crawford, K. M. (2002). Gender-role stereotyping and career aspirations: A comparison of gifted early adolescent boys and girls. *The Journal Of Secondary Gifted Education*, 13(3), 96-107. doi: 10.4219/jsge-2002-375
- Michaelson, M. M. (2001). A model of extraordinary social engagement, or "moral giftedness". *New Direction for Child and Adolescent Development*, 93(Fall), 19 - 32. doi: 10.1002/cd.22
- Mills, C. J. (1981). Sex roles, personality, and intellectual abilities in adolescents. *Journal of Youth and Adolescence*, 10(2), 85-112. doi: 10.1007/bf02091739
- Mills, C. J. (1993). Personality, learning style and cognitive style profiles of mathematically talented students. *European Journal of High Ability*, 4(1), 70-85. doi: 10.1080/0937445930040108
- Mills, R. K. (1987). Traditional morality, moral reasoning and the moral education of adolescents. *Adolescence*, 22(86), 371-375.
- Mischel, W., & Mischel, H. N. (1976). A cognitive social learning approach to morality and self-regulation. In T. Lickona (Ed.), *Moral development and behavior: Theory, research, and social issues* (pp. 84 - 107). New York: Holt, Rinehart and Winston.
- Mönks, F. J., & Ferguson, T. J. (1983). Gifted adolescents: An analysis of their psychosocial development. *Journal of Youth and Adolescence*, 12(1), 1-18. doi: 10.1007/bf02092110

Montgomery, M. J. (2005). Psychosocial Intimacy and Identity. *Journal of Adolescent Research, 20*(3), 346-374. doi: 10.1177/0743558404273118

Moon, S. M., & Dixon, F. A. (2006). Conceptions of giftedness in adolescence. In F. A. Dixon & S. M. Moon (Eds.), *The handbook of secondary gifted education* (pp. 7 - 33). Texas: Prufrock Press.

Morelock, M. J. (1996). On the nature of giftedness and talent: imposing order on chaos. *Roeper Review, 19*(1), 4-12. doi: 10.1080/02783199609553774

Mosher, R. A., & Sullivan, P. R. (1976). A curriculum in moral education for adolescents. *Journal of Moral Education, 5*(2), 159 - 172.

Muuss, R. E. (1988). Carol Gilligan's theory of sex differences in the development of moral reasoning during adolescence. *Adolescence, 23*(89), 229 - 243.

Muuss, R. E. (1996). *Theories of adolescence* (6 ed.). New York: McGraw-Hill

Myyrya, L., Juujärvi, S., & Pesso, K. (2010). Empathy, perspective taking and personal values as predictors of moral schemas. *Journal of Moral Education, 39*(2), 213 - 233. doi: 10.1080/03057241003754955

Narvaez, D. (1993). High achieving students and moral judgment. *Journal for the Education of the Gifted, 16*(3), 268 - 279. Retrieved from <http://www.nd.edu/~dnarvaez/documents/NarvaezGifted293.pdf>.

Narvaez, D. (1998). The influence of moral schemas on the reconstruction of moral narratives in eighth graders and college students. *Journal of Educational*

Psychology, 90(1), 13-24. doi: 10.1037/0022-0663.90.1.13

Narvaez, D. (2001). Moral text comprehension: implications for education and research.

Journal of Moral Education, 30(1), 43-54. doi: 10.1080/03057240120033802

Narvaez, D. (2006). Integrative Ethical Education. In M. Killen & J. Smetana (Eds.),

Handbook of Moral Development (pp. 703-733). Mahwah, NJ: Erlbaum.

Narvaez, D., & Bock, T. (2002). Moral schema and tacit judgment of how the Defining

Issues Test is supported by cognitive science. *Journal of Moral Education*, 31(3), 297 - 314. doi: 10.1080/0305724022000008124

National Health and Medical Research Council, Australian Government (2002). *Human*

research ethics handbook. Canberra AusInfo. Retrieved 26 August 2009, from <http://www.nhmrc.gov.au/>.

Neemann, J., Hubbard, J., & Masten, A. S. (1995). The changing importance of romantic relationship involvement to competence from late childhood to late adolescence.

Development and Psychopathology, 7(04), 727-750. doi: 10.1017/S0954579400006817

Neihart, M. (1999). The impact of giftedness on psychological well-being. *Roeper Review*, 22(1), 4. Retrieved from

http://www.sengifted.org/articles_counseling/Neihart_TheImpactOfGiftednessOnPsychologicalWellbeing.shtml

Neihart, M., Reis, S., Robinson, N., & Moon, S. E. (2002). *The social and emotional*

development of gifted children: What do we know? Waco, TX: Prufrock Press.

- Neisser, U., Boodoo, G., Bouchard, T. J., Boykin, A. W., Brody, N., Ceci, S. J., . . . Urbina, S. (1996). Intelligence: Knowns and unknowns. *American Psychologist*, 51(2), 77 - 101.
- Nelson, J. R., Smith, D. J., & Dodd, J. (1990). The moral reasoning of juvenile delinquents: A meta-analysis. *Journal of Abnormal Child Psychology*, 18(3), 231-239. doi: 10.1007/bf00916562
- Norman, A. D., Ramsay, S. G., Martray, C. R., & Roberts, J. L. (1999). Relationship between levels of giftedness and psychosocial adjustment. *Roeper Review*, 22(1), 5-9. doi: 10.1080/02783199909553990
- Norman, A. D., Ramsay, S. G., Roberts, J. L., & Martray, C. R. (2000). Effect of social setting, self-concept, and relative age on the social status of moderately and highly gifted students. *Roeper Review*, 23(1), 34-39. doi: 10.1080/02783190009554059
- O'Boyle, M. W., Cunnington, R., Silk, T. J., Vaughan, D., Jackson, G., Syngieniotis, A., & Egan, G. F. (2005). Mathematically gifted male adolescents activate a unique brain network during mental rotation. *Cognitive Brain Research*, 25(2), 583-587. doi: 10.1016/j.cogbrainres.2005.08.004
- O'Connor, B. P. (1995). Identity development and perceived parental behavior as sources of adolescent egocentrism. *Journal of Youth and Adolescence*, 24(2), 205-227. doi: 10.1007/bf01537150
- O'Leary, K. T. (2005). *Development of personal strengths and moral reasoning in gifted adolescents*. (Unpublished doctoral dissertation), University of New South Wales, Sydney. Retrieved from <http://unsworks.unsw.edu.au/vital/access/manager/Repository/unsworks:634>

- Olenchak, F. R. (1999). Affective development of gifted students with nontraditional talents. *Roeper Review*, 21(3), 293-297.
- Olszewski-Kubilius, P. M., & Subotnik, R. F. (1991). Experimental research In N. K. Buchanan & J. F. Feldhusen (Eds.), *Conducting research and evaluation in gifted education : A handbook of methods and applications* (pp. 51-68). New York: Teachers College Press.
- Olszewski-Kubilius, P., & Whalen, S. P. (2000). The education and development of verbally talented students. In K. A. Heller, F. J. Mönks, R. Subotnik & R. J. Sternberg (Eds.), *International handbook of giftedness and talent* (pp. 397 - 411). Oxford: Elsevier Science.
- Olszewski-Kubilius, P. (1994). Talent search: A driving force in gifted education. *Understanding Our Gifted*, 6(4), 1, 8-10.
- Olszewski-Kubilius, P. (1998). Talent search: Purposes, rationale, and role in gifted education. *The Journal of Secondary Gifted Education*, 9(3), 106-113.
- Oram, G. D., Cornell, D. G., & Rutemiller, L. A. (1995). Relations between academic aptitude and psychosocial adjustment in gifted program students. *Gifted Child Quarterly*, 39(4), 236-244. doi: 10.1177/001698629503900407
- Orlofsky, J. L. (1977). Sex-role orientation, identity formation, and self-esteem in college men and women. *Sex Roles*, 3(6), 561-575. doi: 10.1007/bf00287839
- Orlofsky, J. L. (1978). Identity formation, Achievement, and fear of success in college men and women. *Journal of Youth and Adolescence*, 7(1), 49-62. doi: 10.1007/bf01538686

- Orlofsky, J. L., Marcia, J. E., & Lesser, I. M. (1973). Ego identity status and the intimacy versus isolation crisis of young adulthood. *Journal of Personality and Social Psychology*, 27(2), 211-219. doi: 10.1037/h0034787
- Padilla-Walker, L. M., Barry, C. M., Carroll, J. S., Madsen, S. D., & Nelson, L. J. (2008). Looking on the bright side: The role of identity status and gender on positive orientations during emerging adulthood. *Journal of Adolescence*, 31(4), 451-467. doi: 10.1016/j.adolescence.2007.09.001
- Pagnin, A., & Andreani, O. (2000). New trends in research on moral development in the gifted. In K. A. Heller, F. J. Monks & A. H. Passow (Eds.), *International handbook of research and development of giftedness and talent* (pp. 467 - 489). Oxford: Elsevier Science.
- Park, G., Lubinski, D., & Benbow, C. P. (2007). Contrasting intellectual patterns predict creativity in the arts and sciences. *Psychological Science*, 18(11), 948-952. doi: 10.1111/j.1467-9280.2007.02007.x
- Passow, A. H. (1988). Educating gifted persons who are caring and concerned. *Roeper Review: A Journal on Gifted Education*, 11(1), 13-15. doi: 10.1080/02783198809553152
- Paul, R., & Elder, L. (2009). Critical thinking, creativity, ethical reasoning: A unity of opposites. In D. Ambrose & T. Cross (Eds.), *Morality, ethics, and gifted minds* (pp. 117 - 131). New York: Springer.
- Paulhas, D. L., & Vazire, S. (2007). The self-report method. In R. W. Robins, R. C. Farley & R. F. Krueger (Eds.), *Handbook of Research Methods in Personality Psychology* (pp. 224 - 239). New York: Guilford Press.

Pearson, F. C., & Rodgers, R. F. (1998). Cognitive and identity development: Gender effects. *Initiatives (Washington D.C.)*, 58(3), 17-33.

Phillips, T. M., & Pittman, J. F. (2007). Adolescent psychological well-being by identity style. *Journal of Adolescence*, 30(6), 1021-1034. doi: 10.1016/j.adolescence.2007.03.002

Piaget, J. (1932). *The moral judgment of the child*. London: Routledge.

Piaget, J. (1965). *The moral judgment of the child*. New York: The Free Press.

Piaget, J., & Inhelder, B. (1966). *The psychology of the child*. London: Routledge & Kegan Paul.

Piechowski, M. M. (1986). The concept of developmental potential. *Roeper Review*, 8(3), 190 - 197. doi: 10.1080/02783198609552971

Piechowski, M. M. (1997). Emotional giftedness: The measure of intrapersonal intelligence. In N. Colangelo & G. A. Davis (Eds.), *Handbook of gifted education* (2 ed., pp. 366 - 381). Boston: Allyn and Bacon.

Piechowski, M. M. (2003). Emotional and spiritual giftedness. In N. Colangelo & G. A. Davis (Eds.), *Handbook of gifted education* (pp. 403-416). Boston: Allyn and Bacon.

Piechowski, M. M., & Colangelo, N. (1984). Developmental potential of the gifted. *Gifted Child Quarterly*, 28(2), 80-88. doi: 10.1177/001698628402800207

Pietsch, J., Graetz, B., & McAllister, I. (2010). *Dimensions of Australian society* (3 ed.). South Yarra, VIC: Palgrave Macmillan.

- Podd, M. H. (1972). Ego identity status and morality: The relationship between two developmental constructs. *Developmental Psychology*, 6(3), 497-507. doi: 10.1037/h0032611
- Puka, B. (2002). The DIT and the 'dark side' of development. *Journal of Moral Education*, 31(3), 339-352. doi: 10.1080/0305724022000008157
- Quatman, T., Sampson, K., Robinson, C., & Watson, C. M. (2001). Academic, motivational, and emotional correlates of adolescent dating. *Genetic, Social, and General Psychology Monographs*, 127(2), 211-234.
- Rawls, J. (1985). Justice as fairness: Political not metaphysical. *Philosophy and Public Affairs*, 14(3), 223-251. Retrieved from <http://www.jstor.org/stable/2265349>.
- Rawls, J. (1988). The priority of right and ideas of the good. *Philosophy and Public Affairs*, 17(4), 251-276. Retrieved from <http://www.jstor.org/stable/2265400>.
- Read, D., Adams, G. R., & Dobson, W. R. (1984). Ego-identity status, personality, and social-influence style. *Journal of Personality and Social Psychology*, 46(1), 169-177. doi: 10.1037/0022-3514.46.1.169
- Reis, S. M. (2002). Social and emotional issues faced by gifted girls in elementary and secondary school. *The SENG Newsletter*, 2, 1-5. Retrieved from http://www.sengifted.org/articles_social/Reis_SocialAndEmotionalIssuesFacedByGiftedGirls.shtml.
- Renzulli, J. S. (1978). What makes giftedness? Reexamining a definition. *Phi Delta Kappan*, 60, 180 - 185, 261.

- Renzulli, J. S. (2003). Conception of giftedness and its relationship to the development of social capital In N. Colangelo & G. A. Davis (Eds.), *Handbook of gifted education* (3 ed., pp. 75 - 87). Boston: Allyn and Bacon.
- Rest, J. R. (1973). The hierarchical nature of moral judgment: A study of patterns of comprehension and preference of moral stages. *Journal of Personality*, 41, 86-109. doi: 10.1111/j.1467-6494.1973.tb00662.x
- Rest, J. R. (1975). Longitudinal study of the Defining Issues Test of moral judgment: A strategy for analyzing developmental change. *Developmental Psychology*, 11(6), 738-748. doi: 10.1037/0012-1649.11.6.738
- Rest, J. R. (1976). New approaches in the assessment of moral judgment. In T. Lickona (Ed.), *Moral development and behavior: Theory, research, and social issues* (pp. 198 - 218). New York: Holt, Rinehart and Winston.
- Rest, J. R. (1977). Charting the course of development through cross-sectional and longitudinal studies. *Development in judging moral issues: A summary of research using the Defining Issues Test*. (pp. 12-22). Minneapolis: Minnesota University.
- Rest, J. R. (1979). *Development in judging moral issues*. Minneapolis, MN: University of Minnesota.
- Rest, J. R. (1983). Morality. In P. H. Mussen (Ed.), *Handbook of child psychology* (Vol. 3, pp. 556 - 629). New York: John Wiley & Sons.
- Rest, J. R. (1986). *Manual for the Defining Issues Test* (3 ed.). Minneapolis, Minnesota: Center for the Study of Ethical Development, University of Minnesota.

- Rest, J. R., & Narvaez, D. (1994). *Moral development in the professions: Psychology and applied ethics*. Hillsdale, NJ: Lawrence Erlbaum.
- Rest, J. R., Cooper, D., Coder, R., Masanz, J., & Anderson, D. (1974). Judging the important issues in moral dilemmas: An objective measure of development. *Developmental Psychology*, 10(4), 491-501. doi: 10.1037/h0036598
- Rest, J. R., Narvaez, D., Bebeau, M.J., & Thoma, S. J. (1999a). A Neo-Kohlbergian approach: The DIT and schema theory *Educational Psychology Review*, 11(4), 291-324. doi: 10.1023/A:1022053215271
- Rest, J. R., Narvaez, D., Thoma, S. J., & Bebeau, M. J. (1999b). DIT2: Devising and testing a revised instrument of moral judgment. *Journal of Educational Psychology*, 91(4), 644-659. doi: 10.1037/0022-0663.91.4.644
- Rest, J. R., Narvaez, D., Bebeau, M. J., & Thoma, S. J. (1999c). *Postconventional moral thinking: A Neo-Kohlbergian approach*. New Jersey: Lawrence Erlbaum Associates Publishers.
- Rest, J. R., Narvaez, D., Thoma, S. J., & Bebeau, M. J. (2000). A Neo-Kohlbergian approach to morality research. *Journal of Moral Education*, 29(4), 381-395. doi: 10.1080/713679390
- Rest, J. R., Thoma, S.J., & Edwards, L. (1997a). Designing and validating a measure of moral judgment: Stage preference and stage consistency approaches. *Journal of Educational Psychology*, 89(1), 5-28. doi: 10.1037/0022-0663.89.1.5
- Rest, J. R., Thoma, S. J., Narvaez, D., & Bebeau, M. J. (1997b). Alchemy and beyond: Indexing the Defining Issues Test. *Journal of Educational Psychology*, 89(3), 498-507. doi: 10.1037/0022-0663.89.3.498

- Rickart, C. (1996). Structuralism and mathematical thinking. In R. J. Sternberg & T. Ben-Zeev (Eds.), *The nature of mathematical thinking* (pp. 285 - 300). New Jersey: Lawrence Erlbaum Associates.
- Robertson, K. F., Smeets, S., Lubinski, D., & Benbow, C. P. (2010). Beyond the threshold hypothesis. *Current Directions in Psychological Science*, 19(6), 346-351. doi: 10.1177/0963721410391442
- Robinson, N. M. (2000). Giftedness in very young children: How seriously should it be taken? In R. C. Friedman & B. M. Shore (Eds.), *Talents Unfolding: Cognition and Development* (pp. 7-26). Washington, DC: American Psychological Association.
- Robinson, N. M. (2004). Effects of academic acceleration on the social-emotional status of gifted students. In N. Colangelo, S. G. Assouline & M. U. M. Gross (Eds.), *A nation deceived: How schools hold back America's brightest students* (pp. 59-67). Iowa: The University of Iowa.
- Robinson, N. M., & Chamrad, D. L. (1986). Appropriate uses of intelligence tests with gifted children. *Roeper Review: A Journal on Gifted Education*, 8(3), 160-163. doi: 10.1080/02783198609552962
- Roedell, W. C. (1984). Vulnerabilities of highly gifted children. *Roeper Review*, 6 (3), 127-130.
- Roeper, A. (1988). Should educators of the gifted and talented be more concerned with world issues? *Roeper Review*, 11(1), 12-13.
- Rogers, K. B. (2002). *Re-forming gifted education: Helping parents and teachers to match the option to the child*. Scottsdale, AZ Great Potential Press.

- Rowe, I., & Marcia, J. E. (1980). Ego identity status, formal operations, and moral development. *Journal of Youth and Adolescence*, 9(2), 87-99. doi: 10.1007/bf02087928
- Runco, M. (2009). The continuous nature of moral creativity. In D. Ambrose & T. Cross (Eds.), *Morality, ethics, and gifted minds* (pp. 105 - 115). New York: Springer.
- Sanders, C. E., Lubinski, D., & Benbow, C. P. (1995). Does the Defining Issues Test measure psychological phenomena distinct from verbal ability?: An examination of Lykken's query. *Journal of Personality and Social Psychology*, 69(3), 498-504. Retrieved from <http://www.sciencedirect.com/science/article/pii/S0022351402010750>.
- Scarr, S. (1986). Intelligence: Revisited In R. J. Sternberg & D. K. Detterman (Eds.), *What is intelligence? Contemporary viewpoints on its nature and definition* (pp. 117-120). New Jersey: Ablex Publishing Corporation.
- Schenkel, S. (1975). Relationship among ego identity status, field-independence, and traditional femininity. *Journal of Youth and Adolescence*, 4(1), 73-82. doi: 10.1007/bf01537802
- Schoenfeld, A. H. (1992). Learning to think mathematically: Problem solving, metacognition, and sense-making in mathematics. In D. Grouws (Ed.), *Handbook for Research on Mathematics Teaching and Learning* (pp. 334-370). New York: MacMillan.
- Schwartz, S. J. (2001). The evolution of Eriksonian and Neo-Eriksonian identity theory and research: A review and integration. *Identity: An international Journal of Theory and Research*, 1(1), 7-58. Retrieved from http://www.sethschwartz.info/pdfs/Identity_Review_Paper.pdf.

- Schwartz, S. J. (2002). Convergent validity in objective measures of identity status: Implications for identity status theory. *Adolescence*, 37(147), 609 - 625.
- Schwartz, S. J. (2004). Brief report: Construct validity of two identity status measures: the EIPQ and the EOM-EIS-II. *Journal of Adolescence*, 27(4), 477-483
doi:410.1016/j.adolescence.2004.1003.1005
- Schwartz, S. J. (2006). Predicting identity consolidation from self-construction, eudaimonistic self-discovery, and agentic personality. *Journal of Adolescence*, 29(5), 777-793. doi: 10.1016/j.adolescence.2005.11.008
- Schwartz, S. J., & Dunham, R. M. (2000). Identity status formulae: Generating continuous measures of the identity statuses from measures of exploration and commitment. *Adolescence*, 35(137), 147-165.
- Schwartz, S. J., Adamson, L., Ferrer-Wreder, L., Dillon, F. R., & Berman, S. L. (2006). Identity status measurement across contexts: Variations in measurement structure and mean levels among white American, Hispanic American, and swedish emerging adults. *Journal of Personality Assessment*, 86(1), 61-76. doi: 10.1207/s15327752jpa8601_08
- Schwartz, S. J., Côté, J. E., & Arnett, J. J. (2005). Identity and agency in emerging adulthood. *Youth & Society*, 37(2), 201-229. doi: 10.1177/0044118x05275965
- Selman, R. L. (1971). The relations of role taking to the development of moral judgment in children. *Child Development*, 42, 79 - 91. Retrieved from <http://www.jstor.org/stable/1127066>.
- Selman, R. L. (1976). Social-cognitive understanding: A guide to educational and clinical practice. In T. Lickona (Ed.), *Moral development and behavior: Theory, research,*

and social issues (pp. 299 - 316). New York: Holt, Rinehart and Winston.

Selman, R. L., & Byrne, D. F. (1974). A structural-developmental analysis of levels of role taking in middle childhood. *Child Development*, 45(3), 803-806. Retrieved from <http://www.jstor.org/stable/1127850>.

Shanahan, M. J., & Pychyl, T. A. (2007). An ego identity perspective on volitional action: Identity status, agency, and procrastination. *Personality and Individual Differences*, 43(4), 901-911. doi: 10.1016/j.paid.2007.02.013

Shannon, D. M., & Bradshaw, C. C. (2002). A comparison of response rate, response time, and costs of mail and electronic surveys. *The Journal of Experimental Education*, 70(2), 179-192. Retrieved from <http://www.jstor.org/stable/20152675>.

Shaw, S. M., Kleiber, D. A., & Caldwell, L. L. (1995). Leisure and identity formation in male and female adolescents: A preliminary examination. *Journal of Leisure Research*, 27(3), 245-245.

Shea, D. L., Lubinski, D., & Benbow, C. P. (2001). Importance of assessing spatial ability in intellectually talented young adolescents: A 20-year longitudinal study. *Journal of Educational Psychology*; *Journal of Educational Psychology*, 93(3), 604-614. doi: 10.1037/0022-0663.93.3.604

Shoffner, M. F. (1996). *The moral reasoning of gifted adolescents: Its relationship with identity development, sensitivity, and gender role flexibility*. (Unpublished doctoral dissertation), University of Virginia, Virginia.

Shoffner, M. F., & Newsome., D. W. (2001). Identity development of gifted female adolescents: the influence of career development, age, and life-role salience. *Journal of Secondary Gifted Education*, 12(4), 201- 213.

- Siefring, J. J. (1981). *Intelligence, sex, and behavioral correlates of moral reasoning of public high school students*. (Unpublished doctoral dissertation), Fordham University, New York.
- Silverman, L. K. (1993a). Social development, leadership, and gender issues. In L. K. Silverman (Ed.), *Counseling gifted and talented* (pp. 291 - 327). Denver: Love Publishing.
- Silverman, L. K. (1993b). The gifted individual. In L. K. Silverman (Ed.), *Counseling gifted and talented* (pp. 3 - 28). Denver: Love Publishing.
- Silverman, L. K. (1994). The moral sensitivity of gifted children and the evolution of society. *Roeper Review: A Journal on Gifted Education*, 17(2), 110-116. doi: 10.1080/02783199409553636
- Silverman, L. K. (1995, July 31). *The universal experience of being out-of-sync*. Paper presented at the The 11th World Conference on Gifted and Talented Children, Hong Kong. Retrieve 28 September 2010, from <http://talentdevelop.com/articles/TUEOBO.html>
- Silverman, L. K. (1998a). Developmental stages of giftedness: Infancy through adulthood. In J. VanTassel-Baska (Ed.), *Excellence in educating gifted & talented learners* (pp. 145-166). Denver: Love.
- Silverman, L. K. (1998b). The highly gifted. In J. VanTassel-Baska (Ed.), *Excellence in educating gifted and talented learner* (pp. 115 - 128). Denver: Love Publishing.
- Silverman, L. K., & Kearney, K. (1992a). Don't throw away the old Binet. *Understanding Our gifted*, 4(4), 2, 8-10.

- Silverman, L. K., & Kearney, K. (1992b). The case for the Stanford-Binet L-M as a supplemental test. *Roeper Review*, 15(1), 34-37. Retrieved from http://www.gifteddevelopment.com/PDF_files/casesblm.pdf
- Simonton, D. K. (2003). Genius and *g*: Intelligence and exceptional achievement In H. Nyborg (Ed.), *The scientific study of general intelligence: Tribute to Arthur R. Jensen* (pp. 229-245). Oxford: Elsevier Science.
- Sisk, D. A. (1982). Caring and sharing: moral development of gifted students. *The Elementary School Journal*, 82(3), 221-229. Retrieved from <http://www.jstor.org/stable/1001572>.
- Soenens, B., Berzonsky, M. D., Vansteenkiste, M., Beyers, W., & Goossens, L. (2005). Identity styles and causality orientations: in search of the motivational underpinnings of the identity exploration process. *European Journal of Personality*, 19(5), 427-442. doi: 10.1002/per.551
- Soenens, B., Duriez, B., & Goossens, L. (2005). Social-psychological profiles of identity styles: attitudinal and social-cognitive correlates in late adolescence. *Journal of Adolescence*, 28(1), 107-125. doi: 10.1016/j.adolescence.2004.07.001
- Solomontos-Kountouri, O., & Hurry, J. (2008). Political, religious and occupational identities in context: Placing identity status paradigm in context. *Journal of Adolescence*, 31(2), 241-258. doi: 10.1016/j.adolescence.2007.11.006
- Sowell, E. J., Zeigler, A. J., Bergwall, L., & Cartwright, R. M. (1990). Identification and Description of Mathematically Gifted Students: A Review of Empirical Research. *Gifted Child Quarterly*, 34(4), 147-154. doi: 10.1177/001698629003400404

- Spearman, C. (1904). "General intelligence," objectively determined and measured. *The American Journal of Psychology*, 15(2), 201-292. Retrieved from <http://www.jstor.org/stable/1412107>.
- Spearman, C. (1927). *The abilities of man*. New York: Macmillan.
- St. Clair, S., & Day, H. (1979). Ego identity status and values among high school females. *Journal of Youth and Adolescence*, 8(3), 317-326. doi: 10.1007/bf02272797
- Steiner, H., & Carr, M. (2003). Cognitive Development in Gifted Children: Toward a More Precise Understanding of Emerging Differences in Intelligence. *Educational Psychology Review*, 15(3), 215-246. doi: 10.1023/a:1024636317011
- Stephen, J., Fraser, E., & Marcia, J. E. (1992). Moratorium-achievement (Mama) cycles in lifespan identity development: value orientations and reasoning system correlates. *Journal of Adolescence*, 15(3), 283-300. doi: 10.1016/0140-1971(92)90031-y
- Sternberg, R. J. (1996). What is mathematical thinking? In R. J. Sternberg & T. Ben-Zeev (Eds.), *The nature of mathematical thinking* (pp. 303 -318). New Jersey: Lawrence Erlbaum Associates.
- Straughan, R. (1985). Why act on Kohlberg's moral judgment? (Or how to reach Stage 6 and remain a bastard). In S. Modgil & C. Modgil (Eds.), *Lawrence Kohlberg: Consensus and controversy* (pp. 149 - 157). Philadelphia: The Falmer Press.
- Streitmatter, J. (1993a). Gender differences in identity development: An examination of longitudinal data. *Adolescence*, 28(109), 55-66.

- Streitmatter, J. (1993b). Identity status and identity style: A replication study. *Journal of Adolescence*, 16(2), 211-215. doi: 10.1006/jado.1993.1019
- Swanson, H. L., & Hill, G. (1993). Metacognitive aspects of moral reasoning and behavior. *Adolescence*, 28(111), 711 - 735.
- Swiatek, M. A. (1995). An empirical investigation of the social coping strategies used by gifted adolescents. *Gifted Child Quarterly*, 39(3), 154-160. doi: 10.1177/001698629503900305
- Swiatek, M. A. (2007). The talent search model. *Gifted Child Quarterly*, 51(4), 320-329. doi: 10.1177/0016986207306318
- Tall, D. O. (1991). The psychology of advanced mathematical thinking. In D. O. Tall (Ed.), *Advanced mathematical thinking* (pp. 3-21). Norwell, Massachusetts: Kluwer Academic Publishers.
- Tannenbaum, A. J. (1983). *Gifted children: Psychological and educational perspectives*. New York: Macmillan Publishing.
- Tannenbaum, A. J. (2000). Giftedness: The ultimate instrument for good and evil. In K. A. Heller, F. J. Monks & A. H. Passow (Eds.), *International handbook of research and development of giftedness and talent* (pp. 447 - 465). Oxford: Elsevier Science.
- Tannenbaum, A. J. (2003). Nature and nurture of giftedness. In N. Colangelo & G. A. Davis (Eds.), *Handbook of gifted education* (pp. 45 - 59). Boston: Allyn and Bacon.

- Tan-Willman, C., & Gutteridge, D. (1981). Creative thinking and moral reasoning of academically gifted secondary school adolescents. *Gifted Child Quarterly*, 25(4), 149-153. doi: 10.1177/001698628102500402
- Terman, L. M. (1921). Intelligence and its measurement: A symposium--II. *Journal of Educational Psychology*, 12(3), 127-133. doi: 10.1037/h0064940
- Terman, L. M. (1925). *Genetic studies of genius: Mental and physical traits of a thousand gifted children* (Vol. 1). California: Stanford University Press.
- Terman, L. M., & Oden, M. H. (1976). The Terman study of intellectually gifted children. In W. W. Dennis & M. Dennis (Eds.), *The intellectually gifted: An overview* (pp. 51 - 72). New York:: Grune & Stratton.
- Tesch, S. A., & Cameron, K. A. (1987). Openness to experience and development of adult identity. *Journal of Personality*, 55(4), 615-630. doi: 10.1111/j.1467-6494.1987.tb00455.x
- Thoma, S. J. (2002). An overview of the Minnesota approach to research in moral development. *Journal of Moral Education*, 31, 225-245. doi: 10.1080/0305724022000008098
- Thoma, S. J., Derryberry, P., & Narvaez, D. (2009). The distinction between moral judgment development and verbal ability: Some relevant data using socio-political outcome variables. *High Ability Studies*, 20(2), 173 - 185. doi: 10.1080/13598130903358535
- Thoma, S., Narvaez, D., Rest, J., & Derryberry, P. (1999). Does moral judgment development reduce to political attitudes or verbal ability? Evidence using the defining issues test. *Educational Psychology Review*, 11(4), 325-341. doi:

10.1023/a:1022005332110

- Thorbecke, W., & Grotevant, H. D. (1982). Gender differences in adolescent interpersonal identity formation. *Journal of Youth and Adolescence*, 11(6), 479-492. doi: 10.1007/bf01538808
- Thorndike, R. L. (1940). Performance of gifted children on tests of developmental age. *The Journal of Psychology*, 9, 337 - 343.
- Tirri, K., & Pehkonen, L. (2002). The moral reasoning and scientific argumentation of gifted adolescents. *Journal of Secondary Gifted Education*, 13(3), 120 - 131. doi: 10.4219/jsge-2002-374
- Toder, N. L., & Marcia, J. E. (1973). Ego identity status and response to conformity pressure in college women. *Journal of Personality and Social Psychology*, 26(2), 287-294. doi: 10.1037/h0034477
- Turiel, E. (1983). *The development of social knowledge: Morality and convention*. Cambridge: Cambridge University Press. .
- Turiel, E. (1998). The development of morality. In W.Damon & N. Eisenberg (Eds.), *Handbook of child psychology* (Vol. 3, pp. 863 - 932). New York: John Wiley & Sons.
- Undheim, J. O., & Gustafsson, J. E. (1987). The hierarchical organization of cognitive abilities: restoring general intelligence through the use of Linear Structural Relations (LISREL). *Multivariate Behavioral Research*, 22, 149-171. Retrieved from <http://jtoomim.org/brain-training/general%20intelligence%20equal%20to%20general%20fluid%20intelligence.pdf>

- Van Blerkom, M. L. (2009). *Measurement and statistics for teachers*. Oxford: Taylor & Francis.
- VanTassel-Baska, J. (1984). The talent search as an identification model. *Gifted Child Quarterly*, 28(4), 172-176. doi: 10.1177/001698628402800406
- VanTassel-Baska, J. (1986). The use of aptitude tests for identifying the gifted: The talent search concept. *Roeper Review: A Journal on Gifted Education*, 8(3), 185-189. doi: 10.1080/02783198609552970
- VanTassel-Baska, J. (1998). Characteristics and needs of talented learners. In J. VanTassel-Baska (Ed.), *Excellence in educating gifted and talented learners* (3rd ed., pp. 173 - 191). Denver: Love Publishing.
- Verba, S., Burns, N., & Schlozman, K. L. (1997). Knowing and caring about politics: gender and political engagement. *The Journal of Politics*, 59(4), 1051-1072 doi: 10.2307/2998592
- von Karolyi, C. (2006). Issue awareness in young highly gifted children: do the claims hold up? *Roeper Review*, 28 (3), 167-174. doi: 10.1080/02783190609554356
- Vondracek, F. W., Schulenberg, J., Skorikov, V., Gillespie, L. K., & Wahlheim, C. (1995). The relationship of identity status to career indecision during adolescence. *Journal of Adolescence*, 18(1), 17-29. doi: 10.1006/jado.1995.1003
- Wadsworth, B. J. (1971). *Piaget's theory of cognitive and affective development*. New York: David McKay Company.
- Walker, L. J. (1980). Cognitive and perspective taking prerequisites for moral development. *Child Development*, 51, 131 - 139. Retrieved from

<http://www.jstor.org/stable/1129599>.

Walker, L. J. (1982). The sequentiality of Kohlberg's stages of moral development. *Child Development*, 53(5), 1330-1336. Retrieved from <http://www.jstor.org/stable/1129023>.

Walker, L. J. (1984). Sex differences in the development of moral reasoning: A critical review. *Child Development*, 55, 677 - 691. Retrieved from <http://www.jstor.org/stable/1130121>.

Walker, L. J. (1989). A longitudinal study of moral reasoning. *Child Development*, 60, 157 - 166. doi: <http://www.jstor.org/stable/1131081>

Wanshaffe, K. R. (2001). *Are formal operations necessary for moral reasoning or ego identity achievement?* (Unpublished master's thesis), San Jose State University, California.

Wark, G. R., & Krebs, D. L. (1996). Gender and dilemma differences in real-life moral judgment. *Developmental Psychology*, 32(2), 220-230. doi: 10.1037/0012-1649.32.2.220

Waterman, A. S. (1982). Identity development from adolescence to adulthood: An extension of theory and a review of research. *Developmental Psychology*, 18(3), 341-358. doi: 10.1037/0012-1649.18.3.341

Waterman, A. S. (1985). Identity in the context of adolescent psychology. *New Directions for Child and Adolescent Development*, 1985(30), 5-24. doi: 10.1002/cd.23219853003

- Waterman, A. S. (1988). Identity status theory and Erikson's theory: Communalities and differences. *Developmental Review*, 8(2), 185-208. doi: 10.1016/0273-2297(88)90003-2
- Waterman, A. S. (1989). Curricula interventions for identity change: substantive and ethical considerations. *Journal of Adolescence*, 12(4), 389-400. doi: 10.1016/0140-1971(89)90062-6
- Waterman, A. S., & Waterman, C. K. (1972). Relationship between freshman ego identity status and subsequent academic behavior: A test of the predictive validity of Marcia's categorization system for identity status. *Developmental Psychology*, 6(1), 179. doi: 10.1037/h0032248
- Waterman, A. S., Geary, P. S., & Waterman, C. K. (1974). Longitudinal study of changes in ego identity status from the freshman to the senior year at college. *Developmental Psychology*, 10(3), 387-392. doi: 10.1037/h0036438
- Webb, J. T., Meckstroth, E. A., & Tolan, S. S. (1982). *Guiding the gifted child*. Columbus, OH: Ohio Psychology Publishing Company.
- Wells, M. A., Peltier, S., & Glickauf-Hughes, C. (1982). The analysis of the sex role orientation of gifted male and female adolescents. *Roeper Review*, 4(4), 46-48. doi: 10.1080/02783198209552639
- Wieczerkowski, W., Cropley, A. J., & Prado, T. M. (2000). Nurturing talents/gifts in Mathematics. In K. A. Heller, F. J. Mönks, R. J. Sternberg & R. F. Subotnik (Eds.), *International Handbook of giftedness and talent* (pp. 413 - 426). Oxford: Elsevier Science.

Williams, N., & Williams, S. (1970). *The moral development of children*. London: Macmillan.

Woodcock, R. W. (1998). Extending Gf - Gc theory into practice. In J. J. McArdle & R. W. Woodcock (Eds.), *Human cognitive abilities in theory and practice* (pp. 137-156). New Jersey: Lawrence Erlbaum Associates.

Yammarino, F. J., Skinner, S. J., & Childers, T. L. (1991). Understanding mail survey response behavior: A meta-analysis. *Public Opinion Quarterly*, 55(4), 613-639. doi: 10.1086/269284

Zuo, L. (2005). Gifted children's identity formation: Influential factors and significance. In A. Columbus (Ed.), *Advances in psychology research* (pp. 51 - 94). New York: Nova Science Publisher.

Zuo, L., & Cramond, B. (2001). An examination of Terman's gifted children from the theory of identity. *Gifted Child Quarterly*, 45(4), 251-259. doi: 10.1177/001698620104500403

Zuo, L., & Tao, L. (2001). Importance of personality in gifted children's identity formation. *The Journal of Secondary Gifted Education*, 14(4), 212 - 223. doi: 10.4219/jsge-2001-671

Appendices

Appendix A

UNSW Ethics Approval

3.2(a) Approval

THE UNIVERSITY OF NEW SOUTH WALES

Arts, Humanities & Law Human Research Ethics Advisory Panel

Date: 29/10/2008

Academic/Supervisor: Prof Miraca Gross, Dr. Putai Jin

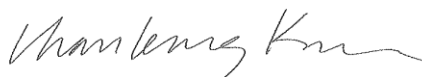
School: School of Education, Faculty of Art and Social Science

Title of Project: The development of moral reasoning and ego identity status of academically gifted adolescents

Reference Number: 08 2 129

Investigator: Mrs. Linda Winit

The Arts, Humanities & Law Human Research Ethics Advisory Panel has recommended to your Head of School/Unit/Centre and the Human Research Ethics Committee that this project, being of minimal ethical impact, may proceed. This approval is valid for 12 months from this date.



.....
Associate Professor Leong K. Chan
Convenor,
Arts, Humanities & Law Human Research Ethics Advisory Panel



.....
Professor Chris Davison
Head
School of Education

Appendix B

Parental consent form for gifted participants



Approval No. 08 2129

THE UNIVERSITY OF NEW SOUTH WALES

PARENTAL (OR GUARDIAN) INFORMATION STATEMENT

Attitudes towards social issues and self-understanding in adolescent students

Invitation and purpose of study

You are invited to permit your child to participate in a study of attitudes towards social issues and self-understanding of adolescent students at the secondary school level. We hope to investigate whether there will be any relationships between students' perception of self and their opinions about social issues. Your child was selected as a possible participant in this study because he/she has been identified as being academically gifted through his/her admission to either the Australian Secondary Schools Educational Talent Search (ASSETS) or the Australian Primary Talent Search (APTS) conducted by GERRIC at the University of New South Wales.

Description of study

If you decide to permit your child to participate, we would like to ask your child to complete the enclosed questionnaire at the time of his/her convenience and without the assistance of family or friends. There are two parts of the questionnaire, which will explore self-understanding and attitudes towards social issues in adolescence. The questionnaire will take approximately 30 to 40 minutes to complete and instructions are provided in each part of the questionnaire. *There are no right or wrong answers or responses:* it is important to us that your child chooses answers that he/she thinks are the closest to his/her opinions.

After your child has completed the questionnaire, please put it, together with the signed parental/ guardian consent form (which is attached), in the enclosed reply paid envelope and mail the envelope back to us. We ask that you return the completed documents to us by 31st January 2009.

Confidentiality and disclosure of information

Any information that is obtained in connection with this study and that can be identified with you or your child will remain confidential and will be disclosed only with your permission, except as required by law. In any publication, information will be presented in such a way that you or your child will not be able to be identified.

Your consent

Your decision whether to not to permit your child to participate will not affect you or your child's future relations with the University of New South Wales or GERRIC. If you decide to permit your child to participate, you are free to withdraw your consent and to discontinue your child's participation at any later time without prejudice.

Further questions, Complaints and Feedback to participants

If you have any additional questions or would like to receive a summary of research findings at the completion of the study, please feel free to contact Linda Yeh (phone 043 120 2852, email linda.winit@student.unsw.edu.au) or Professor Miraca Gross (phone 9385 1971, email m.gross@unsw.edu.au).

Should you have any complaints regarding this study, please direct your concerns to the Ethics Secretariat, The University of New South Wales, SYDNEY 2052 AUSTRALIA (phone 9385 4234, fax 9385 6648, email ethics.sec@unsw.edu.au). Any complaint you make will be investigated promptly and you will be informed of the outcome. You will be given a copy of this form to keep.

THE UNIVERSITY OF NEW SOUTH WALES

PARENTAL (OR GUARDIAN) INFORMATION STATEMENT (continued)*Attitudes towards social issues and self-understanding in adolescent students*

You are making a decision whether or not to permit your child to participate. Your signature indicates that, having read the information provided above, you have decided to permit your child to participate.

.....
Signature of Parent/Guardian

.....
Signature of Witness

.....
Please PRINT name

.....
Please PRINT name

.....
Date

.....
Nature of Witness

REVOCATION OF CONSENT BY PARENT (OR GUARDIAN)*Attitudes towards social issues and self-understanding in adolescent students*

I hereby wish to **WITHDRAW** my consent for my child/ward to participate in the research proposal described above and understand that such withdrawal **WILL NOT** jeopardise any treatment, or my child's relationship, with The University of New South Wales or GERRIC.

.....
Signature

.....
Date

.....
Please PRINT Name

The section for Revocation of consent by the parent/guardian should be forwarded to Linda Yeh (Winit), School of Education, University of New South Wales, Kensington, NSW 2052.

Appendix C

Participant consent form for gifted participants



Approval No. 08 2129

19th December 2008

Dear student,

Re: Participant Information Letter

You are invited to participate in a research study, which is supervised by Professor Miraca Gross and Dr. Putai Jin, on attitudes towards social issues and self-understanding of adolescent students at the secondary school level. You are selected as a possible participant in this study because you have been identified as being academically gifted on the basis of your admission to either the Australian Primary Talent Search (APTS) or the Australian Secondary Schools Educational Talent Search (ASSETS) conducted by the Gifted Education Research, Resource and Information Centre (GERRIC) at the University of New South Wales (UNSW).

Participation in this study is voluntary; however, we would be very grateful if you would agree to do so. If you decide to participate, we would like you to complete the enclosed questionnaire at the time of your convenience and without the assistance of your family or friends. The questionnaire will take approximately 30 to 40 minutes to complete. All information obtained in connection with this study will remain strictly confidential and will be disclosed only with your permission, except as required by law. We have provided a reply paid envelope that can be used for sending the completed questionnaire back to us, as well as a consent form that needs to be signed by you to fulfill legal requirements. We ask that you mail the completed documents back to us by **31st January 2009**.

If you have any questions about the questionnaire or this research, please feel free to contact me, Linda Yeh (phone 043 120 2852, email linda.winit@student.unsw.edu.au), or Professor Miraca Gross (phone 9385 1971, email m.gross@unsw.edu.au). Any queries that you may have in respect to ethical concerns may be directed to the Ethics Secretariat, The University of New South Wales, SYDNEY 2052 AUSTRALIA (phone 9385 4234, fax 9385 6648, email ethics.sec@unsw.edu.au).

You are advised that in the event that you decide not to participate in this study for any reason, your future relations with UNSW or GERRIC will not be affected in any way. If you decide to participate, you are free to withdraw your consent and to discontinue participation at any later time without prejudice.

Thank you in advance for your participation. We look forward to hearing from you.

Yours sincerely,

Linda Yeh (Winit)

THE UNIVERSITY OF NEW SOUTH WALES

PARTICIPANT INFORMATION STATEMENT AND CONSENT FORM*Attitudes towards social issues and self-understanding in adolescent students*

You are making a decision whether or not to participate. Your signature indicates that, having read the information provided above, you have decided to participate.

.....
Signature of Research Participant

.....
Signature of Witness

.....
(Please PRINT name)

.....
(Please PRINT name)

.....
Date

.....
Nature of Witness

REVOCATION OF CONSENT*Attitudes towards social issues and self-understanding in adolescent students*

I hereby wish to **WITHDRAW** my consent to participate in the research proposal described above and understand that such withdrawal **WILL NOT** jeopardise any treatment or my relationship with The University of New South Wales or GERRIC.

.....
Signature

.....
Date

.....
Please PRINT Name

The section for Revocation of consent by the parent/guardian should be forwarded to Linda Yeh, School of Education, University of New South Wales, Kensington, NSW 2052.

Appendix D

Instruments

ATTITUDES TOWARDS SOCIAL ISSUES AND SELF-UNDERSTANDING OF ADOLESCENTS

By completing this questionnaire you will be participating in research aimed to examine attitudes of high school students towards some social issues and self-understanding.

This questionnaire is in two parts. *First*, you will be asked your views about some social situations. *Second*, you will be asked some questions about your self-perceptions. You will be given instructions on how to complete each part of the questionnaire. Please complete **both** parts of the questionnaire.

All information supplied by you will be treated as confidential and you will not be identified in any way. The information gained from you will be analysed with other respondents, not individually; and the findings will be reported in group form.

Please answer **ALL** questions in the questionnaire. There are no “right” or “wrong” answers or responses. It is important that you choose answers or responses that are the closest to your opinions because it is your opinions that are the main focus of this study.

After completing both parts of the questionnaire, please send it, along with the signed consent form, back to us using the enclosed reply paid envelope by **31st January 2009**.

Thank you very much for your participation.

Participant's information

Please provide the following information about yourself, ticking boxes where appropriate or writing an answer where a space is provided.

1. Name: _____

2. Gender: ☐ Male ☐ Female

3. Age:

- | | |
|---------------------------------------|---------------------------------------|
| ☐ 13 years old | ☐ 14 years old |
| ☐ 15 years old | ☐ 16 years old |
| ☐ 17 years old | ☐ 18 years old |

4. Current Year level at school (Year level commencing Term 1, 2009):

- | | |
|----------------------------------|----------------------------------|
| ☐ Year 9 | ☐ Year 10 |
| ☐ Year 11 | ☐ Year 12 |

5. School currently attended: _____

Questionnaire Part 1:
Opinions about social problems

This questionnaire is aimed at understanding how people think about social problems. Different people often have different opinions about questions of right and wrong. There are no “right” answers in the way that there are right answers to maths problems. We would like you to tell us what you think about several problem stories. The papers will be fed to a computer to find the average for the whole group, and no one will see your individual answers.

* * * * *

In this questionnaire you will be asked to give your opinions about several stories. Here is a story as an example.

Frank Jones has been thinking about buying a car. He is married, has two small children and earns an average income. The car he buys will be his family's only car. It will be used mostly to get to work and drive around town, but sometimes for vacation trips also. In trying to decide what car to buy, Frank Jones realized that there were a lot of questions to consider. Below there is a list of some of these questions.

If you were Frank Jones, how important would each of these questions be in deciding what car to buy?

Instructions for Part A: (Sample Question)

On the left hand side check one of the spaces by each statement of a consideration. (For instance, if you think that statement #1 is not important in making a decision about buying a car, check the space on the right.)

IMPORTANCE:

Great	Much	Some	Little	No	
				✓	1. Whether the car dealer was in the same block as where Frank lives. (Note that in this sample, the person taking the questionnaire did not think this was important in making a decision)
✓					2. Would a <i>used</i> car be more economical in the long run than a <i>new</i> car (Note that a check was put in the far left space to indicate the opinion that this is an important issue in making a decision about buying a car.)
		✓			3. Whether the color was green, Frank's favorite color.
				✓	4. Whether the cubic inch displacement was at least 200. (Note that if you are unsure about what "cubic inch displacement" means, mark it "no importance".)
✓					5. Would a large, roomy car be better than a compact car?
				✓	6. Whether the front connibilies were differential. (Note that if a statement sounds like gibberish or nonsense to you, mark it "no importance".)

Instructions for Part B: (Sample Question)

From the list of questions above, select the most important one of the whole group. Put the number of the most important question on the top line below. Do likewise for your 2nd, 3rd and 4th most important choices. (Note that the top choices in this case will come from statements that were checked on the far left-hand side - statements #2 and #5 were thought to be very important. In deciding what is the *most* important, a person would re-read #2 and #5 and then pick one of them as the *most* important, then put the other one as "second most important" and so on.)

MOST IMPORTANT	2 ND MOST IMPORTANT	3 RD MOST IMPORTANT	4 TH MOST IMPORTANT
5	2	3	1

HEINZ AND THE DRUG

In Europe a woman was near death from a special kind of cancer. There was one drug that doctors thought might save her. It was a form of radium that a chemist in the same town had recently discovered. The drug was expensive to make, but the chemist was charging ten times what the drug cost to make. He paid \$200 for the radium and charged \$2,000 for a small dose of the drug. The sick woman's husband, Heinz, went to everyone he knew to borrow the money, but he could only get together about \$1,000, which is half of what it cost. He told the chemist that his wife was dying, and asked him to sell it cheaper or let him pay later. But the chemist said, "No, I discovered the drug and I'm going to make money from it." So Heinz got desperate and began to think about breaking into the man's store to steal the drug for his wife.

Should Heinz steal the drug? (Check one)

_____ Should steal it _____ Can't decide _____ Should not steal it

IMPORTANCE:

Great Much Some Little No

					1. Whether a community's laws are going to be upheld.
					2. Isn't it only natural for a loving husband to care so much for his wife that he'd steal?
					3. Is Heinz willing to risk getting shot as a burglar or going to jail for the chance that stealing the drug might help?
					4. Whether Heinz is a professional wrestler, or has considerable influence with professional wrestlers.
					5. Whether Heinz is stealing for himself or doing this solely to help someone else.
					6. Whether the chemist's rights to his invention have to be respected.
					7. Whether the essence of living is more encompassing than the termination of dying, socially and individually.
					8. What values are going to be the basis for governing how people act towards each other?
					9. Whether the chemist is going to be allowed to hide behind a worthless law which only protects the rich anyhow.
					10. Whether the law in this case is getting in the way of the most basic claim of any member of society.
					11. Whether the chemist deserves to be robbed for being so greedy and cruel.
					12. Would stealing in such a case bring about more total good for the whole society or not.

From the list of questions above, select the four most important and write down the number of the question in the space below:

Most important _____
Third most important _____

Second most important _____
Fourth most important _____

STUDENT TAKEOVER

At Harvard University a group of students, called the Students for a Democratic Society (SDS), believe that the University should not have an Army Reserve program. SDS students are against wars and the army training program helps send men and women to fight overseas. The SDS students demanded that Harvard end the Army Reserve training program as a university course. This would mean that Harvard students could not get army training as a part of their regular course work and not get credit for it towards their degrees.

Agreeing with the SDS students, the Harvard professors voted to end the Army Reserve program as a university course. But the President of the University stated that he wanted to keep the army program on campus as a course. The SDS students felt that the President was not going to pay attention to the faculty vote or to their demands.

So, one day last April, two hundred SDS students walked into the university's administration building and told everyone else to get out. They said they were doing this to force Harvard to get rid of the army training program as a course.

Should the students have taken over the administration building? (Check one)

_____ Yes, they should take it over _____ Can't decide _____ No, they shouldn't take it over

IMPORTANCE:

Great	Much	Some	Little	No	
					1. Are the students doing this to really help other people or are they doing it just for kicks?
					2. Do the students have any right to take over property that doesn't belong to them?
					3. Do the students realize that they might be arrested and fined, and even expelled from university?
					4. Would taking over the building in the long run benefit more people to a greater extent?
					5. Whether the President stayed within the limits of his authority in ignoring the faculty vote.
					6. Will the takeover anger the public and give all students a bad name?
					7. Is taking over a building consistent with principles of justice?
					8. Would allowing one student takeover encourage many other student takeovers?
					9. Did the President bring his misunderstanding on himself by being so unreasonable and uncooperative?
					10. Whether running the university ought to be in the hands of a few administrators or in the hands of all the people.
					11. Are the students following principles which they believe are above the law?
					12. Whether or not university decisions ought to be respected by students.

From the list of questions above, select the four most important and write down the number of the question in the space below:

Most important _____

Second most important _____

Third most important _____

Fourth most important _____

ESCAPED PRISONER

A man had been sentenced to prison for 10 years. After one year, however, he escaped from prison, moved to a new area of the country and took on the name of Thompson. For 8 years he worked hard, and gradually he saved enough money to buy his own business. He was fair to his customers, gave his employees top wages and gave most of his own profits to charity. Then, one day, Mrs. Jones, an old neighbor, recognized him as the man who had escaped from prison 8 years before, and whom the police had been looking for.

Should Mrs. Jones report Mr. Thompson to the police and have him sent back to prison? (Check one)

_____ Should report him _____ Can't decide _____ Should not report him

IMPORTANCE;

Great Much Some Little No

					13. Hasn't Mr. Thompson been good enough for such a long time to prove he isn't a bad person?
					14. Everytime someone escapes punishment for a crime, doesn't that just encourage more crime?
					15. Wouldn't we be better off without prisons and the oppression of our legal systems?
					16. Has Mr. Thompson really paid his debt to society?
					17. Would society be failing what Mr. Thompson should fairly expect?
					18. What benefits would prisons be apart from society, especially for a charitable man?
					19. How could anyone be so cruel and heartless as to send Mr. Thompson to prison?
					20. Would it be fair to all the prisoners who have to serve out their full sentences if Mr. Thompson was let off?
					21. Was Mrs. Jones a good friend of Mr. Thompson?
					22. Wouldn't it be a citizen's duty to report an escaped criminal, regardless of the circumstances?
					23. How would the will of the people and the public good best be served?
					24. Would going to prison do any good for Mr. Thompson or protect anybody?

From the list of questions above, select the four most important and write the number of the question in the space below:

Most important _____

Second most important _____

Third most important _____

Fourth most important _____

THE DOCTOR'S DILEMMA

A lady was dying of cancer which could not be cured and she had only about six months to live. She was in terrible pain, but she was so weak that a good dose of painkiller like morphine would make her die sooner. She was delirious and almost crazy with pain, and in her calm periods, she would ask the doctor to give her enough morphine to kill her. She said she couldn't stand the pain and that she was going to die in a few months anyway.

What should the doctor do? (Check one)

_____ He should give the lady an overdose that will make her die. _____ Can't decide _____ Should not give the overdose

IMPORTANCE:

Great Much Some Little No

					13. Whether the woman's family is in favor of giving her the overdose or not.
					14. Is the doctor obligated by the same laws as everybody else if giving her an overdose would be the same as killing her?
					15. Whether people would be much better off without society regimenting their lives and even their deaths.
					16. Whether the doctor could make it appear like an accident.
					17. Does the state have the right to force continued existence on those who don't want to live?
					18. What is the value of death prior to society's perspective on personal values?
					19. Whether the doctor has sympathy for the woman's suffering or cares more about what society might think.
					20. Is helping to end another's life ever a responsible act of cooperation?
					21. Whether only God should decide when a person's life should end.
					22. What values the doctor has set for himself in his own personal code of behavior?
					23. Can society afford to let everybody end their lives when they want to?
					24. Can society allow suicides or mercy killing and still protect the lives of individuals who want to live?

From the list of questions above, select the four most important and write down the number of the question in the space below:

Most important _____

Second most important _____

Third most important _____

Fourth most important _____

WEBSTER

Mr. Webster was the owner and manager of a petrol station. He wanted to hire another mechanic to help him, but good mechanics were hard to find. The only person he found who seemed to be a good mechanic was Mr. Lee, but he was Chinese. While Mr. Webster himself didn't have anything against Asians, he was afraid to hire Mr. Lee because many of his customers didn't like Asians. His customers might take their business elsewhere if Mr. Lee was working in the petrol station.

When Mr. Lee asked Mr. Webster if he could have the job, Mr. Webster said that he had already hired somebody else. But Mr. Webster really had not hired anybody, because he could not find anybody who was a good mechanic besides Mr. Lee.

What should Mr. Webster have done? (Check one)

_____ Should have hired Mr. Lee _____ Can't decide _____ Should not have hired him

IMPORTANCE:

Great Much Some Little No

					25. Does the owner of a business have the right to make his own business decisions or not?
					26. Whether there is a law that forbids racial discrimination in hiring for jobs.
					27. Whether Mr. Webster is prejudiced against Asians himself or whether he means nothing personal in refusing the job.
					28. Whether hiring a good mechanic or paying attention to his customers' wishes would be best for his business.
					29. What individual differences ought to be relevant in deciding how society's roles are filled?
					30. Whether the greedy and competitive capitalistic system ought to be completely abandoned.
					31. Do a majority of people in Mr. Webster's society feel like his customers or are a majority against prejudice?
					32. Whether hiring capable men and women like Mr. Lee would use talents that would otherwise be lost to society.
					33. Would refusing the job to Mr. Lee be consistent with Mr. Webster's own moral beliefs?
					34. Could Mr. Webster be so hard-hearted as to refuse the job, knowing how much it means to Mr. Lee?
					35. Whether the Christian commandment to love your fellow man applies in this case.
					36. If someone's in need, shouldn't he be helped regardless of what you get back from him?

From the list of questions above, select the four most important and write the number of the question in the space below:

Most important _____

Second most important _____

Third most important _____

Fourth most important _____

NEWSPAPER

Fred, a senior in high school, wanted to publish a mimeographed newspaper for students so that he could express many of his opinions. He wanted to speak out against the war and to speak out against some of the school's rules, like the rule forbidding boys to wear long hair.

When Fred started his newspaper, he asked his principal for permission. The principal said it would be all right if before every publication Fred would turn in all his articles for the principal's approval. Fred agreed and turned in several articles for approval. The principal approved all of them and Fred published two issues of the paper in the next two weeks.

But the principal had not expected that Fred's newspaper would receive so much attention. Students were so excited by the paper that they began to organize protests against the hair regulation and other school rules. Angry parents objected to Fred's opinions. They phoned the principal telling him that the newspaper was unpatriotic and should not be published. As a result of the rising excitement, the principal ordered Fred to stop publishing. He gave as a reason that Fred's activities were disruptive to the operation of the school.

Should the principal stop the newspaper? (Check one)

_____ Should stop it _____ Can't decide _____ Should not stop it

IMPORTANCE:

Great	Much	Some	Little	No	
					37. Is the principal more responsible to students or to the parents?
					38. Did the principal give his word that the newspaper could be published for a long time, or did he just promise to approve the newspaper one issue at a time?
					39. Would the students start protesting even more if the principal stopped the newspaper?
					40. When the welfare of the school is threatened, does the principal have the right to give orders to students?
					41. Does the principal have the freedom of speech to say "no" in this case?
					42. If the principal stopped the newspaper would he be preventing full discussion of important problems?
					43. Whether the principal's order would make Fred lose faith in the principal.
					44. Whether Fred was really loyal to his school and patriotic to his country.
					45. What effect would stopping the paper have on the student's education in critical thinking and judgments?
					46. Whether Fred was in any way violating the rights of others in publishing his own opinions.
					47. Whether the principal should be influenced by some angry parents when it is the principal that knows best what is going on in the school.
					48. Whether Fred was using the newspaper to stir up hatred and discontent.

From the list of questions above, select the four most important and write the number of the question in the space below:

Most important _____

Second most important _____

Third most important _____

Fourth most important _____

Questionnaire Part 2:

Self-understanding Questionnaire

Instruction

This questionnaire aims to ask for your opinions on how you perceive yourself. We would like to know the degree to which you agree or disagree with the statements provided in each item.

Please read each statement carefully and tick the column which most corresponds to your opinion, where:

- | | |
|----------------------|-------------------------|
| 1 = Strong Agree | 4 = Disagree |
| 2 = Moderately Agree | 5 = Moderately Disagree |
| 3 = Agree | 6 = Strongly Disagree |

You may begin by thinking about whether you agree or disagree with each statement. Then you can decide how strongly you feel about it.

There are no right or wrong responses. It is important to us that you choose answers that best suit your opinion and impression about yourself.

Please answer ALL questions in this questionnaire.

Item	Strongly Agree	Moderately Agree	Agree	Disagree	Moderately Disagree	Strongly Disagree
1. I have not chosen the occupation I really want to get into, and I am just working at what is available until something better comes along.	1	2	3	4	5	6
2. When it comes to religion I just have not found anything that appeals and I do not really feel the need to look.	1	2	3	4	5	6
3. My ideas about men's and women's roles are identical to my parents'. What has worked for them will obviously work for me.	1	2	3	4	5	6
4. There is no single "life style" which appeals to me more than another.	1	2	3	4	5	6
5. There are a lot of different kinds of people. I am still exploring the many possibilities to find the right kind of friends for me.	1	2	3	4	5	6
6. I sometimes join in recreational activities when asked, but I rarely try anything on my own.	1	2	3	4	5	6
7. I have not really thought about a "dating style". I am not too concerned whether I date or not.	1	2	3	4	5	6
8. Politics is something that I can never be too sure about because things change so fast. But I think it is important to know what I can politically stand for and believe in.	1	2	3	4	5	6
9. I am still trying to decide how capable I am as a person and what work will be right for me.	1	2	3	4	5	6
10. I do not give religion much thought and it does not bother me one way or the other.	1	2	3	4	5	6

Item	Strongly Agree	Moderately Agree	Agree	Disagree	Moderately Disagree	Strongly Disagree
11. There are so many ways to divide responsibilities in marriage. I am trying to decide what will work for me.	1	2	3	4	5	6
12. I am looking for an acceptable perspective for my own "life style", but I have not really found it yet.	1	2	3	4	5	6
13. There are many reasons for friendship, but I choose my close friends on the basis of certain values and similarities and I have personally decided on.	1	2	3	4	5	6
14. While I do not have one recreational activity I am really committed to, I am experiencing numerous leisure outlets to identify one I can truly enjoy.	1	2	3	4	5	6
15. Based on past experiences, I have chosen the type of dating relationship I want now.	1	2	3	4	5	6
16. I have not really considered politics. It just does not excite me much.	1	2	3	4	5	6
17. I might have thought about a lot of different jobs, but there is never really been any question since my parents said what they wanted.	1	2	3	4	5	6
18. A person's faith is unique to each individual. I have considered and reconsidered it myself and know what I can believe.	1	2	3	4	5	6
19. I have never really seriously considered men's and women's roles in marriage. It does not seem to concern me.	1	2	3	4	5	6
20. After considerable thought I have developed my own individual viewpoint of what is it for me an ideal "life style" and I do not believe anyone will be likely to change my perspective.	1	2	3	4	5	6
21. My parents know what is best for me in terms of how to choose my friends.	1	2	3	4	5	6
22. I have chosen one or more recreational activities to engage in regularly from lots of things and I am satisfied with those choices.	1	2	3	4	5	6
23. I do not think about dating much. I just kind of take it as it comes.	1	2	3	4	5	6
24. I guess I am pretty much like my folks when it comes to politics. I follow what they do in terms of voting and such.	1	2	3	4	5	6
25. I am not really interested in finding the right job, any job will do. I just seem to flow with what is available.	1	2	3	4	5	6
26. I am not sure what religion means to me. I would like to make up my mind but I am not done looking yet.	1	2	3	4	5	6
27. My ideas about men's and women's roles have come right for my parents and family. I have not seen any need to look further.	1	2	3	4	5	6
28. My own views on a desirable life style were taught to me by my parents and I do not see any need to question what they taught me	1	2	3	4	5	6

Item	Strongly Agree	Moderately Agree	Agree	Disagree	Moderately Disagree	Strongly Disagree
29. I do not have any real close friends, and I do not think I am looking for one right now.	1	2	3	4	5	6
30. Sometimes I join in leisure activities, but I really do not see a need to look for a particular activity to do regularly.	1	2	3	4	5	6
31. I am trying out different types of dating relationships. I just have not decided what is best for me.	1	2	3	4	5	6
32. There are so many different political parties and ideals. I cannot decide which to follow until I figure it all out.	1	2	3	4	5	6
33. It took me a while to figure it out, but now I really know what I want for a career.	1	2	3	4	5	6
34. Religion is confusing to me right now. I keep changing my views on what is right and wrong for me.	1	2	3	4	5	6
35. I have spent some time thinking about men's and women's roles in marriage and I have decided what will work best for me.	1	2	3	4	5	6
36. In finding an acceptable viewpoint to life itself, I find myself engaging in a lot of discussions with others and some self exploration.	1	2	3	4	5	6
37. I only pick friends my parents would approve of.	1	2	3	4	5	6
38. I have always liked doing the same recreational activities my parents do and have not ever seriously considered anything else.	1	2	3	4	5	6
39. I only go out with the type of people my parents expect me to date.	1	2	3	4	5	6
40. I have thought my political beliefs through and realize I can agree with some and not other aspects of what my parents believe.	1	2	3	4	5	6
41. My parents decided a long time ago what I should go into for employment and I am following through their plans.	1	2	3	4	5	6
42. I have gone through a period of serious questions about faith and can now say I understand what I believe in as an individual.	1	2	3	4	5	6
43. I have been thinking about the roles that husbands and wives play a lot these days, and I am trying to make a final decision.	1	2	3	4	5	6
44. My parents' views on life are good enough for me; I do not need anything else.	1	2	3	4	5	6
45. I have had many different friendships and now I have a clear idea of what I look for in a friend.	1	2	3	4	5	6
46. After trying a lot of different recreational activities I have found one or more I really enjoy doing by myself or with friends.	1	2	3	4	5	6
47. My preferences about dating are still in the process of developing. I have not fully decided yet.	1	2	3	4	5	6

Item	Strongly Agree	Moderately Agree	Agree	Disagree	Moderately Disagree	Strongly Disagree
48. I am not sure about my political beliefs, but I am trying to figure out what I can truly believe in.	1	2	3	4	5	6
49. I took me a long time to decide but now I know for sure what direction to move in for a career.	1	2	3	4	5	6
50. I attend the same church as my family has always attended. I have never really questioned why.	1	2	3	4	5	6
51. There are many ways that married couples can divide up family responsibilities. I have thought about lots of ways, and now I know exactly how I want it to happen for me.	1	2	3	4	5	6
52. I guess I just kind of enjoy life in general, and I do not see myself living by any particular viewpoint to life.	1	2	3	4	5	6
53. I do not have any close friends. I just like to hang around with the crowd.	1	2	3	4	5	6
54. I have been experiencing a variety of recreational activities in hope of finding one or more I can really enjoy for some time to come.	1	2	3	4	5	6
55. I have dated different types of people and know exactly what my own "unwritten rules" for dating are and who I will date.	1	2	3	4	5	6
56. I really have never been involved in politics enough to have made a firm stand one way or the other.	1	2	3	4	5	6
57. I just cannot decide what to do for an occupation. There are so many possibilities.	1	2	3	4	5	6
58. I have never really questioned my religion. If it is right for my parents it must be right for me.	1	2	3	4	5	6
59. Opinions on men's and women's roles seem so varied that I do not think much about it.	1	2	3	4	5	6
60. After a lot of self-examination I have established a very definite view on what my own life style will be.	1	2	3	4	5	6
61. I really do not know what kind of friend is best for me. I am trying to figure out exactly what friendship means to me.	1	2	3	4	5	6
62. All of my recreational preferences I got from my parents and I have not really tried anything else.	1	2	3	4	5	6
63. I date only people my parents would approve of.	1	2	3	4	5	6
64. My folks have always had their own political and moral beliefs about issues like abortion and mercy killing and I have always gone along accepting what they have.	1	2	3	4	5	6

Appendix E

First reminder letter for gifted participants



Approval No 08 2129

25th February 2009

Dear student,

Re: Research on the attitudes towards social issues and self-understanding of adolescents

On 19th December 2008, I mailed you an information and questionnaire package about a research study that I am currently conducting which focuses on attitudes towards social issues and self-understanding of adolescent students. I have not yet received a reply from you. I know your time is valuable and also that you may have been away on a holiday, but I am writing again to ask for your help by participating in the study as I have not received nearly as many replies as I need to be able to complete my PhD successfully.

As mentioned in the questionnaire package, you have been selected as a participant of this study because you have been identified as being academically gifted on the basis on your admission to either the Australian Secondary Schools Educational Talent Search (ASSETS) or the Australian Primary Talent Search (APTS). As a researcher in gifted education, I am very interested in finding out about academically gifted students' perceptions on prevailing social issues and self-understanding. I am *certain* that your participation in this study will contribute to gaining a greater breadth and depth in the understanding of academically gifted adolescent students' attitudes towards some social issues and their self-understanding.

I would greatly appreciate if you could return the completed questionnaire by 31st March 2009, or as soon as possible thereafter. I promise you that the task will require at most 30 to 40 minutes of your time to complete but it will be a donation of time that will assist me to complete my study.

In case you may have mislaid the original information and questionnaire package, or indeed in case it did not get to you, please contact me, Linda Yeh (phone 0431 202 852, email linda.winit@student.unsw.edu.au) and I will mail the questionnaire package to you. Please also feel free to contact me if you have any other questions in regard to this study.

Thank you in advance. I look forward to hearing from you.

Yours sincerely,

Linda Yeh (Winit)

Appendix F

Reminder letter for Highly Mathematically-Moderately Verbally gifted participants



Approval No 08 2129

25th February 2009

Dear student,

Re: Research on the attitudes towards social issues and self-understanding of adolescents

On 19th December 2008, I mailed you an information and questionnaire package about a research study that I am currently conducting which focuses on attitudes towards social issues and self-understanding of adolescent students. I have not yet received a reply from you. I know your time is valuable and also that you may have been away on a holiday, but I am writing again to ask for your help by participating in the study as I have not received nearly as many replies as I need to be able to complete my PhD successfully.

As mentioned in the questionnaire package, you have been selected as a participant of this study because you have been identified as being academically gifted on the basis on your admission to either the Australian Secondary Schools Educational Talent Search (ASSETS) or the Australian Primary Talent Search (APTS). As a researcher in gifted education, I am very interested in finding out about academically gifted students' perceptions on prevailing social issues and self-understanding. I am *certain* that your participation in this study will contribute to gaining a greater breadth and depth in the understanding of academically gifted adolescent students' attitudes towards some social issues and their self-understanding. It will be very interesting for the study to receive a reply from students like you who are particularly talented in mathematics.

I would greatly appreciate if you could return the completed questionnaire by 31st March 2009, or as soon as possible thereafter. I promise you that the task will require at most 30 to 40 minutes of your time to complete but it will be a donation of time that will assist me to complete my study.

In case you may have mislaid the original information and questionnaire package, or indeed in case it did not get to you, please contact me, Linda Yeh (phone 0431 202 852, email linda.winit@student.unsw.edu.au) and I will mail the questionnaire package to you. Please also feel free to contact me if you have any other questions in regard to this study.

Thank you in advance. I look forward to hearing from you.

Yours sincerely,

Linda Yeh (Winit)

Appendix G

Second reminder letter for gifted participants



Approval No. 08 2129

1st May 2009

Dear student,

Re: Request for participation in a research study

On the 19th December 2008 and 25th February 2009, I sent you information and questionnaire packages about a study that I am currently conducting. It seeks to explore adolescent students' perception on some prevailing social issues and their self-understanding. As mentioned in the previous letters, you have been selected as a participant in this study because you have been identified as being academically gifted on the basis of your admission to either the Australian Primary Talent Search (APTS) or the Australian Secondary Schools Educational Talent Search (ASSETS) conducted by the Gifted Education Research, Resource and Information Centre (GERRIC) at the University of New South Wales (UNSW).

It is voluntary to participate in this study. However, it would be greatly appreciated if you agree to do so. The questionnaire will take approximately 30 to 40 minutes of your time to complete. I ensure that information provided by you will be treated as strictly confidential and will be disclosed only with your permission, except as required by law. With this letter, I have attached a copy of the questionnaire, participant/ parental consent form and a reply paid envelope. I would like to ask you to complete the questionnaire and return it along with a signed consent form to me using the reply paid envelope provided.

I ask that you mail the completed documents back to me by **18th May 2009 or as soon as possible**. Your participation in this study will contribute to establishing a body of knowledge that has been lacking in the field of gifted education.

If you have any questions about the questionnaire or this research, please feel free to contact me, Linda Yeh (phone 043 120 2852, email linda.winit@student.unsw.edu.au), or Professor Miraca Gross (phone 9385 1971, email m.gross@unsw.edu.au). Any queries that you may have in respect to ethical concerns may be directed to the Ethics Secretariat, The University of New South Wales, SYDNEY 2052 AUSTRALIA (phone 9385 4234, fax 9385 6648, email ethics.sec@unsw.edu.au).

You are advised that in the event that you decide not to participate in this study for any reason, your future relations with UNSW or GERRIC will not be affected in any way. If you decide to participate, you are free to withdraw your consent and to discontinue participation at any later time without prejudice. Thank you in advance for your participation. I look forward to hearing from you.

Yours sincerely,

Linda Yeh (Winit)

Appendix H

Letter of support



1st May 2009

Dear student,

I am Professor Miraca Gross, Professor of Gifted Education and Director of the Gifted Education Research, Resource and Information Centre (GERRIC) at the University of New South Wales (UNSW). I am writing to ask for your support with a study being conducted by my PhD student, Linda Yeh.

You are probably acquainted with GERRIC as the Centre which conducts the Australian Primary Talent Search (APTS) and the Australian Secondary Schools Educational Talent Search (ASSETS) as you have participated in at least one of these testing programs. Apart from supporting educational needs of gifted and talented students, GERRIC also conducts and fosters research in the area of gifted education. Linda Yeh has completed a Master of Education degree with a focus on gifted education course components and is now enrolled in a PhD program in the School of Education here at UNSW under the supervision of myself and Dr. Putai Jin.

Her research focuses on attitudes towards social issues and self-understanding of academically gifted adolescent students. She is completing her degree and currently in the process of collecting data for analysis.

I would be grateful if you could help this very talented young woman by giving 30 to 40 minutes your time to complete the enclosed questionnaire, and return it to Linda as soon as possible. By assisting us, you will contribute to expanding knowledge and understanding of some aspects of the socio-affective development of Australian gifted and talented high school students.

Thank you in advance for your generous assistance.

Yours very sincerely,

Miraca U.M. Gross, PhD
Director: GERRIC

Appendix I

Email to participating teachers



Date.....

Dear (name),

Re: Research on the attitudes towards social issues and self-understanding of adolescents

On 9th January 2009, I visited a COGE class which you attended and asked for your assistance in my PhD study. I would like to express my sincere gratitude for your generous offer to participate in my study.

The study that I am currently undertaking is supervised by Professor Miraca Gross and Dr. Putai Jin from the School of Education at the University of New South Wales. It focuses on the development of moral reasoning and self-understanding of academically gifted students who enrol in Year 9, 10, 11 or 12.

One of the research objectives is to examine possible differences and/or similarities between academically gifted students and their age peers who are of average ability in the development of moral reasoning and self-understanding. In order to fulfil this objective, students who have not been identified as academically gifted are to be recruited.

I would greatly appreciate if you could nominate students who you think are *not* academically gifted who are currently in Year 9, 10, 11 or 12 in your classes. I would like to ask you to distribute the questionnaire package to students whom you wish to nominate. The nominated students will be asked to complete the questionnaire at home at the time of their convenience. After students complete the questionnaire, they are instructed to mail it back to me using an attached reply paid envelope. Details of instruction will be provided in the questionnaire package.

It is important to note that nominated students will be informed that they have been selected as possible participants in the study because they are in Year 9, 10, 11, or 12 which are year groups being examined. I assure you that *the students will not be acknowledged that the recruitment in the study is based on the fact that they are not academically gifted.*

Following this email, I ask that you confirm your postal address and number of questionnaires you wish to distribute. I sincerely appreciate your offer to assist in my study. Your knowledge and insight in gifted education is of great value in my study especially in identifying students who are not academically gifted.

If you have any queries in regards to the study, please contact me via this email address (linda.winit@student.unsw.edu.au) or mobile phone (0431 202 852).

Thank you again for your time. I look forward to hearing from you.

Yours faithfully,
Linda Yeh (Winit)

Appendix J

Parental consent form for participants not identified as gifted

Approval No 08 2129

THE UNIVERSITY OF NEW SOUTH WALES

PARENTAL (OR GUARDIAN) INFORMATION STATEMENT

Attitudes towards social issues and self-understanding in adolescent students

Invitation and purpose of study

You are invited to permit your child to participate in a study of attitudes towards social issues and self-understanding of adolescent students at the secondary school level. We hope to investigate whether there will be any relationships between students' perception of self and their opinions about social issues. Your child was selected as a possible participant in this study because he/she is in Year 9, 10, 11 or 12 and these are the year groups being examined in this study.

Description of study

If you decide to permit your child to participate, we would like to ask your child to complete the enclosed questionnaire at the time of his/her convenience and without the assistance of family or friends. There are two parts of the questionnaire, which will explore self-understanding and attitudes towards social issues in adolescence. The questionnaire will take approximately 30 to 40 minutes to complete and instructions are provided in each part of the questionnaire. *There are no right or wrong answers or responses*: it is important to us that your child chooses answers that he/she thinks are the closest to his or her opinions.

After your child has completed the questionnaire, please put it, together with the signed parental/ guardian consent form and participant consent form (which are attached), in the enclosed reply paid envelope and mail the envelope back to us. We ask that you return the completed documents to us by **10th April 2009**.

Confidentiality and disclosure of information

Any information that is obtained in connection with this study and that can be identified with you or your child will remain confidential and will be disclosed only with your permission, except as required by law. In any publication, information will be presented in such a way that you or your child will not be able to be identified.

Your consent

Your decision whether to not to permit your child to participate will not prejudice you or your child's future relations with the University of New South Wales. If you decide to permit your child to participate, you are free to withdraw your consent and to discontinue your child's participation at any later time without prejudice.

Further questions, Complaints and Feedback to participants

If you have any additional questions or would like to receive a summary of research findings at the completion of the study, please feel free to contact Linda Yeh (phone 043 120 2852, email linda.winit@student.unsw.edu.au) or Professor Miraca Gross (phone 9385 1971, email m.gross@unsw.edu.au).

Should you have any complaints regarding this study, please direct your concerns to the Ethics Secretariat, The University of New South Wales, SYDNEY 2052 AUSTRALIA (phone 9385 4234, fax 9385 6648, email ethics.sec@unsw.edu.au). Any complaint you make will be investigated promptly and you will be informed of the outcome. You will be given this form to keep.

THE UNIVERSITY OF NEW SOUTH WALES

PARENTAL (OR GUARDIAN) INFORMATION STATEMENT (continued)*Attitudes towards social issues and self-understanding in adolescent students*

You are making a decision whether or not to permit your child to participate. Your signature indicates that, having read the information provided above, you have decided to permit your child to participate.

.....
Signature of Parent/Guardian

.....
Signature of Witness

.....
Please PRINT name

.....
Please PRINT name

.....
Date

.....
Nature of Witness

REVOCATION OF CONSENT BY PARENT (OR GUARDIAN)*Attitudes towards social issues and self-understanding in adolescent students*

I hereby wish to **WITHDRAW** my consent for my child/ward to participate in the research proposal described above and understand that such withdrawal **WILL NOT** jeopardise any treatment, or my child's relationship, with The University of New South Wales.

.....
Signature

.....
Date

.....
Please PRINT Name

The section for Revocation of consent by the parent/guardian should be forwarded to Linda Yeh, School of Education, University of New South Wales, Kensington, NSW 2052.

Appendix K

Participant consent form for students not identified as gifted



Approval No. 08 2129

5 March 2009

Dear student,

Re: Participant Information Letter

You are invited to participate in a research study, which is supervised by Professor Miraca Gross and Dr. Putai Jin, on attitudes towards social issues and self-understanding of adolescent students at the secondary school level. You are selected as a possible participant in this study because you are in Year 9, 10, 11 or 12 and these are the year groups being examined in this study.

Participation in this study is voluntary; however, we would be very grateful if you would agree to do so. If you decide to participate, we would like you to complete the enclosed questionnaire at the time of your convenience and without the assistance of your family or friends. The questionnaire will take approximately 30 to 40 minutes to complete.

All information obtained in connection with this study will remain strictly confidential and will be disclosed only with your permission, except as required by law. We have provided a reply paid envelope that can be used for sending the completed questionnaire back to us, as well as consent forms that needs to be signed by you and your parent/ guardian to fulfill legal requirements. We ask that you mail the completed documents back to us by **10th April 2009.**

If you have any questions about the questionnaire or this research, please feel free to contact me, Linda Yeh (phone 043 120 2852, email linda.winit@student.unsw.edu.au), or Professor Miraca Gross (phone 9385 1971, email m.gross@unsw.edu.au). Any queries that you may have in respect to ethical concerns may be directed to the Ethics Secretariat, The University of New South Wales, SYDNEY 2052 AUSTRALIA (phone 9385 4234, fax 9385 6648, email ethics.sec@unsw.edu.au).

You are advised that in the event that you decide not to participate in this study for any reason, your future relations with the University of New South Wales will not be affected in any way. If you decide to participate, you are free to withdraw your consent and to discontinue participation at any later time without prejudice.

Thank you in advance for your participation. We look forward to hearing from you.

Yours sincerely,

Linda Yeh (Winit)

THE UNIVERSITY OF NEW SOUTH WALES
PARTICIPANT INFORMATION STATEMENT AND CONSENT FORM

Attitudes towards social issues and self-understanding in adolescent students

You are making a decision whether or not to participate. Your signature indicates that, having read the information provided above, you have decided to participate.

.....
 Signature of Research Participant

.....
 Signature of Witness

.....
 (Please PRINT name)

.....
 (Please PRINT name)

.....
 Date

.....
 Nature of Witness

REVOCATION OF CONSENT

Attitudes towards social issues and self-understanding in adolescent students

I hereby wish to **WITHDRAW** my consent to participate in the research proposal described above and understand that such withdrawal **WILL NOT** jeopardise any treatment or my relationship with The University of New South Wales.

.....
 Signature

.....
 Date

.....
 Please PRINT Name

The section for Revocation of consent by the parent/guardian should be forwarded to Linda Yeh, School of Education, University of New South Wales, Kensington, NSW 2052.

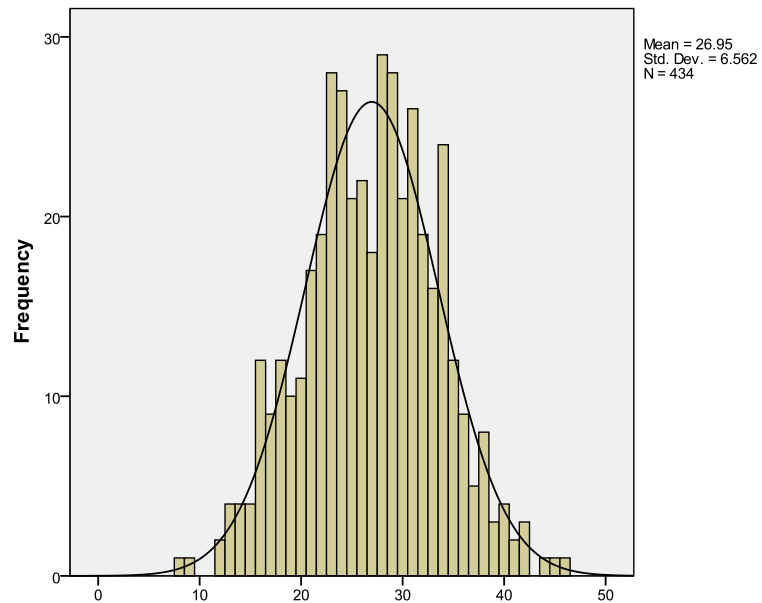
Appendix L

Cut-off points of the EOM-EIS-2 ideological, interpersonal, and total identity domains

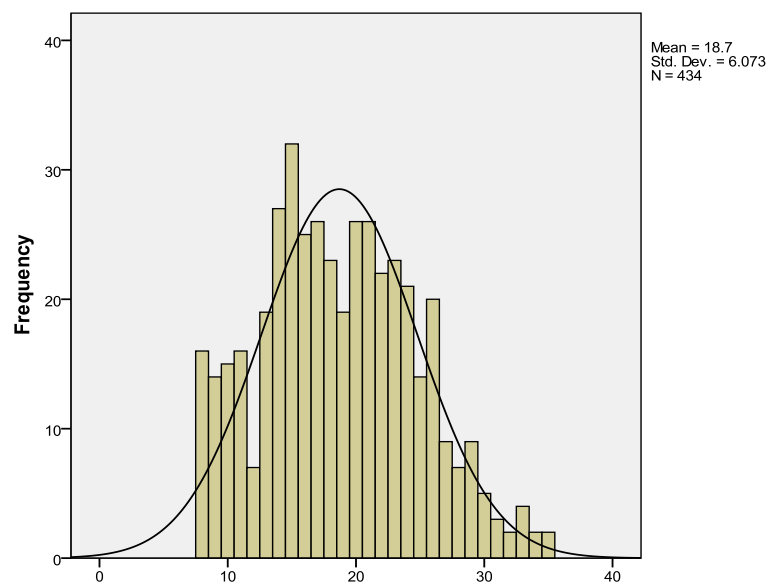
Status\ Domain	Ideological	Interpersonal	Total
Identity achievement	35	32	66
Moratorium	30	29	59
Foreclosure	22	22	43
Diffusion	30	27	56

Appendix M

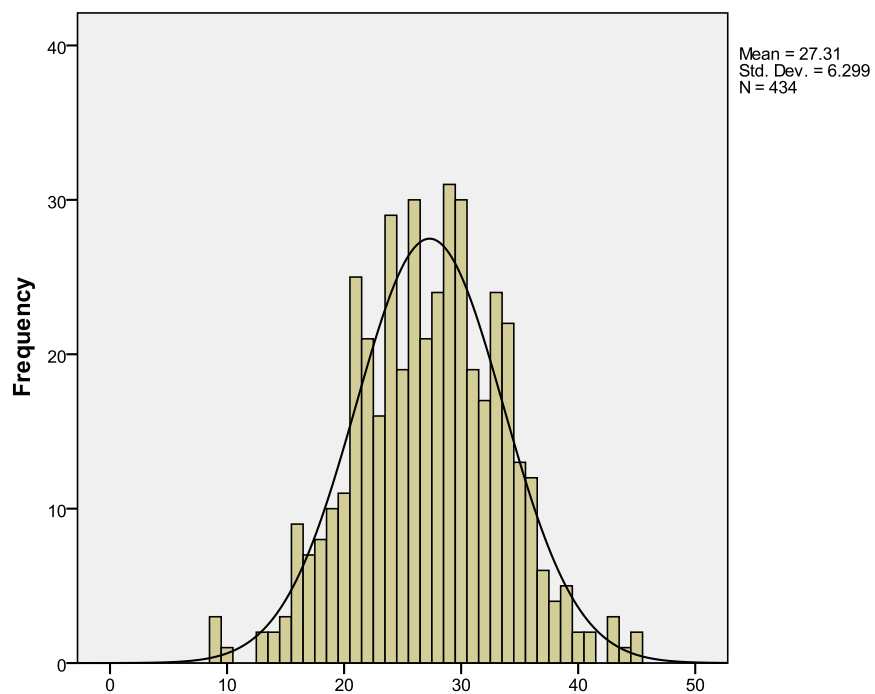
Histograms of the EOM-EIS-2 sub-scores



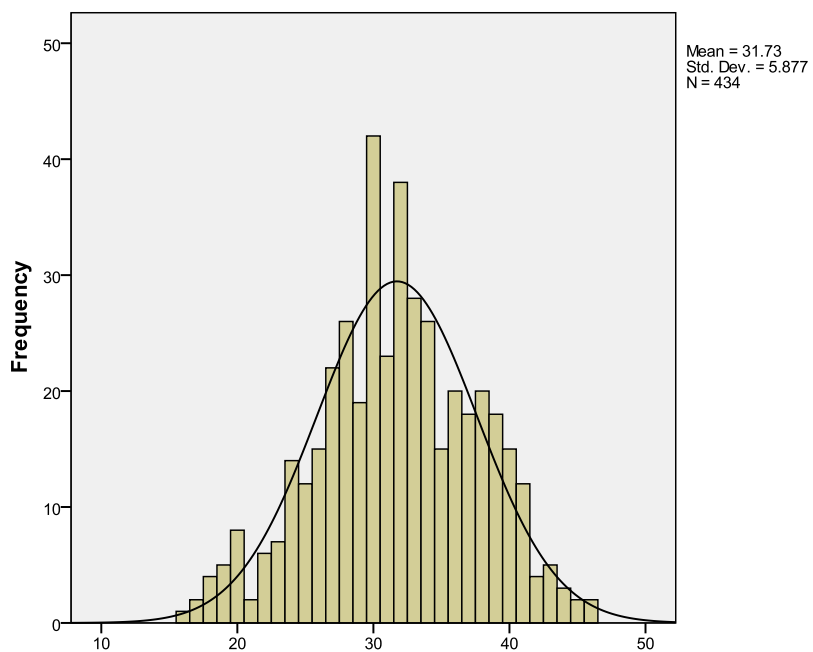
Histogram of the ideological diffusion scores



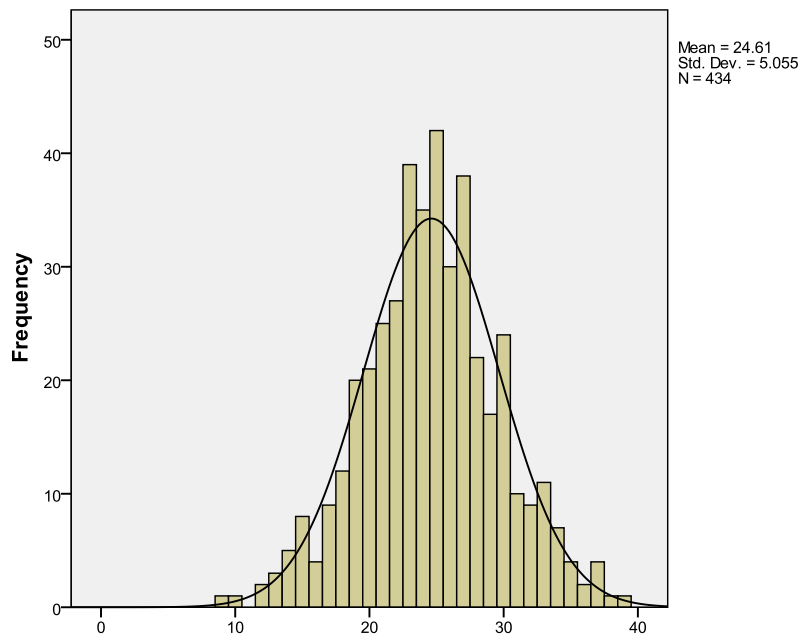
Histogram of the ideological foreclosure scores



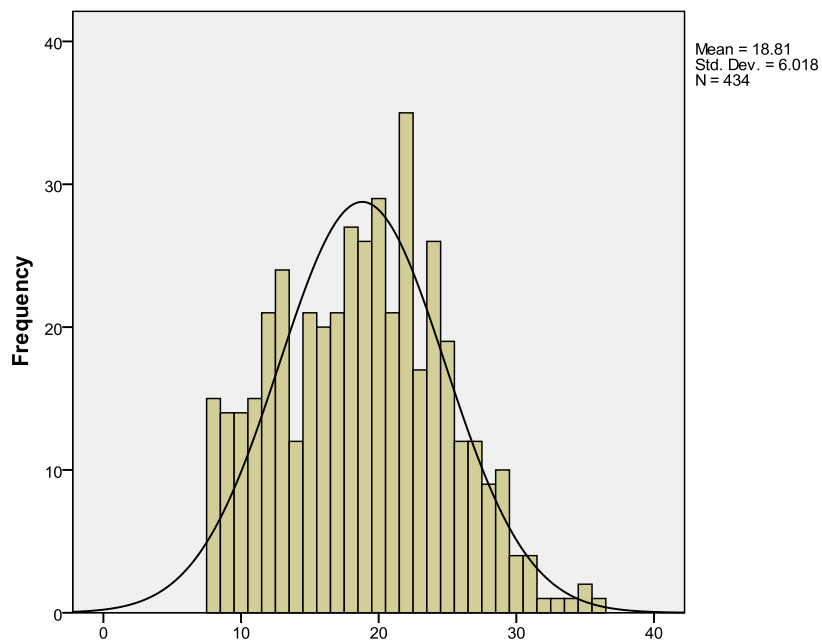
Histogram of the ideological moratorium scores



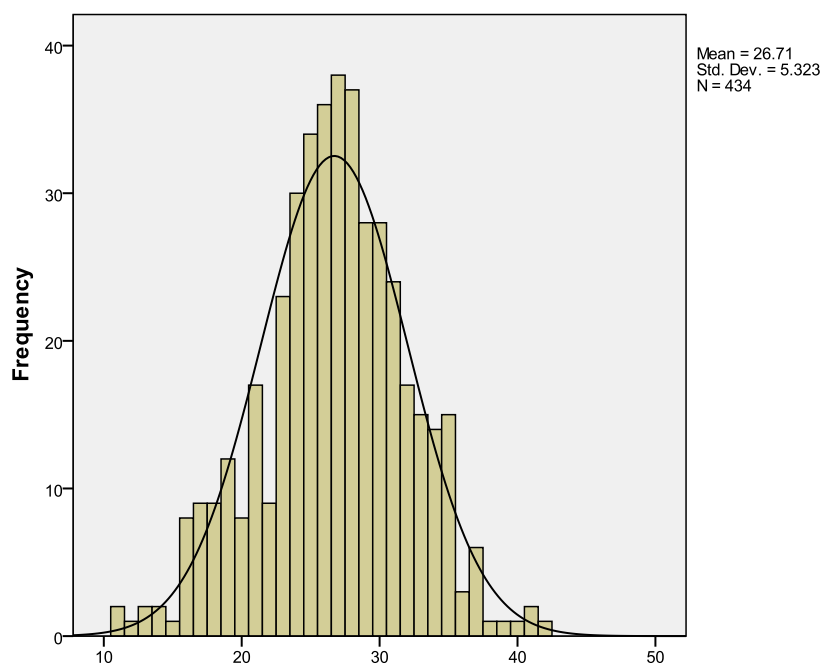
Histogram of the ideological achievement scores



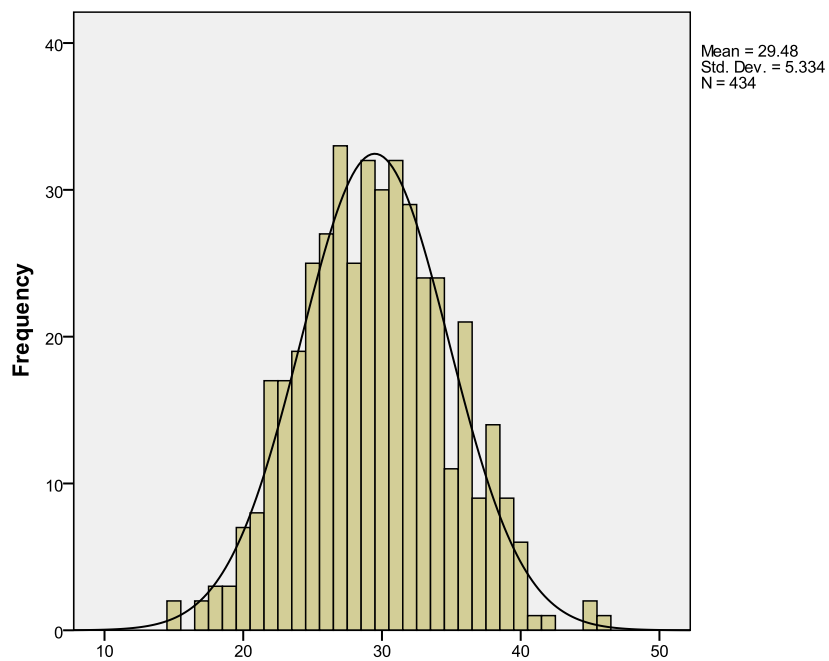
Histogram of the interpersonal diffusion scores



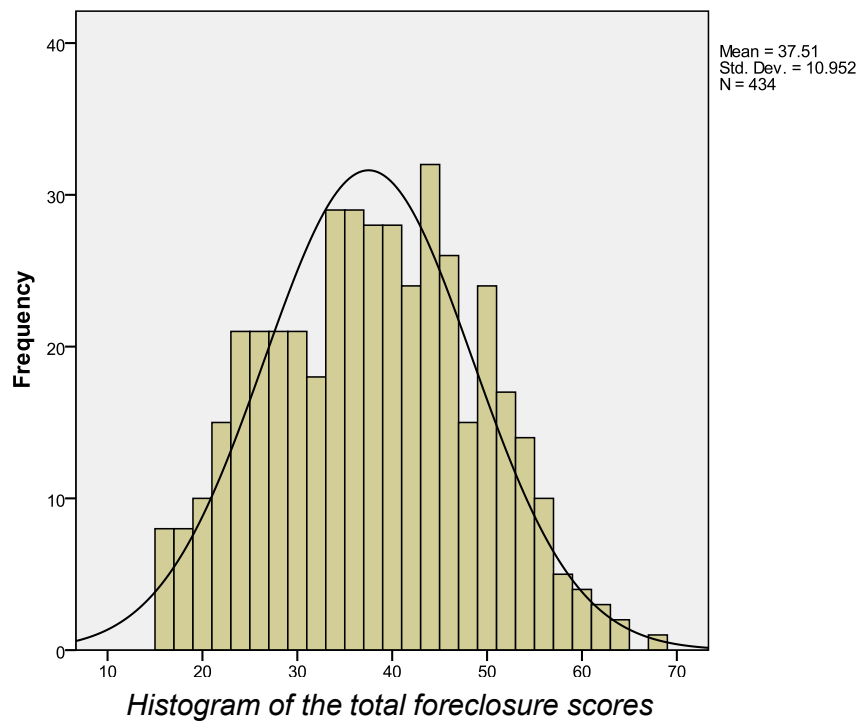
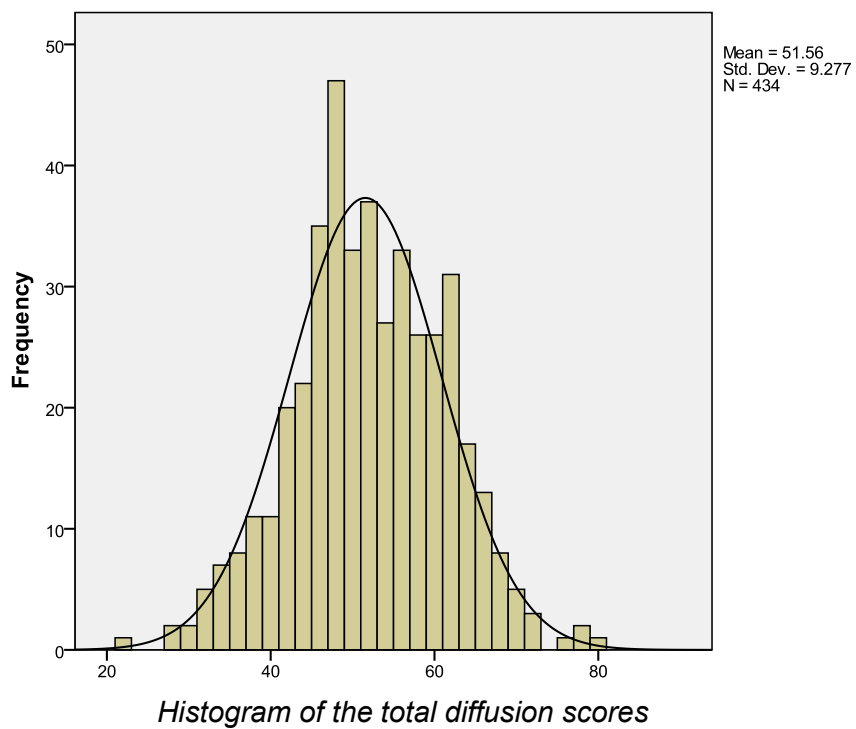
Histogram of the interpersonal foreclosure scores

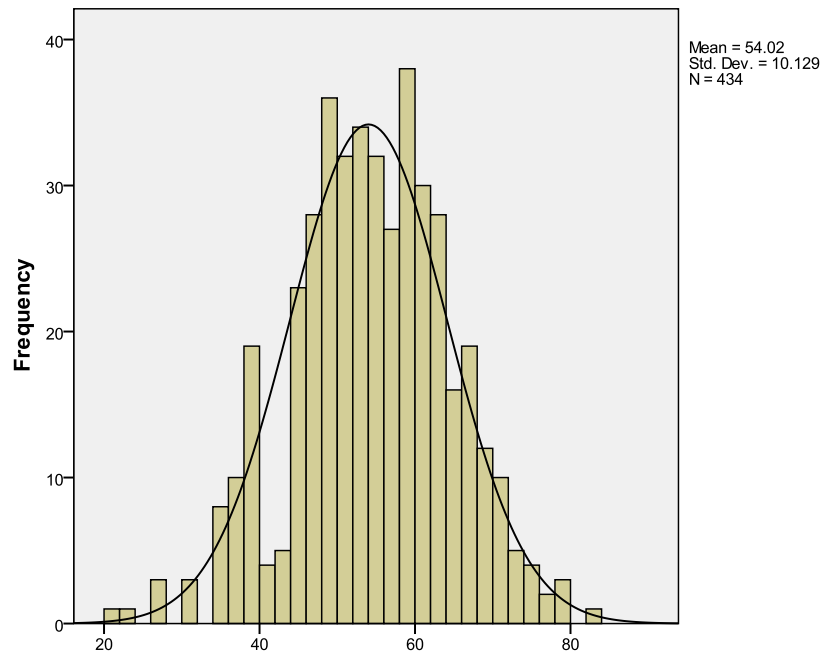


Histogram of the interpersonal moratorium scores

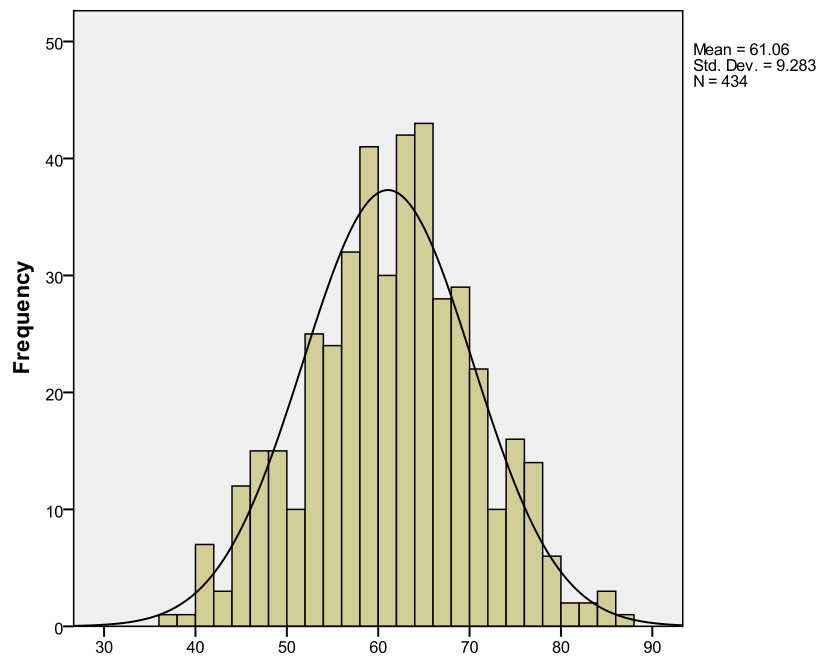


Histogram of the interpersonal achievement scores





Histogram of the total moratorium scores



Histogram of the total achievement scores

Appendix N

Means and standard deviations of each group on the EOM-EIS-2

Ability and Gender

Goup		ID DIF	ID FOR	ID MOR	ID ACH	IN DIF	IN FOR	IN MOR	IN ACH	TTL DIF	TTL FOR	TTL MOR	TTL ACH
Gifted	<i>M</i>	26.67	18.72	27.25	31.91	24.69	18.94	26.88	29.30	51.37	37.66	54.13	61.14
	<i>SD</i>	6.45	6.13	6.36	5.89	5.03	6.07	5.25	5.29	9.21	11.06	10.21	9.25
Gifted Female	<i>M</i>	25.86	18.36	28.41	31.91	23.96	18.18	27.31	29.55	49.82	36.54	55.73	61.41
	<i>SD</i>	6.20	5.86	6.40	5.68	5.06	5.59	5.25	4.94	8.96	10.24	10.28	8.92
Gifted Male	<i>M</i>	27.31	18.99	26.34	31.90	25.27	19.54	26.54	29.11	52.57	38.53	52.88	60.92
	<i>SD</i>	6.59	6.34	6.20	6.06	4.94	6.36	5.25	5.55	9.23	11.61	10.01	9.51
NGT	<i>M</i>	30.38	18.50	28.03	29.50	23.59	17.16	24.59	31.72	53.97	35.66	52.63	60.13
	<i>SD</i>	7.03	5.33	5.44	5.32	5.35	5.20	5.80	5.48	9.98	9.41	9.07	9.80
NGT Female	<i>M</i>	31.08	17.48	28.04	29.76	23.52	16.88	24.04	31.28	54.60	34.36	52.08	60.20
	<i>SD</i>	7.54	4.93	5.94	5.76	5.58	5.57	6.17	5.70	10.70	9.54	10.10	10.57
NGT Male	<i>M</i>	27.86	22.14	28.00	28.57	23.86	18.14	26.57	33.29	51.71	40.29	54.57	59.86
	<i>SD</i>	4.34	5.46	3.46	3.46	4.81	3.76	3.95	4.68	7.02	7.85	3.31	7.06

Note. ID DIF = Ideological Diffusion; ID FOR = Ideological Foreclosure; ID MOR = Ideological Moratorium; ID ACH = Ideological Achievement; IN DIF = Interpersonal Diffusion; IN FOR = Interpersonal Foreclosure; IN MOR = Interpersonal Moratorium; IN ACH = Interpersonal Achievement; TTL DIF = Total Diffusion; TTL FOR = Total Foreclosure; TTL MOR = Total Moratorium; TTL ACH = Total Achievement; NGT = Not identified as gifted.

Ability and Year in school

Goup		ID DIF	ID FOR	ID MOR	ID ACH	IN DIF	IN FOR	IN MOR	IN ACH	TTL DIF	TTL FOR	TTL MOR	TTL ACH
Gifted													
Lower High school	<i>M</i>	27.53	19.76	27.41	31.67	24.90	19.83	26.96	29.47	52.42	39.59	54.37	61.10
	<i>SD</i>	6.43	6.16	6.23	5.76	4.86	5.95	5.11	5.13	9.12	10.94	10.00	9.02
Upper High school	<i>M</i>	25.23	16.95	26.97	32.31	24.35	17.43	26.75	29.01	49.58	34.38	53.72	61.19
	<i>SD</i>	6.25	5.69	6.60	6.10	5.30	5.98	5.51	5.56	9.09	10.51	10.59	9.65
NGT													
Lower High school	<i>M</i>	32.25	18.88	29.00	29.63	26.38	18.00	25.38	32.38	58.63	36.88	54.38	60.50
	<i>SD</i>	8.41	4.16	6.30	2.39	6.28	3.93	4.44	6.37	12.50	7.49	9.07	8.18
Upper High school	<i>M</i>	29.75	18.38	27.71	29.46	22.67	16.88	24.33	31.50	52.42	35.25	52.04	60.00
	<i>SD</i>	6.60	5.75	5.24	6.03	4.79	5.61	6.25	5.29	8.76	10.08	9.18	10.45

Note. ID DIF = Ideological Diffusion; ID FOR = Ideological Foreclosure; ID MOR = Ideological Moratorium; ID ACH = Ideological Achievement; IN DIF = Interpersonal Diffusion; IN FOR = Interpersonal Foreclosure; IN MOR = Interpersonal Moratorium; IN ACH = Interpersonal Achievement; TTL DIF = Total Diffusion; TTL FOR = Total Foreclosure; TTL MOR = Total Moratorium; TTL ACH = Total Achievement; NGT = Not identified as gifted.

Level of mathematical giftedness and Level of verbal giftedness

Goup		ID DIF	ID FOR	ID MOR	ID ACH	IN DIF	IN FOR	IN MOR	IN ACH	TTL DIF	TTL FOR	TTL MOR	TTL ACH
Maths Giftedness													
Moderate	<i>M</i>	26.51	18.52	27.29	32.07	24.48	18.70	26.78	29.24	51.00	37.22	54.07	61.31
	<i>SD</i>	6.40	5.96	6.40	5.78	5.19	6.25	5.17	5.14	9.31	11.09	10.27	8.83
High	<i>M</i>	26.95	19.05	27.17	31.62	25.05	19.35	27.05	29.41	52.00	38.40	54.23	60.85
	<i>SD</i>	6.56	6.42	6.32	6.08	4.75	5.73	5.41	5.55	9.02	11.00	10.15	9.95
Verbal Giftedness													
Moderate	<i>M</i>	27.50	19.07	26.86	31.63	25.23	18.68	26.80	29.18	52.73	37.76	53.65	60.61
	<i>SD</i>	5.81	6.38	6.10	5.88	4.89	6.50	4.83	5.23	8.50	11.67	9.45	9.04
High	<i>M</i>	26.24	18.53	27.46	32.05	24.41	19.08	26.92	29.37	50.65	37.60	54.38	61.41
	<i>SD</i>	6.74	6.01	6.50	5.90	5.09	5.83	5.47	5.33	9.49	10.75	10.60	9.36

Note. ID DIF = Ideological Diffusion; ID FOR = Ideological Foreclosure; ID MOR = Ideological Moratorium; ID ACH = Ideological Achievement; IN DIF = Interpersonal Diffusion; IN FOR = Interpersonal Foreclosure; IN MOR = Interpersonal Moratorium; IN ACH = Interpersonal Achievement; TTL DIF = Total Diffusion; TTL FOR = Total Foreclosure; TTL MOR = Total Moratorium; TTL ACH = Total Achievement; NGT = Not identified as gifted.