Idiocentrism-allocentrism and academics' self-efficacy in research in Beijing universities

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Idiocentrism-Allocentrism and Academics’ Self-efficacy in Research in Beijing Universities

By

Jingsong Zhao

Submitted to the School of Education, the University of New South Wales, in fulfilment of the requirements for the degree of Master of Educational Administration by Research

2003
Abstract

The context for this study was academics’ research activity in higher education in Beijing, where, in recent times, higher education reform has taken place.

The main research aim was to investigate self-efficacy in research activity. In particular, relationships were examined between self-efficacy in research and research productivity and between self-efficacy in research and idiocentrism.allocentrism.

A questionnaire was administered to a random sample of 296 academics, who varied in terms of rank, age and tenure in the higher education sector, selected from universities in Beijing. Analysis was carried out using principal axis factoring and multiple regression.

Self-efficacy in research was related to gender difference. Female academics reported lower levels of self-efficacy in research than males. A second factor related to self-efficacy in research was academic discipline. Academics in the Social Sciences reported lower levels of self-efficacy in research than those in the Natural Sciences. Relationships were also found between self-efficacy in research and idiocentrism.allocentrism, self-efficacy in research and collective efficacy in departmental research.
In summary, the conclusion was that idiocentrism-allocentrism mediated the level of academics’ self-efficacy in research. Significant difference in self-efficacy in research was found between male and female academics in Beijing universities.
Acknowledgements

I wish to thank my supervisor, Dr. John McCormick, and co-supervisor, Dr. Katherine Hoekman. The thesis could not have been completed without their persistent and kind support.

I also wish to thank my family and friends for so much support through the two and a half years of my study.
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Chapter one: Introduction
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2.1. Introduction

This chapter first provides a theoretical perspective of individualism and collectivism. Individualism and collectivism are terms used to explain cultural similarities and differences. The terms idiocentrism and allocentrism are also used to explain differences, at the individual level, equivalent to individualism and collectivism. This review then focuses on such concepts as self-construal and preference for group work, which are related to individualism and collectivism. Moving from the cultural level to the individual level is not a simple process because the relationships and functions found at the cultural level may not be applicable at the individual level (Hofstede, 2001; Smith & Bond, 1999). Since this study was carried out within a culture, the implications of moving from the cultural to the individual level will be addressed.

Secondly, theoretical perspectives regarding self-efficacy and collective efficacy are provided. As predictors of individual and collective behaviours, self-efficacy and collective-efficacy are likely to be related to idiocentrism and allocentrism. The review draws attention to previous studies that illuminated the interrelationships among self-efficacy and idiocentrism-allocentrism concepts. Finally, the research questions and hypotheses
derived from the conceptual framework are proposed.

2.2. Individualism and collectivism

2.2.1. Individualism and collectivism at the cultural level

*Hofstede’s work-related values study*

Social researchers have paid attention to how group members relate to one another for almost the last 100 years (Earley & Gibson, 1998). Parsons and Shils (1951), for example, used self and collective orientation to report how individuals related to one other. More recently, Hofstede’s individualism and collectivism distinction has been dominant in this area (Earley & Gibson, 1998).

Hofstede (1980) conducted an international survey among IBM’s employees when he was the head of this computer company’s personnel research team in Europe. Comprehensive data were collected from IBM’s 117,000 employees all around the world during the late 1960s and early 1970s, which allowed Hofstede to compare different work-related values among countries. Factor analyzing a sample of forty countries, Hofstede (1980) categorized the countries along four dimensions: power distance, uncertainty avoidance, individualism-collectivism, and masculinity-femininity.
Power distance refers to “the extent to which the less powerful members of institutions and organizations within a country expect and accept that power is distributed unequally” (Hofstede, 2001, p.98). Uncertainty avoidance refers to “the extent to which the members of a culture feel threatened by uncertain or unknown situations” (Hofstede, 2001, p.161). Individualism-collectivism is the focus of this study: “Individualism stands for a society in which the ties between individuals are loose. Everyone is expected to look after him/herself and her/his immediate family only. Collectivism stands for a society in which people from birth onwards are integrated into strong, cohesive in-groups, which throughout people’s lifetime continue to protect them in exchange for unquestioning loyalty” (Hofstede, 2001, p.225). Masculinity–femininity is a cultural dimension drawn on the basis of gender role patterns in society: “Masculinity stands for a society in which social gender roles are clearly distinct: Men are supposed to be assertive, tough, and focused on material success; women are supposed to be more modest, tender, and concerned with the equality of life. Femininity stands for a society in which social gender roles overlap: Both men and women are supposed to be modest, tender, and concerned with the quality of life” (Hofstede, 2001, p.297).

In 1982, Hofstede extended the list of counties surveyed and replicated this survey in another 10 countries and three regions. In a later joint study with
Michael Harris Bond (Chinese Culture Connection, 1987, cited in Smith & Bond, 1999), Hofstede identified a fifth cultural dimension: long-term and short-term orientation: “Long term orientation stands for the fostering of virtues oriented towards future rewards, in particular, perseverance and thrift. Its opposite pole, short term orientation, stands for the fostering of virtues related to the past and present, in particular, respect for tradition, preservation of ‘face’ and fulfilling social obligations” (Hofstede, 2001, p.359). This distinction was drawn from the analysis of data collected from 230 students among 23 countries using the “Chinese Value Survey”. In addition, the “Chinese Value Survey” identified and confirmed Hofstede’s first three dimensions, namely, power distance, individualism-collectivism and masculinity-femininity (Hofstede, 2001).

Hofstede (1980) measured national differences in individualism-collectivism in the computer company IBM by using the Individualism Index (IDV), which comprised 14 work goals items. In workplace motivation theories, motivating goals are normally divided into intrinsic goals (work related) and extrinsic goals (non-work related) (Hofstede, 2001). Hofstede (1980) found that the work goals in individualist countries emphasized independence from the organization, while those in collectivist countries emphasized dependence on the organization. Of relevance here, is the finding that Hong Kong, Singapore and Taiwan were in the pool of
countries with low IDV values, ranking 37, 39 and 44 respectively. All three of these countries or areas are mainly populated by Chinese.

To some extent, individualism and collectivism are characterized by distinguishing patterns in terms of the way in which members relate to one another within a group, and to their group. These patterns symbolize values, beliefs or norms in a social context and thus affect an individual’s behaviour preferences. As a country characteristic, the dimension of individualism and collectivism describes the individuality and collectivity that prevails in a given society (Hofstede, 2001). Hofstede (1980) also found that the level of individualism and collectivism was a powerful predictor of the level of economic development of a country, and vice versa.

**Individualism and collectivism as a multidimensional construct**

Triandis (1996) took the view that individualism and collectivism is a multidimensional construct and should be defined “polythetically” (p.410). He illustrated this using the metaphor of a bird. The bird can be defined by a few attributes, such as feathers and wings. Additional attributes then form many subcategories, such as canary and sparrow. Triandis (1995) identified four key attributes of individualism and collectivism. The first is the conception of the self, in fact, this is similar to the concept of self-construal that will be discussed later. Individualists tend to refer to the self as an
autonomous entity independent of groups, whereas, collectivists tend to refer to the self in terms of connectedness to others within groups. Secondly, priority is given to personal goals or collective goals. Triandis (1989) argued that personal goals are given priority to group goals in individualist cultures, whereas, group goals are given priority to personal goals in collectivist cultures. Thirdly, individualism and collectivism emphasize different relationships: individualism emphasizes exchange and rationality relationships, and collectivism emphasizes communal relationships. Finally, the relative importance of attitudes and norms differentiates collectivism from individualism. Triandis (1995) argued that social behaviours of collectivists are more like to be driven by social norms, duties and obligations, and those of individualists are more likely to be driven by personal beliefs, values and attitudes. In addition to these four attributes, Triandis (1995) also identified another 60 attributes to demonstrate subtle differences between cultures.

Although why individualism and collectivism, rather than other dimensions, have drawn more attention from researchers is beyond this study, the high correlations among Hofstede’s (1980) four dimensions suggest that there is overlap in reflecting cultural differences, that is, one dimension may partially represent other dimensions (Earley & Gibson, 1998). For example, Hofstede (2001) found a strong negative relationship between
individualism and power distance. More specifically, high power distance tended to be associated more with collectivism and low power distance tended to be associated more with individualism. Smith and Bond (1999) argued that the fact that other dimensions were less consistently supported by “subsequent results and theorizing” than individualism and collectivism might be why researchers did not employ other dimensions (p.48).

However, Hofstede (2001) argued that why he treated power distance as a different dimension from individualism and collectivism were threefold. First, they were conceptually different. Second, power distance was not related to individualism and collectivism in all the countries. Third, both dimensions were related to a third variable, national wealth, which implied that national wealth was predictive of both, but they did not predict each other. Some researchers proposed that Masculinity has similar values to individualism, while Femininity has similar values to collectivism, that is, masculinity-femininity might be one aspect of individualism-collectivism. Hofstede (2001), however, argued that they are conceptually different and statistically independent from one another. In fact, masculinity-femininity and individualism-collectivism are related in some countries (Hofstede, 2001). For example, in Hofstede’s study (1980), Hong Kong, mainly populated by Chinese, is a high masculinity and high collectivism area and Netherlands is a low masculinity and high individualism country. Hence,
Hofstede (2001) argued that masculinity was not necessarily related to individualism and femininity was not necessarily related to collectivism, and vice versa.

With individualism and collectivism conceptualized as a multifaceted and multidimensional cultural syndrome, Triandis (1995) identified vertical and horizontal dimensions of individualism and collectivism, which produce four types, namely, horizontal individualism (HI), vertical individualism (VI), horizontal collectivism (HC) and vertical collectivism (VC). Vertical cultures emphasize hierarchy while horizontal cultures emphasize equality.

According to Triandis and Gelfand (1998), the difference between horizontal collectivists and vertical collectivists lies in the extent to which they easily submit to the will of group authorities. More specifically, vertical collectivists are more likely to submit to the will of authority and focus on the hierarchical relationship, whereas horizontal collectivists are more concerned about peer relationships. Vertical collectivists value in-groups, in-group goals and absolute in-group authorities. They are more likely to submit to the will of group authorities although the requirement is extremely distasteful to them but doing so will benefit the in-group. Horizontal collectivists would like to be similar to others and emphasize interdependence and sociability, but they do not submit easily to authority. Horizontal individualists want to be different from others or from groups,
whereas vertical individualists want to be the best.

The vertical-horizontal distinction enables examination of individualism and collectivism in depth. It encourages further classifications of different types of individualism and collectivism. Although power distance and individualism-collectivism are different dimensions, Hofstede admitted they are related to one another and Triandis’s vertical and horizontal distinction is similar to power distance (Hofstede, 2001).

**Evaluation and application of Hofstede’s study**

Smith and Bond (1999, p.45) wrote that in terms of extent and global coverage, Hofstede’s study “until very recently has been, unrivalled.” The publication of his classic work, *Culture’s Consequences* (1980), so far has ignited the enthusiasm of many cross-cultural researchers, especially for individualism and collectivism. An important contribution of the individualism–collectivism construct is to make cross-cultural psychology researchers realize that traditional psychology developed in the western world is not universal. Traditional psychology was developed in individualist cultures without considering particular social context (Hofstede, 2001).

However, Hui (1988) argued that Hofstede’s work-related value study was problematic in being confined to the work setting. Another criticism
concerns the measures of Hofstede’s study. Wagner and Moch (1986) argued that there was one conceptual weakness in Hofstede’s measure of individualism and collectivism. For example, the measure is too unidimensional to identify subtle differences in individualism and collectivism within cultures. In addition, they argued that Hofstede’s measure failed to distinguish between beliefs, values and norms that were different from each other (Wagner & Moch, 1986).

Hofstede (2001) pointed out that his model has been applied in three ways. First it has been reviewed and criticized across many areas or disciplines. Earley and Gibson (1998), for example, reviewed research progress in individualism and collectivism for almost one century. Second, researchers have replicated or extended Hofstede’s dimensions to other countries. For example, the Institute for Research on Intercultural Cooperation initiated the Value Survey Model (VSM) in 1981. Since then, VSM has been modified a few times (Hofstede, 2001). The items in the VSM were based on Hofstede’s IBM questionnaire. Hofstede (2001) argued that the VSM was designed for cross-cultural study, comparing two or more countries, regions, or ethnic groups and could not be used as a personality test for comparing individuals within countries. In addition, some other cross-cultural studies attempted to link their findings to Hofstede’s dimension model, especially in terms of distinguishing between individualism and
collectivism. For example, Israeli psychologist Shalom Schwartz (1992, 1994) conducted a values survey in more than 44 countries. He attempted to confirm the correlation between his 56 values and Hofstede’s dimensions. Finally, many researchers used the dimension as a paradigm (Hofstede, 2001).

**Schwartz’s value study**

In order to identify cross-cultural differences in value priorities, Schwartz (1992, 1994) conducted a values study with elementary school teachers and university students. Data were collected from 44 countries, with more than 25,000 respondents. Schwartz clustered his 56 values into seven categories at the beginning. Later, he identified 10 universal values across different cultures, namely self-direction (freedom, creativity, independent, choosing one’s own goals, curiosity, self-respect), stimulation (liking an exciting life, a varied life, being daring), hedonism (pleasure, enjoying life), achievement (ambition, influence, capability, success, intelligence, self-respect), power (social power, wealth authority, preserving one’s public image, social recognition), security (national security, reciprocation of favours, family security, sense of belonging, social order, health, cleanliness), conformity (obedience, self-discipline, politeness, honouring of parents and elders), traditionalism (respect for tradition, devoutness, accepting one’s portion in life, humility, moderation), benevolence
(helpfulness, responsibility, forgiveness, honesty, loyalty, mature love, true friendship) and universalism (equality, unity with nature, wisdom, a world of beauty, social justice, broad-mindedness, protecting the environment, a world at peace).

According to Schwartz, values “differ from attitudes primarily in their generality or abstractness and in their hierarchical ordering by importance” (Schwartz, 1992, p.4). At the individual level, Schwartz (1992) argued that five value types served primarily individual interests, namely, power, achievement, hedonism, stimulation, self-direction. Three value types served primarily collective interests, namely, benevolence, tradition, conformity. Universalism and security serve both types of interests.

Even though, Schwartz’s study was carried out at the individual level, cross-cultural samples allowed him to relate his findings to Hofstede’s individualism and collectivism constructs. In further study, Schwartz (1994) found individualism was related to such values as hedonism, stimulation and self-direction. Collectivism was related to such values as conformity, traditionalism and security. The values unrelated to both individualism and collectivism included power, achievement, universalism and benevolence.

Triandis (1995) also argued that conformity and security are more collectivist values and self-direction and hedonism are more individualist
values. In addition, Schwartz’s values also were related to Triandis vertical and horizontal dimensions for individualism and collectivism. Schwartz’s values were found to serve vertical individualism, horizontal individualism, vertical collectivism and horizontal collectivism, respectively. For example, power and achievement are more vertical values and benevolence and universalism are more horizontal values (Triandis, 1995).

**In-group and out-group distinctions**

Triandis (2001) argued that the largest distinction in collectivist cultures was between in-groups and out-groups while the largest distinction in individualist cultures was between self and others.

The relative importance given to the in-group and out-group is one of the major factors that differentiate individualism and collectivism. In collectivist cultures, people show great concern for the welfare of in-group members, but relative indifference to the needs of out-group members. In individualist cultures, people are likely to make little distinction between in-groups and out-groups while collectivists are more likely to compromise for in-group members (Triandis, McCusker & Hui, 1990). Gudykunst, Gao, Schmidt, Nishida, Bond, Leung, Wang and Barraclough (1992) conducted a survey among 200 students in each of Australia, the USA, Hong Kong and Japan. In each country, the sample was divided into two groups that
answered the questions under the condition of either in-group or out-group. Gudykunst et al. (1992) found that the differences between in-group and out-group were greatest in collectivist cultures, such as Hong Kong and Japan, and much lower in individualist cultures, such as Australia and the USA.

Collectivists were found to evaluate in-group members more generously than do individualists. For example, Leung (1997) found that collectivists and individualists showed differences in in-group favouritism and out-group favouritism in reward allocation. When distributing resources to in-group members, collectivists were more likely to follow the equality rule while individualists were more likely to follow the equity rule. When distributing resources to out-group members, both collectivists and individualists were more like to use the equity principle (Leung, 1997). The equity rule and the equality rule are the most important allocation rules. The equity rule proposes proportional allocation according to contribution or performance while the equality rule proposes equal allocation to all members regardless of contribution (Lawler, 1987). Collectivists are more likely to avoid argument with in-groups and prefer compromise and negotiation when dealing with conflict with in-group members (Leung, 1997).

Chen (1995) also found that collectivists applied the equality allocations
rule and individualists applied the equity allocation rule in terms of reward allocation for in-groups. Furthermore, collectivists did not follow the equality rule absolutely, but tended to stick to the equity rule of allocation for out-group members (Chen, 1995). Hui, Triandis and Yee (1991) found that collectivists (Chinese students) tended to follow the equality rule and be more generous than individualists (American students) in monetary allocation, especially to friends.

Gomez, Kirkman and Shapiro (2000) conducted a survey with Mexican and American MBA students. They found that Mexican students were more generous to in-group members than American students in evaluating group members. This study also suggested that collectivists tended to appraise maintenance contributions (behaviours maintaining harmony within the group) more highly than individualists, and individualists tended to value task contributions (behaviours performing the group task) more than collectivists.

**Collectivism in work settings**

An individual cannot avoid the cultivation and influence of traditional norms and values from childhood to adulthood. Cultural orientation formed during childhood is also reflected in the individual’s behaviours during adulthood. Hofstede (2001) argued that, in collectivist cultures, children
become accustomed to living in a closely connected family, including parents, even extending to grandparents, uncles, aunts and cousins. Children learn to listen to other’s opinions, and personal opinions become trivial and are cultivated to show absolute loyalty and obligation to ingroups. For example, marriage is not only for the happiness of the couple but also for the happiness of both families, and the elders in a family play important roles in advising the youth to select partners (Ho, 1979, cited in Hofstede, 2001).

Hofstede (2001) argued it is the different childhood socialization between individualist and collectivist cultures that leads to differences in personality characteristics and behaviour patterns. For example, consistent with the distinction of in-group and out-group, children in collectivist cultures prefer to form their own subgroups at school. In classrooms, open discussions of conflicts and criticism are not encouraged. In addition, different goals in educational systems have been developed in different cultures. The purpose of education in collectivist cultures is to develop “the skill and virtues necessary to be an acceptable group member” (Hofstede, 2001, p.235). Whereas, the purpose of education in individualist cultures is to prepare the individual to “cope with new, unknown, unforeseen situations in the future” (Hofstede, 2001, p.235).

Child rearing practices in collectivist cultures affect work behaviours in
adulthood (Hofstede, 2001). It is well documented, for example, that collectivists tend to value group harmony more highly than individualists (Kim, Triandis, Kagitcibasi, Choi & Yoon, 1994).

Smith, Dugan, Peterson and Leung (1998) conducted a survey in 23 countries, collecting data from the managers of both public and private sector organizations in each country. They found that collectivism was consistently a strong predictor of how disagreement was handled within a group. Collectivists were more likely to handle disagreement by rules while individualists were more likely to handle disagreement by their own experience and training. One possible explanation is that collectivists rely more on impersonal strategies to maintain in-group harmony while individualists emphasize self-sufficiency in dealing with disagreements.

Individualists tend to focus on values such as autonomy, competitiveness and self-sufficiency, making no substantial difference between in-groups and out-groups. Collectivists emphasize behaviours and values towards in-group members and groups, such as interpersonal harmony (Wagner & Moch, 1986). Within a group, collectivists prefer to subordinate personal goals to group goals and an individual’s goal is attained by contributing to the group goal (Triandis et al., 1990). Earley (1993) found that collectivists achieved lower performances working alone or in an out-group than working in an in-group.
Wagner (1995) demonstrated that levels of individualism or collectivism may influence cooperation in groups and collectivists are more likely to be cooperative than individualists. Graham, Mintu and Rodgers (1994) also found that collectivists were more cooperative and willing to attend to other’s needs. Therefore, it may be inferred that, in general, the individual in a collectivist culture prefers cooperative behaviours rather than competitive behaviours. Furthermore, different emphasis is given to competence in individualism and collectivism. Individualists consider competence as the ability to achieve a self-interested goal, whereas, collectivists perceive competence as the ability to pursue strategies that contribute to the realization of a collective goal (Chen, Chen, & Meindl, 1998).

**Measurement of individualism and collectivism**

Although individualism and collectivism have been empirically studied widely, there are few well-accepted measurements of individualism and collectivism (Earley & Gibson, 1998). Most existing measures, in general, are not consistent and practical (Earley & Gibson, 1998). Earley and Gibson (1998) attributed this problem to the fact that individualism and collectivism constructs were not defined properly because they were too broad and abstract. Therefore, it was considered that more narrow and concrete concepts should be introduced to measure cultural orientation.
Some researchers have attempted to symbolize the individualism-collectivism constructs in empirical studies in order to obtain workable, observable and operational data. Triandis (1995) recommended that the best way to assess individualism-collectivism was to use multiple methods to measure numerous facets of individualism and collectivism. As mentioned earlier, Triandis introduced vertical and horizontal dimensions to the individualism-collectivism construct. A multiple approach based on vertical-horizontal dimensions was also developed to measure individualism-collectivism (Triandis & Gelfand, 1998). However, little empirical research has supported this well-conceptualized framework (Earley & Gibson, 1998).

Most studies of individualism and collectivism have measured cultural values or beliefs (Earley & Gibson, 1998). It is important to differentiate beliefs, values and norms in the measurement of individualism and collectivism. Breer and Locke (1965) first developed an individualism-collectivism measure that differentiated beliefs, values and norms. Wagner and Moch (1986) argued the importance of such distinctions was that these three aspects might fall on different points along the continuum of individualism and collectivism. According to Wagner and Moch (1986, p.287):
By definition, beliefs are statements about reality that individuals accept as true, values are generalized principles of behaviour to which people feel strong positive or negative emotional commitment, and norms are socially shared rules or standards regarding the extent to which specific behaviours are to be considered socially acceptable.

Other concerns about the measurement of individualism and collectivism are response bias and meaning difference. Response bias and meaning difference are the main problems that undermine the validity of cross-cultural studies (Smith & Schwartz, 1997).

Response bias happens typically when respondents from different cultures respond to a rating scale. Some respondents prefer to use extreme respond while others prefer to use moderate ones. For example, Chinese respondents prefer to use such ratings as “neither agree nor disagree”, “no idea” or “neutral” rather than extreme rates. Chen, Lee and Stevenson (1995) found that Japanese and Chinese (Taiwanese) students were more likely to use midpoint value than American and Canadian students when responding to 7-point Likert-like items. However, this is not an issue for this study, which is intracultural.

As for meaning difference, it is not easy for researchers to make sure instruments have the same meaning across cultures. Smith and Schwartz (1997) recommended emic methods to handle this problem. “Etic” and “emic” are important distinctions for cross-cultural research. Etic focuses
on universals that can be applied to all cultures in the same way, while emic focuses on differences between cultural settings (Smith & Bond, 1999). Etic and emic were initiated as linguistic terminology, distinguishing phonetics from phonemics. Phonetics are universal and allow the characterization of any sound in any language. Phonemics are particular and allow the sound to be meaningful only within particular words and languages. Berry (1989) borrowed and applied this terminology in anthropology.

More and more studies have drawn the conclusion that there is no method that can be used across cultures in the same way (Smith & Schwartz, 1997). The most important task of cross-cultural research is to compare cultures and find universals and differences. Methods applied to cross-cultural research should be subject to greater scrutiny of validity and reliability (Smith & Schwartz, 1997). For example, in order to compare cultures or replicate a study in a different culture, it is very important that the applied instrument has equivalent meaning to the original one. It cannot be assumed that the meaning of instruments formulated in one culture is unchanged when applied to other cultures. Triandis (2001) argued that etic methods were important to compare studies across cultures but emic methods provided crucial information of culturally sensitive elements.
2.2.2. Level distinction for individualism and collectivism

Hofstede (2001) argued that individualism-collectivism was an anthropological, not a psychological distinction, since it referred to countries not to individuals within those cultures. Hofstede (2001) also argued that relationships between variables at a cultural level might be different from those at an individual level. So it is not correct to measure individualism-collectivism at an individual level and then attempt to generalize into a cultural level, or vice versa. It may be argued that, "cultures are formed through the interactions of different personalities, both conflicting and complementary, which create a whole that is more than the sum of its parts" (Hofstede, 2001, p.463).

Triandis et al. (1985) introduced the term idiocentrism.allocentrism for individualism-collectivism at the individual level, to avoid confusion. Hofstede (2001) argued that individualism and collectivism should be treated as opposite poles on a dimension; a country’s culture is predominantly either one or the other. However, this is not the case for idiocentrism and allocentrism, depending on context (Triandis et al., 1985), a person can be both allocentric and idiocentric.

Before further discussing idiocentrism and allocentrism, the question has to be raised first whether the differences and relationships found at the
cultural level are applicable at the individual level. In fact, there are pitfalls and one needs to be very careful (Hofstede, 2001). Cultural and individual levels are not always parallel to each other. Researchers have to realize that not all members in one culture may fit the prototype that characterizes the culture. More specifically, an individual in a collectivist culture is not necessarily more allocentric and an individual in an individualist culture is not necessarily more idiocentric (Triandis et al., 1985).

Smith and Bond (1999) argued that the distinction between levels is very important since the relationship at the cultural level could be reversed at the individual level. For example, from Hofstede’s study (1980), we know that power distance is negatively related to national wealth. Specifically, the countries emphasizing lower power distance tend to be wealthier. However, when moving to the individual level, the conclusion that individualists with lower power distance values are rich, or vice versa is obviously not true (Smith & Bond, 1999).

Singelis, Bond, Sharkey and Lai (1999) argued that cross-cultural studies at the individual level would make additional contributions in this area. Firstly, studies at the individual level can help overcome stereotyping at the culture level. Secondly, they allow researchers to scrutinize the subtle differences within cultures.
Smith and Schwartz (1997) suggested that whether applying research questions of social psychology at a cultural or individual level some rules should be followed. In fact, all data are collected on the basis of individual responses. At the cultural level, data are usually collected from two or more cultural groups. If the researcher wants to analyse data at a cultural level, he or she must take culture differences into account when designing the research. For example, researchers should ensure questionnaires applied to different cultural groups are identical, especially when translated into different languages, and use the same procedure to collect data.

2.2.3. Individualism and collectivism at the individual level

Introduction

Researchers have explored characteristics of individualism and collectivism at the individual level (Earley & Gibson, 1998). Idiocentrism-allocentrism (Triandis et al., 1985) and independent-interdependent self-construals (Markus & Kitayama, 1991) are well-accepted frameworks. In fact, some researchers (for example, Smith & Bond, 1999, Singelis, 1994) have considered independent-interdependent self-construal as essentially the same as idiocentrism-allocentrism, since both represent individual variability in individualism-collectivism. Triandis (1995) suggested that self-construal was one attribute of individualism-collectivism. The
definition of the self reflects individualism and collectivism in terms of self-others relationships (Triandis, 1989). However, Earley and Gibson (1998) argued that self-construal was a psychological construct rather than an individualism-collectivism construct and a psychological consequence of an individual’s cultural orientation. In this study, independent-interdependent self-construals and idiocentrism-allocentrism will be treated as equivalent constructs.

A number of subsequent studies have developed and enriched these two frameworks respectively (Earley & Gibson, 1998). However, most studies have used inconsistent terms to describe idiocentrism and allocentrism (Triandis, 1995). To avoid conceptual confusion, the original terms from the studies are kept in the literature review. Hence, three pairs of terms are used in relation to individualism and collectivism at the individual level: idiocentrism and allocentrism, independent and interdependent self-construal, individualist and collectivist. Although use of the term “individualist” and “collectivist” is generally restricted to cross-cultural contexts, some researchers have used these terms to refer to the equivalent phenomena at the individual level (Triandis, 1995).

**Idiocentrism and allocentrism**

Triandis and his colleagues (for example, Hui & Triandis, 1986; Triandis et
al., 1985; Triandis, Chan, Bhawuk, Iwao & Sinha, 1995) have developed and contributed to the idiocentrism-allocentrism framework. Hui and Triandis (1986) defined allocentrism (collectivism at the individual level was used in the study) as a syndrome of “feelings, emotions, beliefs, ideology and actions” (p.229) related to interpersonal concern. Furthermore, they identified the content of allocentrism using some categories, namely, consideration for other people, sharing of material or nonmaterial resources, susceptibility to social influence, self-presentation and face-work (face saving), sharing of outcomes, feeling of involvement in others’ lives.

It has been suggested that there were more allocentrics than idiocentrics in collectivist cultures and more idiocentrics than allocentrics in individualist cultures (Triandis et al., 1988). Furthermore, Triandis et al. (1988) argued that there might be some difficulties for allocentrics in an individualist culture and idiocentrics in a collectivist culture. For example, allocentrics in an individualist culture may be “excessively” concerned about their in-groups and idiocentrics in a collectivist culture may find it difficult to accept in-group norms.

Allocentrism and idiocentrism are a multidimensional rather than a simple construct (Triandis, 2001). Singelis, Triandis, Bhawuk and Gelfand (1995, cited in Smith & Bond, 1999) found that allocentrism and idiocentrism could vary in terms of equality of members and hierarchy within groups.
Triandis et al. (1988) identified four factors of idiocentrism and allocentrism, at the individual level, namely, self-reliance with competition, concern for in-groups, distance from in-groups, and subordination of self to in-group goals. Wagner (1995) identified five factors of personal difference in individualism-collectivism, namely, independence and self-reliance, importance of competitive success, value attached to working alone, subordination of personal needs to group interest, pursuit of personal interest.

In addition, Realo, Allik and Vadi (1997) identified three types of allocentrics (collectivists were used in the study) that focused on relations with family, peers and society respectively. The data were collected from more than 1000 Estonians, from Estonia, Sweden and Kihnu Island. Both Triandis (1993) and Schwartz (1994) demonstrated that Estonia was a relatively collectivistic country. The family-related collectivism called Familism put family interests before other interests. The collectivists in this type of collectivism focused on family security, respect and obedience to parents and elders, and following traditions. The peer-related collectivism was called companionship. This type of collectivist likely focused on in-group relationships with neighbours, friends and co-workers. “Companionship-oriented people are generally supportive, esteem social recognition, like to be influential, and are willing to pardon others” (Realo
et al., 1997, p.110). Society-related collectivism called Patriotism focused on national interest even at the expense of personal comfort. These collectivists were always ready to sacrifice themselves to protect their country. Realo et al. (1997) argued that these three types were related to Triandis’ (1995) vertical and horizontal constructs. Peer-related collectivism was related to horizontal collectivism. Family-related and society-related collectivism were related to vertical collectivism.

In fact, many characteristics at the cultural level were found to reflect at the individual level. For example, some studies consistently suggested that allocentrics were more likely to differentiate in-groups from out-groups than idiocentrics. Specifically, Verkuyten and Masson (1996) found that allocentrics were more sensitive to friends than idiocentrics, differentiating friends from others. In Japan, Yamaguchi (1994) also found that allocentrics were more sensitive to others and allocentrism was positively related to affiliative tendencies. Carpenter and Radhakrishnan (2000) found Mexican Americans (allocentrics) referred to more social representations when describing in-groups than European Americans (idiocentrics). In their study, social references included social identity, social traits and social reference to others. The finding suggested that allocentrism was analogous to collectivism in terms of salience of in-groups.

Triandis (2001) argued that idiocentrics believed that the self was stable
and the environment was changeable. Consequently, idiocentrics are likely to change jobs if dissatisfied. Allocentrics believed that the self was changeable and environment was stable so they were more likely to adjust to current environment. In addition, Yamaguchi (1994) found that allocentrics were more likely to give priority to collective self over private self, suggesting that allocentrics tended to emphasize groups' or others' needs rather than their own needs.

Furthermore, allocentrics and idiocentrics handle conflict differently because they have different relationship foci (Leung, 1997). Allocentrics are more likely to maintain harmony in a relationship. Leung (1997) found that allocentrics tended to avoid putting themselves in conflict situations for the sake of maintaining relationships. Once in a conflict situation, allocentrics tended to prefer a solution that did not destroy relationships, such as mediation, while idiocentrics tended to prefer a just solution, such as going to court. The reason may be that idiocentrics prefer to clarify their positions directly with other people while allocentrics prefer to hide their positions from other people. Ting-Toomey (1988) argued that allocentrics (collectivists used in the study) preferred to use mediators to manage conflict more than idiocentrics (individualists used in the study) because mediators could help to deal with conflict without confrontation and harmonious relationships could be maintained.
Independent and interdependent self-construals

Self-construals are the understandings that an individual develops about herself or himself, including “traits, beliefs, motivations, values and behavioral styles” (Smith & Bond, 1999, p.112). According to Markus and Kitayama (1991), definition of the self depends partially on what separateness or connectedness between self and others is culturally preferred. Hence, independent self-construal and interdependent self-construal were introduced as constructs corresponding to individualism and collectivism (Markus & Kitayama, 1991). As with many psychological processes, independence and interdependence coexist in an individual to different degrees (Bond & Smith, 1999, Triandis, 2001).

In general, independent self-construal is fostered by many individualistic cultural systems while interdependent self-construal is fostered by many collectivistic cultural systems (Markus & Kitayama, 1991). Individuals with interdependent self-construal values tend to emphasize shared values and common goals with in-groups, maintaining harmony with others, interrelatedness and obligation according to different contexts. Those with independent self-construal values tend to emphasize autonomy, self-interest, self-determination and freedom (Earley & Gibson, 1998).

More specifically, independent self-construal emphasizes “(a) internal
abilities, thoughts, and feelings, (b) being unique and expressing the self, (c)
realizing internal attributes and promoting one’s own goals, and (d) being
direct in communication” (Singelis, 1994, p.581). Interdependent self-
construal emphasizes “(a) external, public features such as statuses, roles
and relationships, (b) belonging and fitting in, (c) occupying one’s proper
place and engaging in appropriate action and (d) being indirect in
communication and ‘reading others’ minds’” (Singelis, 1994, p.581).

Some studies have provided evidence for the proposition that independent
and interdependent self-construal are reflections of individualism and
collectivism at the individual level. For example, Singelis et al. (1995)
found that interdependence was positively associated with collectivism and
independence positively associated with individualism. Furthermore,
Singelis (1997, cited in Smith & Bond, 1999) found that collectivism was
related to more interdependent self-construal dispositions, such as being
more sensitive and responsive to others’ emotions. Singelis and Brown
(1995) also found that interdependent individuals were more likely to
adjust their behaviours according to context than independent individuals.
In addition, Gudykunst, Matsumoto, Ting-Toomey, Nishida, Kim and
Heyman (1996) found that interdependent personas were likely to hold
values (such as restrictive conformity, security and prosociality) which
served primarily collectivist interests (Schwartz, 1994), while independent
persons were likely to hold values (such as self-direction) which served primarily individualist interests (Schwartz, 1994).

One’s construal of the self plays a key role in forming a positive view of self (Markus & Kitayama, 1991). A positive view of independent individuals is being independent, more specifically, being unique, expressing one’s inner attributes and asserting oneself. In contrast, a positive view of interdependent self is being interdependent with relevant others, more specifically, belonging, fitting in, occupying one’s proper place, engaging in appropriate action, promoting other’s goals and maintaining harmony (Markus & Kitayama, 1991).

Triandis (2001) argued that interdependent people were more likely to describe themselves by referring to social content than independent people. Smith and Bond (1999) also argued that individuals with independent self-construal values preferred to use general traits and roles to describe themselves while those with interdependent self-construal values preferred to refer to special traits and roles. For example, Cousins (1989) demonstrated that Japanese (collectivists) could characterize themselves better when their situations or relationships with others or groups were specified. Triandis et al. (1990) found Chinese from Mainland China and Hong Kong were more likely to present themselves in a social category. Specifically, comparing students from Mainland United States, Greece,
Hawaii, Hong Kong and the People’s Republic of China, they found students from a collectivist culture used 30% to 50% of social content in describing themselves while those from an individualist culture used only zero to 20%. They also found this was the case within one culture. For example, American allocentrics were found to mention family more frequently than American idiocentrics when presenting themselves.

The need for being unique and expressing self is one important attribute of interdependent self-construal, which was supported by empirical studies. For example, Campbell, Trapnell, Heine, Kate, Lavallee and Lehman (1996) used self-concept clarity to examine the extent to which an individual defined her or himself clearly and found that Canadians showed a higher level of self-concept clarity than Japanese. It may be argued that independent self-construal individuals tend to distinguish themselves from others while interdependent self-construal tend to define themselves as similar to others, especially in relations to in-groups. Furthermore, Cross, Morris and Gore (2002) demonstrated that interdependent self-construal individuals made more similarity judgments between self and friends than independent self-construal individuals.

As mentioned early, maintaining harmony is one of the important values in collectivist cultures. Interdependent self is more likely to behave in a way consistent with the anticipated expectations of others. So individuals with
interdependent self-construal values are more likely to develop context-specific knowledge of self and others. Different self-construals also influence how knowledge about self and others is processed, organized and retrieved from memory (Markus & Kitayama, 1991). Comparing German and Chinese people, Haberstroh, Oyserman, Schwarz, Kuhnen and Ji (2002) found that Chinese (interdependent individuals) were more sensitive and attentive than German (independent individuals) to the purpose of researchers who raised the questions in the experiment. Kim and Wilson (1994) demonstrated that people with interdependent self-construals (Koreans) were more concerned with other’s feelings and people with independent self-construal (Americans) were more concerned with clarity in conversations.

Triandis (2001) argued that personality is “a configuration of cognitions, emotions, and habits that are activated when situations stimulate their expression” (p.908). Personality determines the individual’s unique adjustment to the world. It may be argued that independent self-construal and interdependent self-construal entwined with the development of personality. For example, Kwan, Bond and Singelis (1997) found that independent self-construal was predicted by such personality characteristics as extroversion, conscientiousness and openness to experience, while interdependent self-construal was related to agreeableness.
From a theoretical perspective, it is expected that level and type of self-esteem may change across cultures (Smith & Bond, 1999). Self-esteem is related to "the motive to develop and sustain an overall sense of self-worth and self regard" (Smith & Bond, 1999, p.119). Maintaining and regarding self-esteem is a universal need to discipline individual’s behaviour. Kwan et al. (1997) found that an interdependent self-construal was negatively related to self-esteem in individualist cultures (for example, the United States) while there was no such a correlation in collectivist cultures (for example, Hong Kong). Tafarodi and Swann (1996) found that Chinese were more likely to have developed the self-liking aspects of self-esteem while US Americans were more likely to have developed the self-competence aspects of self-esteem. According to Tafarodi et al. (1999), self-competence (SC) is an overall sense of personal efficacy and self-liking (SL) is an overall sense of one’s worth as a social object.

**Measurement at the individual level**

Triandis (1995) suggested that individualism and collectivism at both cultural level and individual level should be measured using multiple methods since they have numerous facets. Triandis et al. (1995) argued that researchers had to balance between bandwidth and fidelity in idiocentrism and allocentrism measures. A measure that focuses on bandwidth, includes many items and risks sacrificing fidelity, reducing the reliability of the
information collected. On the other hand, a measure that focuses on fidelity risks sacrificing comprehension of the information collected.

A host of measures for allocentric and idiocentric dispositions have emerged since the mid 1980s (Triandis, 1996). The influential measures have included Yamaguchi’s (1994) collectivism scale, Hui’s (1988) INDCOL scale, Triandis et al.’s (1995) idiocentrism and allocentrism scale, and Singelis’ Self-construal scale (1994). The measures address different aspects of allocentrism and idocentrism while may be expected to be interrelated with each other (Triandis, 1996).

Hui (1988) argued that individuals varied in terms of idiocentrism and allocentrism when responding to different collectives. For example, an individual may be more allocentric in family relationship but more idiocentric in co-worker relationships. Hui’s INDCOL scale allowed subjects to respond to different contexts, including spouse, parents, kin, neighbours, friends and colleagues.

Schwartz (1994) argued that not all of the universal values had the same meaning across cultures. In research in Japan (collectivist culture), Triandis et al. (1995) found that allocentric value factors identified by factor analysis were consistent with the total measure of allocentrism used in the study, while the idiocentric factors were not consistent with the total
measure of idiocentrism. Triandis et al. (1995) argued that idiocentric items might not have clear meaning in a collectivist culture.

Earley and Gibson (1998) argued that many studies have used self-construal instruments to measure cultural orientation inappropriately. Specifically, the relationship found between self-construal and the individualism and collectivism construct might be partial because many items used to measure independent and interdependent self-construals are often used for measuring individualism and collectivism. Therefore, Earley and Gibson (1998) recommended avoiding a single survey instrument since some instruments may be overly simplistic and incongruent with the individualism-collectivism construct.

2.3. Self-efficacy and collective efficacy

2.3.1. Conceptual clarification in motivation theory

Self-efficacy refers to a person’s belief in his or her capability to perform a task (Bandura, 1997). Self-efficacy is a concept that may be easily confused with others. Hence, its differences from expectancy concepts are discussed first.

Vroom (1995) defined motivation in three dimensions, namely, valence (preference), expectancy and force. Valence refers to “affective orientations
toward particular outcomes” (Vroom, 1995, p.18). Expectancy refers to “a momentary belief concerning the likelihood that a particular act will be followed by a particular outcome.” (Vroom, 1995, p.20). Force refers to “monotonically increasing function of the product of valence and expectancy.” (Vroom, 1995, p.22).

Bandura’s social cognitive theory (including self-efficacy theory) and Vroom’s expectancy theory are process motivation theories. However, self-efficacy and expectancy are different concepts, although, they may be confused as both represent a belief. According to Locke and Latham (1990), self-efficacy has a broader meaning than expectancy.

Expectancy theory emphasizes that the selection of behaviour is a cognitive process in which an organism makes a decision by weighting, reinforcing and utilizing information according to a negative or positive discrepancy (Vroom, 1995). Social cognitive theory is based on the assumption that the discrepancy between actual performance and goals determines the amount and the direction of effort expenditure (Klein, 1989). Social cognitive theory emphasizes the important role of personal factors in the cognitive process and thus behaviour (Steers, Porter & Bigley, 1996). According to Bandura (1997), motivation involves a cognitive comparison process in which people reduce discrepancies and create new discrepancies.
Expectancy is related to performance-outcome relationships, whereas, self-efficacy is related to a perceived capability-performance relationship. According to Lawler’s (1973) expectancy theory, there are three important concepts, namely, performance-outcome expectancy, attractiveness and effort-performance expectancy. “Performance-outcome expectancy” refers to the phenomenon that people believe a certain performance can lead to a certain outcome. This concept is equivalent to “expectancy” in Vroom’s theory. Attractiveness refers to the degree to which an outcome attracts each individual. Attractiveness reflects individual needs and perceptions. “Effort-performance expectancy” refers to the individual’s perception of how hard it will be for him or her to achieve a desired behaviour. This concept is very close to “self-efficacy” (Lawler, 1973).

Bandura (1997) has distinguished between self-efficacy and outcome expectancy. In contrast to outcome expectancy, self-efficacy is a much more reliable and stronger predictor of performance (Bandura, 1997). Self-efficacy and outcome expectancy have a joint effect on actions (Bandura, 1997). In addition, social cognitive theory claims that self-efficacy shapes outcome expectancy in such a way that a high level of self-efficacy is related to positive outcome expectancy, whereas, a low level of self-efficacy is related to negative outcome expectancy (Bandura, 1997).
2.3.2. Self-efficacy as a predictor of individual performance

Self-efficacy refers to a person’s belief in his or her capability to perform a task (Bandura, 1997). The most important finding of self-efficacy theory is a positive relationship between the strength of self-efficacy and actual performance (Bandura, 1997). As a self-regulatory mechanism, self-efficacy has been demonstrated to be strongly related to individual performance (Wood & Bandura, 1989). However, self-efficacy is clearly distinct from individualism even though it involves self-referent processes (Bandura, 1997).

On one hand, self-efficacy can affect a person’s performance as an independent variable. For instance, the strength of self-efficacy can affect persistence of effort (Bandura, 1997). The higher the self-efficacy of an individual, the harder and longer he or she is likely to work towards a challenging goal. On the other hand, self-efficacy has an indirect effect on performance by mediating other factors. For instance, self-efficacy is one of the important factors that affect goal choice and the degree of goal commitment (Locke & Latham, 1990). The stronger the perceived self-efficacy of people, the more likely they are to select a higher or more difficult goal, and the more likely they are to be successful. Equally, higher self-efficacy can lead to a higher degree of goal commitment, which is posited to be a sufficient prerequisite to successful performance (Locke &
Latham, 1990). A comparative study by Earley (1986) also demonstrated that self-efficacy affected goal-setting and goal-commitment, and indirectly affected productivity.

Many studies have demonstrated that participative goal-setting is not more likely to lead to higher job performance than an assigned goal (Klein, Wesson, Hollenbeck & Alge, 1999). Bandura (1997) examined this from a psychological perspective. First, effective participative goal-setting has an effect on performance by enhancing perceived personal efficacy in collective ability. Second, participative goal-setting does not necessarily mean that most members contribute their ideas to the decision-making or exert influence equally, which affects the degree of commitment to this goal. Third, authority sometimes has superior influence on the performance of an employee because it determines the assessment of performance and allocation of rewards.

Some studies (for example, Vasil, 1992) of teachers’ activities in universities have consistently drawn a conclusion that self-efficacy is positively correlated with academic performance, which provides some empirical support for the above argument. Vasil’s study (1992) also suggested that gender was one of the influential factors for self-efficacy. Male members of faculty were found to be more likely to have a higher self-efficacy in carrying out research than females in universities.
Blackburn et al. (1991) in a study found that age was a predictor of faculties’ productivity. The above situation perhaps suggests that some personal characteristics moderate the relationship between self-efficacy and actual performance. Therefore, further research is needed to focus on this moderating function in relationship to self-efficacy.

Since research activities may involve more challenging goals, it should be noted that self-efficacy plays a special role in research activities (Bandura, 1997). Research activity requires a researcher to have a strong sense of efficacy to cope with potentially fruitless outcomes and unexpected problems. In addition, a researcher also needs a high level of self-efficacy to recover quickly from failures and impasses. Vasil (1992) demonstrated empirically that high self-efficacy was related to high research productivity.

Taylor et al. (1984) have suggested that self-efficacy plays a more important role in research activities than in teaching. Schoen and Winocur (1988) also demonstrated that faculty members were likely to have a lower sense of efficacy in research than in teaching or administration. The reasons might be: (1) as a more creative activity, research requires participants to be more confident and tenacious, which is essential to cope with unexpected outcomes and recover quickly from failure and impasses (Bandura, 1997); (2) research activities are more likely to be out of personal control than teaching, because of such factors as research funding,
unexpected outcomes and so on (Schoen & Winocur, 1988).

2.3.3. Collective efficacy as a predictor of group performance

Collective efficacy, in Bandura’s cognitive theory, has been defined as “a group’s shared belief in its conjoint capabilities to organize and execute the course of action required to produce given levels of attainments” (Bandura, 1997, p.477). In the literature, some concepts are used as equivalent to or similar to collective efficacy, such as group efficacy, group potency and accuracy of group belief (Gibson, 1999). Gibson (1999) has used the concept of group efficacy while Bandura used the concept of collective efficacy. The main difference between Gibson’s group efficacy and Bandura’s collective efficacy lies in the way they are measured. Gibson preferred to measure group efficacy using a unanimous judgment of all group members’ of the group efficacy, by discussion. So group efficacy in Gibson’s studies refers to group members’ collective estimate of the group’s ability to perform a specific task (Gibson, 1999). Bandura (2001) preferred to measure collective efficacy by aggregating individual members’ perceived efficacy of the group ability operating as a whole. Bandura’s “collective efficacy” concept is used in this study.

Collective efficacy is an organizational function rather than simply the sum of the members’ self-efficacies (Bandura, 1997). Self-efficacy should
predict individual performance, whereas collective efficacy should predict
group performance. A strong linkage between collective efficacy and group
effectiveness has been demonstrated (Campion, Medsker & Higgs, 1993). In
other words, the level of collective efficacy is predictive of the level of
group performance and vice versa. The stronger the group beliefs people
hold about their collective capability, the more they are likely to achieve
(Bandura, 1997).

By reviewing literature on effective work groups, and conducting a survey,
Campion et al. (1993) suggested that team-level self-efficacy (collective
efficacy) was related to a preference for working in teams and
demonstrated that collective efficacy (named “potency” in their study) was
the strongest predictor of group effectiveness because it met all three
criteria of group effectiveness among a variety of group characteristics.
However, some other studies have shown no direct relationship between
collective efficacy and group effectiveness (Bandura, 1997). This situation
implies that some other factors may moderate the predictive relationship
between collective efficacy and group effectiveness (Earley, 1994; Gibson,
1999). Just as self-efficacy has an effect on an individual’s goal-setting,
collective efficacy plays an important role in a group’s goal-setting. In
particular, collective efficacy influences goal-commitment, the choice of
goal level, and group propensity to set goals (Durham, Knight & Locke,
1997). By jointly using meta-analytic and narrative review methods, O’Leary-Kelly, Martocchio and Frink (1994) examined group goals at the group level and investigated the relationships between group goals and group performance. The review suggested that goal-setting played an important role in the group performance. Specifically, it was found in many studies that groups with goal-setting performed better than those without goal-setting.

Locke and Latham (1990) demonstrated that challenging goals rather than easy goals could do this. During the process of accomplishing a challenging goal, self-efficacy in capacity and self-satisfaction can be increased. In order to have motivational and inspirational functions, goal setting should follow three steps. Firstly, a challenging goal should be established. Secondly, this challenging goal should be divided into some attainable progressive subgoals. Thirdly, a good feedback system should be available in the process to reach the goal.

### 2.3.4. Formation of self-efficacy

The formation and alteration of self-efficacy is a complicated cognitive process. The cognitive process can be viewed as one in which uncertainty is reduced, and consequently anxiety is reduced (Austin & Vancouver, 1996). The importance of this process lies in the fact that incorrect opinions
or inaccurate appraisals of one’s abilities might result in punitive or even fatal consequences (Bandura, 1977). The information that is relevant to the formation and alteration of self-efficacy is judged, selected, weighted and integrated by individuals with different attributes under different circumstances (Bandura, 1997).

Bandura (1997) identified four sources of information that contribute to the formation of self-efficacy: (1) enactive mastery experiences; (2) vicarious experiences; (3) verbal persuasion; (4) physiological and affective states. Enactive mastery experiences and vicarious experiences are the most potent sources of self-efficacy (Bandura, 1997; Wood & Bandura, 1989).

Enactive mastery experiences are related to successes and failures in specific domains that an individual experienced in the past. Past experiences provide the most persuasive information for the development of self-efficacy by weighting performance successes and failures. Successes boost self-efficacy while failures undermine it, especially, failures that happened before self-efficacy has been well-established. Bandura (1997) has argued that self-efficacy is both the product and constructor of experiences. A low perceived efficacy derived from past experience is hard to improve. Possible approaches may include explicit and compelling persuasion to remove disbelief in one’s ability and selective self-monitoring that especially focuses on personal successes in
the past (Bandura, 1997).

Vicarious experiences refer to observations of others’ experiences that provide referential comparisons for one’s own capability. According to Bandura (1997), observing models is a source of information by which one can modify and form self-efficacy. One can increase self-efficacy by observing successful performance by oneself or others. However, not all successful performances that are observed can help enhance the self-efficacy. Only when the observer has much in common with the successful model, can he or she increase or reinforce self-efficacy by observational learning (Bandura, 1997).

Verbal persuasion by significant others is another source of self-efficacy. Perceived efficacy can be enhanced or undermined by how evaluative feedback is conveyed to the performer. An effective efficacy builder should not only convey positive or inspirational feedback but also suggest to performers how to affirm perceived efficacy by avoiding repetitive failures (Bandura, 1997).

The development of self-efficacy is also influenced by physiological and affective states. This source of perceived efficacy is especially influential for physical activities. Bandura (1997) thus suggested another way to alter perceived efficacy was “to enhance physical status, reduce stress levels and
negative emotional proclivities, and correct misinterpretations of bodily states” (p.106).

2.3.5. Formation of collective efficacy

Goals play an important role in building and strengthening a sense of efficacy both at the individual level and collective level (Bandura, 1997). Higher collective efficacy raised the difficulty of goals that groups set for themselves ingroup endeavours (Durham, Locke, Poon & McLeod, 2000; Prussia & Kinicki, 1996).

Bandura (1997) suggested that the nature of the relationship of self-efficacy with collective efficacy may vary with context. Specifically, it is possible to simultaneously have low collective efficacy and a high number of self-efficacious members, or high collective efficacy and a low number of self-efficacious members (Bandura, 1997). For example, Lam et al. (2002) found collectivists (Hong Kong Chinese) reported higher collective efficacy but lower self-efficacy in decision participation than individualists (US Americans).

According to Bandura (1997), in addition to self-efficacy, other factors can influence the formation and alteration of collective-efficacy, such as interdependence among group members, external reality and pressures. The strength of collective efficacy varies according to the above factors. A
review of recent literature on collective efficacy suggested there were relationships between collective efficacy and other factors or processes in group work (Mulvey & Ribbens, 1999; Seijts, Latham & Whyte, 2000; Silver & Bufanio, 1996).

For example, the size of a group was a significant predictor of the level of collective efficacy. Members in a small group had higher perceived collective efficacy than members in a relatively large group (Seijts et al., 2000). Mulvey and Ribbens (1999) found that intergroup competition had a positive effect on collective efficacy. In their experimental study, a sample of undergraduate students was invited to assembly LEGO building blocks cooperatively. They argued that intergroup competition increased collective efficacy by reducing group inefficiency. In addition, collective efficacy has been found to be related positively to task performance and past performance (Silver & Bufanio, 1996). This finding suggested that past performance, which is one source of self-efficacy (Bandura, 1997), might also play a key role in enhancing collective efficacy.
2.4. Framework for this study

2.4.1. Preference for group work

*Definition*

Preference for group work refers to the degree to which individuals prefer to do group work (Shaw et al., 2000). Sosik and Jung (2002) argued that preference for group work represented a group member’s degree of comfort and enjoyment in working collectively, rather than individually. Preference for group work is predictive of group effectiveness and cooperation.

Erez and Somech (1996) explained that higher preference for group work may be able to satisfy group members’ social motives and needs when performing group tasks. Preference for group work has been found to be associated with job satisfaction and group performance (Erez & Somech, 1996). Adair (1991) argued groups meet three needs: (1) task need (to accomplish the group’s work); (2) group needs (to establish and maintain the group); (3) individual needs (to attain self-satisfaction by group members). Therefore, the main functions of a group can be summarized as group task, group maintenance and individual self-satisfaction. Adair (1991) argued that job satisfaction and task performance are interactive. In other words, higher job satisfaction can contribute to higher levels of task performance, and vice versa.
Preference for group work as one dimension of individualism-collectivism

Preference for group work has been conceptualised as one dimension of individualism-collectivism (Wagner, 1995; Wagner & Moch, 1986). Earley (1989) found that cultural orientation was related to preference for group work and group performance. He found that collectivists (Chinese) reported a higher level of preference for group work than individualists (American). Erez and Earley (1993) found individualists performed better when working alone than in a group context, whereas, collectivists performed better when working in a group than alone.

To some extent, contextual performance, referring to those behaviours that are not directly related to task performance, is more important than task performance in collectivist cultures (Goodman & Svyantek, 1999). It may be expected that allocentrics favour group work in circumstances where they feel more satisfied with contextual relationships and thus allocentrics may prefer group work accordingly. For example, they distinguish in-groups from out-groups. An in-group context may result in safety and productivity, so they would prefer an in-group work. Eisenhardt and Tabrizi (1995) suggested that individualists might perceive diversity or heterogeneity within a group to be a positive characteristic. On the other hand, collectivists might see group diversity as a threat to common values,
and therefore, might be likely to downplay it since they focused on harmony of group. Sosik and Jung (2002) concluded that within a collectivist group, performance might be enhanced when groups experience task interdependence (Guzzo, Yost, Campbell & Shea, 1993), share responsibility (Mohrman, Cohen & Mohrman, 1995), collaborative work structures (Ilgen, 1999), and common goals (Shamir, 1990).

**Cooperation**

Wagner (1995) defined cooperation as the wilful contribution of personal effort to the completion of interdependent tasks, which is an important group characteristic. Argyle (1991) summarized the pattern of behaviour for successful cooperative work groups: more coordination, more helping, more communication, and more division of labour. Cooperative behaviour can increase the appropriate use of knowledge, skills and task strategy, and enhance task performance (Gladstein, 1984; Hackman, 1983). It is expected that individuals who prefer group work would be more cooperative (Wagner, 1995).

Wagner and Moch (1986) argued that individualism and collectivism are related to how group members pursue self-interest, and consequently, have an indirect effect on cooperation. In individualist cultures where priority is given to self-interest, "cooperation can be predictably induced only by the
contingent receipt of personal incentives (for example, merit pay for effective teamwork, stock options for product company stewardship, high-order need gratification for participation in decision making processes)” (Wagner & Moch, 1986, p.285). In collectivist cultures where priority is given to collective-interest, “cooperation can be predictably induced only by the contingent receipt of outcomes that benefit the entire membership (for example, safe work environment, egalitarian teamwork bonuses)” (Wagner & Moch, 1986, p.285).

Wagner (1995) argued that collectivists were likely to prefer to cooperate in groups, especially in-groups while individualists were likely to prefer to avoid cooperation, especially if it requires sacrificing individual interest to that of their groups. Cox, Lobel and McLeod (1991) demonstrated that collectivists were more cooperative in groups than individualists. Matsui, Kakuyama and Onglato (1987) found collectivists had more cooperative groups and responded more favourably to team goals than individualists.

People vary in terms of personal disposition to cooperate. Chatman and Barsade (1995) suggested that personal cooperativeness was a single dimension, varying from high personal cooperativeness, collectivism at one end and to low personal cooperativeness, individualism at the other end. In fact, they argued that cooperativeness differences existed at the individual level, consistent with the allocentrism-idocentrism continuum. Earley
(1993) argued that individualism and collectivism exist at the organizational level as well as the societal level. An organizational culture tends to emphasize either individualism values or collectivist values (Earley, 1993). Chatman and Barsade (1995) found that match and mismatch between personal disposition and organization cultures was predictive of the level of cooperation. Individuals with higher disposition to cooperate in a collectivist organization were more cooperative than those in other matching situations. Chatman and Barsade (1995) argued that cooperation was maximal when personality and organizational context jointly called for it.

Chen et al. (1998) argued that culture could affect cooperation by mediating certain group mechanisms, such as goal-setting, group identity, trust, group accountability, communication, reward structure and incentives (Komorita & Parks, 1995). Specifically, Chen et al. (1998) argued that “collectivists tend to share common goals, have stronger group identity, more group accountability, more communication, and a more egalitarian reward system” (p.291). So cooperative behaviour should be fostered by considering cultural influence. For example, a goal-setting that helps individuals achieving self-interest could enhance cooperation in an individualist culture while a goal-setting that may contribute to collective interest could enhance cooperation in a collectivist culture. Breer and
Locke (1965) also suggested collectivism might have an impact on cooperation by setting boundaries on appropriate behaviour within a team, for example, cooperative behaviours were more likely to be consistently rewarded and valued in a collectivist group.

Social loafing and free riding have been studied extensively at group level due to their potential to harm group performance (Latane, William & Harkins, 1979). Free riding relates to deriving benefit from public goods, without contribution (Wagner, 1995). In a group, there is a phenomenon of free riding that Kerr and Bruun (1983) labelled the “sucker effect”. The sucker effect refers to when surrounded by others likely to free ride, an individual not otherwise inclined may also choose to free ride in order to avoid the inequity of contributing more than the others for the same share of public goods. Social loafing is concerned with the intentional reduction of an individual’s effort towards a group goal. Social loafing especially occurs when an individual’s effort is not identified easily in collective efforts (Smith & Bond, 1999).

Free riding and social loafing are main underminers of cooperation (Chen et al., 1998). Cooperation may be undermined when collectivists worry that free riders may benefit from membership without making sufficient cooperative contribution. Cooperation can be enhanced when would-be free riders realize their uncooperative behaviour is likely to be identified and
they start to pursue collective well-being (Chen et al., 1998).

2.4.2. Cultural influences on perceived efficacy

Lower perceived efficacy in collectivist cultures

Bandura (1997) has taken the view that cultural values and practices affect how efficacy beliefs are developed and how they are best exercised. For example, collectivists generally display a lower sense of self and collective efficacy in a less culturally similar group (Bandura, 1997). Earley (1994) has found that the self-efficacy of individualists either working in an in-group or an out-group was lower than that of individualists working alone, whereas, collectivists’ self-efficacy was lower in an individual or out-group context than in an in-group context. Hence, he suggested that collectivists could enhance their self-efficacy and collective efficacy in an in-group setting, while individualists could enhance their self-efficacy as well as collective efficacy in an individual performance setting.

The literature (Markus & Kitayama, 1991; Triandis, 1988) on collectivism suggests that self, separated from group, is not encouraged in collectivist cultures. This could provide a partial explanation for lower self-efficacy of collectivists when working alone. A possible explanation is that there may be few opportunities to develop self-efficacy in accomplishing a task successfully without the aid of other persons (or in a group context) in
collectivist cultures. An individual is encouraged to be modest and even to conceal true capability, especially in public or in a group. In other words, expression of self-confidence is not encouraged in public. Expression of apparent low self-efficacy might be translated as a virtue in collectivist cultures, which approve of the self's ability to interact with fellows in a sincere, polite and modest fashion (Hsu, 1981). Some old sayings that present traditional values in collectivist cultures may illustrate this point. For example, “the nail that stands out gets pounded down” in Japan (Markus & Kitayama, 1991, p.224); “the bigger tree gets stronger wind” and “a human being fears to be famous and a pig fears to be fat” in China.

Sastry and Ross (1998), using a sense of personal control construct, demonstrated there was a significant negative relationship between collectivist orientation and strength of self-efficacy. They used one single item in the World Values Survey (European Values Systems Study Group, 1990, cited in Sastry & Ross, 1998) to measure the level of the sense of personal control: “Some people feel that they have completely free choice and control over their lives, and other people feel that what they do has no real effect on what happens to them. Please use the scale to indicate how much freedom of choice and control you feel you have over the way life turns out” (p.106). Sastry and Ross (1998) found that Asian Americans had much lower sense of personal control than non-Asian Americans in the
USA. In addition, individuals in Asian countries, including China, India, South Korea and Japan in this study, reported a lower sense of personal control than those in non-Asian countries. Sastry and Ross (1998) argued that emphasis on sacrificing for the sake of the collectives, such as family and community, decreased personal autonomy, thereby lowering levels of personal control.

Tafarodi et al. (1999), using a generalized self-efficacy measure they called self-competence, also demonstrated that collectivism inhibited the development of self-efficacy while individualism promoted it. The items used to measure self-competence, for example, were “I don’t succeed as much” and “I am a capable person.” (p.625). They found that British students reported higher self-competence than Malaysians.

A few studies have identified a similar relationship at the individual level. For example, Lam et al. (2002) found that Hong Kong Chinese working in an international bank were more allocentric and reported lower self-efficacy in participative decision-making than their American counterparts, and reported higher collective efficacy in participation than Americans.

**Collective efficacy and group effectiveness**

Group effectiveness has been found to be correlated with some characteristics of organizational functioning, such as collective efficacy and
cooperation (Gibson, 1999). Just as Bandura (1997) suggested that efficacy is partially social context, some studies have demonstrated that cultural differences, especially in terms of the individualism and collectivism construct, played a central role in moderating the relationship between collective efficacy and group effectiveness. For example, individualists were found to have more competitive groups than have collectivists (Earley, 1989).

Gibson (1999) argued that the level of collective efficacy (group efficacy used in her studies) in a collectivist team was more strongly related to actual effectiveness than in an individualist team. One possible explanation is that individualists may overestimate collective efficacy (Gibson, 1999).

Gibson (1999) also found that collectivists displayed lower levels of collective efficacy than individualists, which was consistent with the relationship between self-efficacy and individualism-collectivism. In a cross-cultural study, Sosik and Jung (2002) demonstrated that individualists (Americans) reported higher levels of collective efficacy (group potency was used in their study) than collectivists (Koreans). That finding may have been due to the emphasis on humility that is central to eastern philosophies.

Group effectiveness exists as a group level attribute. Due to the increasing complexity of organizations, it is difficult to establish general criteria to
measure group effectiveness in professional management (Scott, 1997). This applies also to academic organizations. The assessment of group research is normally based on the quality and quantity of products, such as publications and reports. However, it is difficult to assess some less tangible outcomes, such as allocations of research fund (Hekelman, Zyzanski & Flocke, 1995). The low effectiveness of some group research may be partially explained by the confusion of criteria of effectiveness and measurability of outcomes (Hekelman et al., 1995). In addition, research activities may result in unexpected outcomes and vary from one discipline to another. However, little research exists on the assessment of effectiveness of group research. Further research is needed to develop a model for assessing the effectiveness of group research.

Interdependence is another important concept in group work due to its positive association with group effectiveness (Guzzo et al., 1993). A group level attribute, interdependence refers to the extent to which group members depend on each other in achieving group goals (Campion et al., 1993). Here, two concepts of interdependence should be clarified, task interdependence and reward interdependence. A group task is the work that a group performs to accomplish its goal (Adair, 1991). Task interdependence is defined as the degree to which individuals interact and depend on one another to perform a group task (Wageman & Baker, 1997).
Reward interdependence refers to the extent to which the rewards that individuals receive are based on others’ performances (Wageman & Baker, 1997). At the group level, task interdependence has been found to be related to group effectiveness (Campion et al., 1993). Reward interdependence has been found to be positively related to group members’ satisfaction and group members’ performance (Campion et al., 1993; Shaw et al., 2000). Wageman and Baker (1997) also demonstrated that task interdependence and reward interdependence interactively influence cooperation within a group.

Perceived efficacy in research

As mentioned early, self-efficacy plays a key role in research activities (Bandura, 1997). Some studies (Parker, 1994; Vasil, 1992) have suggested a predictive relationship between research efficacy and research performance. Some studies (Schoen & Winocur, 1988; Taylor et al., 1984) have suggested that academics were more likely to have lower self-efficacy in research than in teaching.

Landino and Owen (1988) demonstrated that research self-efficacy was positively related to such performance accomplishments (enactive mastery experiences) as highest earned degree and number of publications, and such indicators of vicarious learning (vicarious experiences) as percentage of
women in a department, mentoring and group participation, which partially supported Bandura's (1997) argument about sources of self-efficacy. In addition, age and university responsiveness (feeling encouraged and rewarded by a university or a department) were also demonstrated to be related to research self-efficacy (Landina & Owen, 1988).

Park (1994) found that collective efficacy in teaching Mathematics was positively associated with actual achievement, whereas with other disciplines, Reading and Languages, this was not the case. Bandura (1997) suggested that Mathematics is less “culture-laden” and a more accurate collective efficacy was formed in this team. In less culture-laden domains or disciplines, such as in the Natural Sciences, perceived self-efficacy in research activities may be more likely to be related to actual performance among academics in universities than more culturally influenced disciplines such as the Social Sciences. It may be argued that discipline-type mediates the positive relationship between collective efficacy and group performance and discipline may mediate the relationship between self-efficacy and individual’s performance in the same way.

Although research groups are quite different from workgroups in business, they may be expected to operate in similar ways in terms of collectivism because, research group are generally composed of academic workers who receive a salary. Collectivism is likely to have a strong effect on
cooperative behaviours in research groups. A good research performance needs to employ innovation and creativity to achieve ideal results from research activities. In collectivist cultures, people are less encouraged to question established theories and authority than in individualist cultures (Triandis & Gelfand, 1998). Once some points of view are published or management adopts some proposals, few people are willing to challenge their accuracy and function. In addition, in collectively-oriented systems, concerned with face-saving (Hui & Triandis, 1986; Ting-Toomey, 1988), people try to show respect for other people’s feelings. Therefore, in order to maintain a good relationship with others in a research team or a discussion group, most members could be expected to be hesitant to put forward their own opinions or refute an argument in public, which is not conducive to improving research activities. For instance, when with the mere purpose of making a research procedure better, a member in a research group questions a proposal raised by another member in the presence of others, it would be likely to cause the latter’s unhappiness and subsequently lead to potential dissonance between them.

2.4.3. Context: collectivism and research in Mainland China

Collectivism in Mainland China

To this point in time, it has been well documented that Chinese people have
a long-term collectivist tradition and a strongly collectivist orientation (Hofstede, 1983). In the early classic work of Hofstede (1980), *Culture’s Consequence*, Mainland China was not included among the 40 surveyed countries or areas, and subsequently, in an extended survey (Hofstede, 1983). However, in spite of this, people in Mainland China are still considered collectivist. Many comparative studies of individualism and collectivism have been based on surveys involving Chinese people outside Mainland China, such as Hong Kong, Taiwan or even in the United States (for example, Leung & Bond, 1984; Singelis et al., 1999). In cross-cultural research, Chinese people have consistently tended to cluster at the collectivism end of the individualism and collectivism continuum. Hofstede (2001) concluded that Chinese have a long-term collectivist tradition and orientation.

Chinese have been following Confucian ideas for more than 2000 years, with emphasis on interrelatedness and kindness (Hsu, 1981). Confucius exhorted Chinese to treat each other in a sincere, polite and humble way. In addition, people in Mainland China have undergone a great variety of political and economic transformations for more than five decades and communist ideology has consistently occupied a leading position (Fairbank, 1987). Communism proposes individuals work hard for the benefit of collectives. This idea is reinforced in each student’s mind through required
coursework at school. These experiences have, by and large, reinforced traditional collectivistic orientations in Mainland China, especially those of intellectuals (Altbach, 1998).

Some researchers (for example, Hsu, 1981) have argued it is difficult to find a concept of personality in Chinese equivalent to that in Western countries. Chinese tradition does not encourage individuals to be separate from society and culture. A person’s intimate societal and cultural environment makes that person’s existence meaningful. Chinese people generally adjust their views relatively easily to their intimate societal and cultural environment (Hsu, 1981).

More recently, some research has focused on examining and identifying Chinese traditional values (for example, Cheung & Leung, 1998; Ho, 1996). Some personality traits or values have been identified to be indigenous to China and unique from the Big Five personality traits (Costa & McCrae, 1992), such as Ren Qing and filial piety. Filial piety is related to the demand for children to obey and honour their parents and ancestors. Zhang and Bond (1998) argued that absolute authority is not only applicable to parents over children but also to seniors over juniors in generational rank. Ren Qing refers to relationship-orientated values related to various social exchanges in terms of resources, courteous rituals and nepotism (Cheung, Leung, Fan, Song, Zhang & Zhang, 1996). For example, an individual
should appreciate a favour or a present from others and should repay it in the future.

Research in Mainland China

Let us consider the research system in Mainland China, which constitutes the main context for this review. Research in China is mainly undertaken by professional research institutes and universities. Governmental, specialized departments, such as the National Natural Science Foundation, established in 1986, generally allocate research funding to these research institutes and universities. Under the Chinese Academy of Science and Chinese Academy of Social Sciences, the research institutes in various fields undertake research projects separately from universities.

Since the 1980s, universities have been encouraged to develop substantial research missions. Although, arguably, a more open academic climate in China enables scholars to publish their work in international academic journals, and many Chinese academic journals follow internationally accepted standards for good scholarship, scientific research has generally failed to establish an international reputation in China (Lin & Fan, 1990). Because the government has given priority to conducting research in basic science and technology, research achievements in the natural sciences are much greater than those in the social sciences and humanities (Du, 1992).
Award systems have been established to recognize successful research productivity and researchers (Lin & Fan, 1990). Most universities evaluate the capabilities and academic achievement of their staff based on the awards that they have achieved.

As a consequence of the long-term centralization of the higher education system, research activities appear to be focused on serving national development. Many research tasks are assigned to universities and to some extent, are compulsory. In addition, political policies affect research activities in Mainland China, as they do in other countries, which makes the formation and operation of research groups in universities more complicated. An emphasis has been given to the research of the natural sciences rather than that of the social sciences since the People’s Republic of China was established (Lin & Fan, 1990).

2.4.4. Research questions

As mentioned earlier, self-efficacy is a strong predictor of individual performance (Bandura, 1997). Self-efficacy is a concept rooted in western theories, however, some researchers, such as Smith and Bond (1999) and Bandura (1997), have considered it to be a universal. Although some empirical studies in China have provided positive support for this theory, there has been limited research involving this framework and academics in
China. Since self-efficacy may play a key role in research activities, it is an appropriate construct to include in a study of academics in Beijing. It is expected that self-efficacy in research will predict individual academics’ research performance. In addition, self-efficacy is expected to be related to collective efficacy in this study.

Research in cultural differences, individualism and collectivism, has been carried out for a long time (Earley & Gibson 1998). However, relatively little research in idiocentrism and allocentrism, has been carried out, especially among academics in Mainland China. As mentioned earlier, collectivists are more likely to have lower self-efficacy than individualists (Sastry & Ross, 1998; Tafarodi et al., 1999). It is expected that a similar relationship between idiocentrism-allocentrism and self-efficacy in research exists for academics in Mainland China.

It is the researcher’s experience that in Mainland China academics in universities are likely to carry out research cooperatively rather than individually. In addition to the large scale and complication of many assigned tasks, which have to involve more than one academic, the collectivist culture is likely to be a central contributor to preference for group research.

One possible explanation is that researchers in Mainland China might be
accustomed to close relationships among individuals and a sense of membership to some group, for example, the department or faculty. Since collectivists are more likely to perform better under conditions of shared responsibility and an achievable outcome (Hui & Triandis, 1986), it is expected that researchers in China with a strong allocentric orientation are willing to contribute to the collective betterment, and at the same time, hope to share the rewards and findings of the group in the end.

However, there are no known published empirical studies in the universities of Mainland China that have investigated the relationship between preference for group work and allocentrism. Preference for carrying out research cooperatively may be predicted to be related to idiocentrism and allocentrism among academics in Mainland China.

In summary, this study will address the following research questions: Does academic self-efficacy in research predict research performance among academics in Beijing universities? Is academics’ cultural orientation related to their self-efficacy in research or collective efficacy in research? Do Chinese academics in Beijing prefer group research? Is their cultural orientation related to their preference for group research?

2.4.5. Research hypotheses

The first hypothesis of this study is to examine Bandura’s (1997) predicted
association of self-efficacy with actual performance. So the first hypotheses is:

**Hypothesis 1:** Self-efficacy in research will be positively related to research productivity.

Self-efficacy is important for both individualist cultures and collectivist cultures. Bandura (1997) argued that self-efficacy, in fact, can serve multiple purposes, many of which are related to collectivist values. Importantly, “cultural values and practices affect how efficacy beliefs are developed, the purposes to which they are put and the way in which they are best exercises in particular cultural milieus” (Bandura, 1997, p.32).

Collectivists are more likely to have a lower self-efficacy than individualists (Sastry & Ross 1998; Tafarodi et al., 1999) and perform poorly in a culturally heterogenous group (Bandura, 1997). This study attempts to examine this relationship between self-efficacy and allocentrism-idiocentrism among academics in Beijing. So the second and third hypotheses are:

**Hypothesis 2:** Self-efficacy in research will be positively related to independent self-construal and idiocentrism.
Hypothesis 3: Self-efficacy in research will negatively related to interdependent self-construal and allocentrism.

Self-efficacy plays a key role in the formation of collective efficacy although collective efficacy is not simply the sum of self-efficacy (Bandura, 1997). The nature of the relationship of self-efficacy with collective efficacy may vary with context (Bandura, 1997). It is expected that there is a significant relationship between self-efficacy in research and collective efficacy in research. So the fourth hypothesis is:

Hypothesis 4: Collective-efficacy in departmental research will be positively related to self-efficacy in research.

Preference for group work is considered to be one factor of collectivism. This study attempts to examine the relationship between allocentrism-idocentrism and preference for group research. Allocentric academics are expected to favour group work in Beijing, so the fifth and sixth hypotheses are:

Hypothesis 5: Preference for group research will be positively related to interdependent self-construal and allocentrism.

Hypothesis 6: Preference for group research will be negatively related to independent self-construal and idiocentrism.
Chapter three: Methodology and methods

3.1. Introduction

This study was designed to examine relationships between self-efficacy in research, collective efficacy in research, idiocentrism.allocentrism and preference for group work in Beijing universities. A survey questionnaire was used to collect data for these purposes. This chapter discusses the methods of the survey and principal methodology employed, including sampling and instruments.

3.2. Methods

3.2.1. Identification of the population

There are fifty-seven universities (or higher education institutions) in Beijing, all are public universities governed by the Chinese government. Some are general in the sense that they cover most science and social science subjects. Some are specialized, focusing on one or two areas. Teaching and research quality varies significantly across these universities. According to official statistics (Beijing Municipal Education Commission, 2001), there are more than 30,000 academic staff in higher education in Beijing. It should be noted that academics just beginning an academic position in Chinese universities undertake very little research because
research is not expected of them. They were excluded from this study. Therefore, according to official statistics (Beijing Municipal Educational Commission, 2001), about 20,000 academics, professors, associate professors, senior lecturers and lecturers, constitute the population in this study.

3.2.2. Sampling

The minimum sample size was intended to be 250 subjects. The first selection was of universities and the second was department or faculty within the sampled university. First, each university was given a number from 1 to 57. Secondly, these numbers representing each university were sampled according to a table of random number. Although it was intended to survey 10 universities, 20 universities were selected initially, in expectation that some would not approve the administration of the survey. The universities randomly selected were contacted for approval. When an application was rejected, the researcher moved to the next until ten universities were selected. A list of departments or faculties was obtained from each cooperative university. Those departments or faculties became the second stratum. The procedure in the first stratum was repeated in the second one. It was intended to sample one or two departments or faculties in each cooperative university. The number of departments or faculties selected depended on the size of the department or faculty. More
specifically, if the randomly selected department or faculty consisted of more than fifty academic staff, one department or faculty was selected. If the department or faculty consisted of less than fifty academic staff, two departments or faculties were selected. Finally, 296 valid questionnaires were collected.

3.2.3 Instruments

The self-administered questionnaires consisted of two sections (see Appendix C). Section A was designed to measure constructs related to research activities, namely, self-efficacy in research, research productivity, collective-efficacy in research and preference for group research. Section B was designed to measure independent-interdependent self-construals and co-worker allocentrism.

**Self-efficacy in research**

According to Bandura (2001), self-efficacy differs in generality, strength and level. Research activities in Beijing were described using the Academic Self-efficacy Scale (Schoen & Winocur, 1988), which consisted of 33 items related to research activity. Twelve research activities were chosen as relevant for the Chinese university context in this study. These activities were publishing textbooks, publishing academic books, publishing articles in domestic journals, publishing articles in international journals, taking
charge of research projects, participating in research projects, initiating research interests, publishing papers in domestic conferences, publishing papers in international conferences, supervising Doctoral degree candidates, supervising Masters degree candidates and obtaining research funds.

According to Bandura (2001), a continuous scale should be used to measure self-efficacy. The subjects responded to the self-efficacy items on an 11-point scale, ranging from 0%, not at all confident, to 100%, completely confident.

**Research productivity**

Research productivity has been largely used to assess academics’ accomplishments, especially for the purpose of academic promotion (Landino & Owen, 1988). Research productivity was used in this study to measure academics’ performance.

This scale was designed to correspond to the self-efficacy items except that item 7, “developing research interests”, was excluded from the research productivity scale, as it was difficult to measure by quantitative methods. This scale was intended to measure the “amount” of research activity on an 11-point scale, from not at all to 10. For example, academics were required to tick how many articles they had published in national journals in the last five years.
Collective-efficacy in research

As discussed in the literature review, collective efficacy is not simply the sum of individual members’ self-efficacy (Bandura, 1997). There are three main methods to measure collective efficacy (Bandura, 2001). The first is to “aggregate the individual members’ appraisals of their personal capability to execute the particular functions they perform in the group” (Bandura, 2001, p.7). The second is to “aggregate members’ appraisals of their group’s capability operating as a whole” (Bandura, 2001, p.7). The third is to have the group arrive at a unanimous judgement of the group’s capability by group discussion. The third method was excluded from this study because of practical problems, such as persuasive effects from powerful members that could distort the judgement (Bandura, 2001). The first method was also excluded as it did not fit the context of this study. The second method was used to calculate the collective efficacy in this study.

Collective efficacy was measured on the basis of department or faculty because much academic cooperation in China happens among the colleagues within a department. In general, academics in Beijing carry out research activities that are normally supervised in their departments which are called “Danwei” in China (Earley, 1993). “Danwei” is translated directly into “Unit” in English, which all Chinese people call their work
places. Most universities are governed and administered by the Chinese government. The connection between academics and their "Danwei" is still very important for individual academics. They rely on departments or faculties or the dean for promotion, rewards and achievement. They prefer to defer to the rules in departments or faculties and show respect to the deans. So one may expect "Danwei" to play a key role in academics' activities and behaviours. Because of the above, department or faculty was selected as the basis for measuring collective efficacy in this study.

The collective efficacy scale consisted of 10 items that covered both the group research activity and coordinating or interacting activities within the group. Item 1, "to initiate research interests", item 4, "to undertake leading national research projects", item 5, "to undertake leading international research projects", item 6, "to obtain research fund", item 9 "to reach advanced national standard in its research area" and item 10, "to reach advanced international standard in its research area", were related to group research activity. Item 2, "to encourage academic creativity", item 3, "to establish and improve academic atmosphere", item 7, "to allocate research funds reasonably and item 8, "to carry out academic discussion and communication", were related to coordinating or interacting activities within the group.
The subjects responded to these statements on an 11-point scale, ranging from 0%, not at all confident, to 100%, completely confident.

Preference for group research

The instrument for preference for group research was adapted from Shaw et al.’s Preference for Group Work Scale (2000) to fit the Chinese context. Shaw et al. (2000) attempted to distinguish preference for group work from other individualism and collectivism dimensions. This scale comprised 7 items that were related to two aspects defined in the concept of preference for research group. Item 1, “I try to carry out research cooperatively with others instead of by myself”, item 2, “I prefer to work in a research team rather than individually”, item 3, “carrying out research in a group is better than working alone” and item 4, “Given a choice, I would rather select a research task where I can work alone rather than a research task where I have to work with others”, were related to the willingness to select a group task rather than an individual task. Item 5, “If I were in a research group, I would prefer to do my own work and let others do theirs”, item 6, “I like to interact with others when carrying out research cooperatively, and item 7, “I personally enjoy carrying out research with others”, were related to the extent of enjoying group work. Items 4 and 5 were expressed negatively compared to the other items.
The subjects responded to the statements on a 5-point Likert-type scale, ranging from strongly disagree to strongly agree. Higher scores in this scale indicate higher preference for carrying out research in a group.

**Independent and interdependent self-construals**

Singelis’s Self-construal Scale (SCS) was selected to measure independent and interdependent self-construals.

Singelis (1994) demonstrated the validity of the SCS, especially its construct validity, which is particularly important for instruments measuring aspects of human behaviours. Singelis et al. (1994) also found, as expected, that interdependence of self-construal was positively associated with collectivism and independence of self-construal was positively associated with individualism.

An English version of the SCS and two Chinese versions were obtained from Singelis by personal correspondence. The researcher translated the SCS English version to Chinese independently then compared this version to the two Chinese versions given by Singelis. The researcher renamed some concepts in Chinese, which might confuse the subject in the other Chinese versions. For example, group was a very broad and vague concept in these versions. A group was translated into 小组 in one Chinese version.
and into 团体 in another. The researcher changed it into a concept, 集体, restricted to the work setting for subjects in Chinese.

The adapted SCS consisted of 30 items, 15 related to independent self-construal and 15 related to interdependent self-construal. The subjects responded to these items on a 7-point Likert-type scale, ranging from strongly disagree to strongly agree.

**Co-worker allocentrism**

Hui’s (1988) Individualism-Collectivism (INDCOL) Scale was developed to measure collectivism at the individual level related to six target groups, namely, spouse, parents, kin, neighbours, friends and co-workers. Only the most relevant part, co-worker allocentrism was used in this study. Approval for using part of the scale was obtained from Hui by personal correspondence. He confirmed that some other researchers had already used one part of this scale for their studies. Hui’s INDCOL was selected not only because it was developed to measure an individual’s cultural tendency but also because it had been validated with Hong Kong Chinese.

A Chinese version and an English version were obtained from Hui by personal correspondence. The researcher translated the scale from English to Chinese and then compared this Chinese version to Hui’s Chinese version. Only some minor changes were made to Hui’s Chinese version to
fit differences between Hong Kong and Mainland China. For example, they used different titles to describe supervisors and subordinates.

The co-worker allocentrism scale comprised 11 items (see Appendix C). Item 1 “It is inappropriate for a supervisor to ask subordinates about their personal life”, item 2 “When I am among my colleagues, I do my own thing without minding about them”, item 4 “I have never loaned my camera/coat to any colleagues”, item 5 “We ought to develop the character of independence among the other colleagues, so that they do not rely much on others’ help”, item 6 “One should indicate his opinion when discussing with the other colleagues, and then take into action”, item 10 “In most cases, to cooperate with someone whose ability is lower than one’s own is not as desirable as doing the thing alone” and item 11 “Do you agree with the proverb ‘too many cooks spoil the broth.’”, were expressed negatively. The subjects responded to the items on a 6-point Likert-type scale, ranging from strongly disagree to strongly agree.

**Demographic information**

The questionnaire collected personal information, namely, sex, age, rank, tenure and discipline. Age and tenure in this study were measured as non-metric variables in order to make it more convenient for respondents, ticking instead of writing.
Age consisted of eight categories, with the first “below 30” and the last “over 60”, each category in the middle covering five years. The types of rank were lecturer, senior lecturer, associate professor, and professor. The tenure in this study referred to the number of years in universities working as an academic. Tenure had 12 categories, with the first “less than one year” and the last “more than 11 years”, each category in the middle covered one year. The respondents were asked to write down their academic disciplines. All these disciplines would eventually be categorized into social sciences and natural sciences. The demographic section was at the end of the questionnaire.

3.3. Factor analysis

Factor analysis of the data was employed to identify factors representing theoretical constructs and reduce the number of variables. All the factor analyses were conducted using SPSS.

*Appropriateness of the factor analysis method*

Initially the appropriateness of applying factor analysis was evaluated by analysis of two indices. The first was the Kaiser-Meyer-Olkin statistic (KMO) and the second was Bartlett’s test of sphericity.
The KMO is a statistical test of the sample adequacy by comparing the magnitudes of the observed correlation coefficients to the magnitudes of the partial correlation coefficients (Hair, Anderson, Tatham & Black, 1998). Small values for the KMO measure indicate that a factor analysis for the variables may not be appropriate, since correlations between pairs of variables cannot be explained by the other variables. Kaiser (1974, cited in Hair et al., 1998) characterized measures in and above the 0.70s as acceptable.

Bartlett’s test of sphericity is a statistical test for the overall significance of all correlations within a correlation matrix (Hair et. al., 1998). It provides a statistical probability that the correlation matrix has significant correlations between at least some of the variables. Bartlett’s test of sphericity should be large and significant enough for factorability.

**Factor extraction method**

Principal axis factoring was selected to extract the factors in this study. In principal axis factoring, the first axis extracted accounts for the largest amount of variance. The second factor consists of the next largest amount of variance that is not explained by the first factor. The third factor extracts the next largest amount of the variance, and so on (Pedhazur, 1997).
The criteria for the number of factors extracted were eigenvalues greater than one, scree test and most importantly, interpretation (Hair et al., 1998). The first method is known as Kaiser’s criterion. Only the factors with eigenvalues greater than one are meaningful since each single variable is supposed to have a variance of one. The second criterion is the graphical scree test that illustrates the descending variance accounted for by the factors initially extracted. The factors to be retained are those that emerge before the eigenvalues seem to level off. The third criterion is interpretability. If one cannot interpret the factors then they should be removed from further analysis.

**Factor rotation method**

Factor rotation is an important tool to assist interpretation of factors. The factors first extracted may include more items with a lower loading. In most cases, rotated factor solutions will provide a more interpretable pattern of variable loadings by simplifying the factor structure of the unrotated factor solution (Hair et al., 1998). Orthogonal and oblique are the two main rotation methods (Hair et al., 1998). With orthogonal rotation the factors are extracted so they are maintained at 90 degrees. Each factor is independent of all other factors. Orthogonal rotation is based on the assumption that the factors are not strongly correlated. For oblique rotation
the factors are extracted so that they are correlated. Oblique rotation is based on the assumption that the factors are interrelated.

In this study, varimax, orthogonal rotation, was applied first, then, oblimin, oblique rotation, was applied and solutions compared. When the factor structure was essentially the same for both methods, the orthogonal solution was used for further analysis.

**Reliability**

Reliability refers to the degree to which a test consistently measures whatever it measures (Hair et al., 1998). There are two commonly used measures of reliability, external reliability and internal consistency. External reliability refers to the degree of consistency of a measure over time. Internal consistency requires all items in one scale should measure the same construct and thus be highly intercorrelated. Internal consistency was assessed in this study. One of the most commonly used reliability coefficients is Cronbach’s alpha that ranges from 0 to 1 and was used in this study to determine factors’ validity and reliability.

**3.4. Multiple regression**

Multiple regression is used to identify relationships among variables and estimate the amount of variance in a dependent variable accounted for by
one or more independent variables (Hair et al., 1998). The purpose of multiple regression analysis is to establish a regression model with two or more independent variables. Once a factor solution with acceptable reliability is reached, regression analysis is needed to examine the relationships between the independent and dependent variables. There are three types of multiple regression methods, namely, standard, hierarchical and stepwise.

The hierarchical method was used in this study when demographic variables were put into the regression models. The order of the variables was determined temporally. For example, sex was determined first at birth, and so was entered first. The stepwise method was used when non-demographic variables were put into the regression models.
Chapter four: Data analyses and discussion

4.1. Introduction

This chapter presents the data analysis and results. Factor analysis was first employed to identify interpretable dimensions of all variables, namely, preference for group research, self-efficacy in research, collective efficacy in departmental research, independent-interdependent self-construal and co-worker allocentrism. The reliability of the factors was then examined and the factor scores were calculated for each individual case. Next, the intercorrelations between the factors were examined. Finally, four multiple regression models were established for four dependent variables, namely, research productivity, self-efficacy in research, collective efficacy in departmental research and preference for group research. The relationships between variables were discussed in the following sections.

4.2. Factor analysis

4.2.1. Factor analysis of preference for group research items

The preference for group research scale consisted of seven items, with items 4 and 5 reverse coded before the factor analysis. Factor analysis of preference for group research was carried out using SPSS. First, the factorability of the data was assessed. A sample size of 296 for a seven-item scale more than met the desirable ratio for factor analysis. The Kaiser-Meyer-Olkin (KMO) of 0.79 was satisfactory, and the Bartlett’s test of
sphericity, 771.9 \( (p<0.001) \), was statistically significant. The correlation matrix had a considerable number of correlations exceeding 0.3, which also indicated that factor analysis was appropriate for these data.

The data collected for preference for group research were analysed using principal axis factoring. Factor extraction criteria included eigenvalues greater than one, scree test and most importantly, interpretation. Principal axis factoring produced two possible factors from the preference items with eigenvalues of 3.38 and 1.0, explaining 48.2\% and 15.2\% of the variance respectively. The scree test (see Figure 4.1) also suggested that two factors might be appropriate.

![Scree Plot](image)

**Figure 4.1 First factor scree for preference for group research items**

To aid in the interpretation of these two factors, varimax rotation was
performed. The rotated solution (see Appendix Table 4.1) revealed that both factors showed a number of strong loadings, but item 4 loaded significantly (higher than 0.3) on both factors. Item 4, “Given the choice, I would rather select a research task where I can work alone rather than do a task where I have to work with others”, had low loadings on both factor 1 (0.31) and factor 2 (0.36).

In order to improve the interpretation, factor analysis was conducted again without item 4. The result suggested a two-factor solution (see Appendix Table 4.2). However the reliability coefficient was relatively low for the second factor (r=0.58). The loading of item 5 (0.32) on the second factor was still low, which suggested removing item 5 to improve the factor structure. It is possible that items 4 and 5 may not have been reliable because more complicated wording could lead to some respondents misunderstanding the intended meaning of the items.

**Factor solution of preference for group research items**

Principal axis factoring was repeated without items 4 and item 5 in order to improve the factor solution. The same procedures and criteria were adopted as in the first analysis.

Principal axis factoring produced one interpretable factor with an eigenvalue of 2.96, accounting for 59.1% of the variance. The scree plot (see Figure 4.2) suggested one factor.
The factor solution is shown in Table 4.1. The factor, named *preference for group research*, comprised 5 items that referred to the degree to which individuals prefer to carry out research in groups. The reliability of this factor was 0.82.

Regression factor scores of *preference for group research* were generated for each respondent using SPSS.

**4.2.2. Factor analysis of self-efficacy in research items**

Significant correlations were found between many of the items in the self-efficacy scale. Bartlett's test statistic was 2323.9 (p<0.001) and KMO was
Table 4.1 Principal axis final solution for preference for group research items

<table>
<thead>
<tr>
<th>Factor/Item</th>
<th>Loading</th>
<th>Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Factor 1 Preference for group research</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. I prefer to work in a team rather than individually.</td>
<td>0.83</td>
<td></td>
</tr>
<tr>
<td>3. Carrying out research in a group is better than working alone.</td>
<td>0.80</td>
<td></td>
</tr>
<tr>
<td>1. When I have a choice, I try to carry out research with others instead of by myself.</td>
<td>0.76</td>
<td></td>
</tr>
<tr>
<td>7. I personally enjoy carrying research with others</td>
<td>0.66</td>
<td></td>
</tr>
<tr>
<td>6. I like to interact with others when carrying out research cooperatively.</td>
<td>0.41</td>
<td></td>
</tr>
</tbody>
</table>

0.88. This provided evidence that factor analysis was appropriate for these data.

Principal axis factoring of the self-efficacy in research items produced two interpretable factors with eigenvalues of 6.84 and 1.05 that accounted for 57% and 8.7% of the variance respectively. The scree test (see Figure 4.3) also suggested two factors were appropriate.
Varimax rotation was first employed to produce an interpretable two-factor solution and loadings on the factors are shown in Table 4.2.

The factor *self-efficacy in higher order research activities* included items related to relatively more difficult research tasks. The factor *self-efficacy in lower order research activities* comprised items related to comparably easier tasks. For example, item 10 “To supervise Doctoral degree candidates” compared to item 11 “To supervise Master degree candidates”; item 4 “To present papers in international journals” compared to item 3 “To present papers in domestic journals”.

*Figure 4.3 Factor scree for self-efficacy in research items*
<table>
<thead>
<tr>
<th>Factor / Item</th>
<th>Loading</th>
<th>Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Factor 1 Self-efficacy in Higher Order Research Activities</strong></td>
<td></td>
<td>0.88</td>
</tr>
<tr>
<td>4. To publish articles in international journals.</td>
<td>0.85</td>
<td></td>
</tr>
<tr>
<td>9. To present papers in international conferences.</td>
<td>0.84</td>
<td></td>
</tr>
<tr>
<td>10. To supervise Doctoral degree candidates.</td>
<td>0.68</td>
<td></td>
</tr>
<tr>
<td>7. To initiate research interests.</td>
<td>0.56</td>
<td></td>
</tr>
<tr>
<td><strong>Factor 2 Self-efficacy in Lower Order Research Activities</strong></td>
<td></td>
<td>0.89</td>
</tr>
<tr>
<td>2. To publish academic books.</td>
<td>0.65</td>
<td></td>
</tr>
<tr>
<td>8. To present papers in domestic conferences.</td>
<td>0.65</td>
<td></td>
</tr>
<tr>
<td>1. To publish textbooks.</td>
<td>0.65</td>
<td></td>
</tr>
<tr>
<td>3. To publish articles in domestic journals.</td>
<td>0.65</td>
<td></td>
</tr>
<tr>
<td>11. To supervise Master degree candidates.</td>
<td>0.60</td>
<td></td>
</tr>
<tr>
<td>5. To take charge of research projects.</td>
<td>0.59</td>
<td></td>
</tr>
<tr>
<td>12. To obtain research funds.</td>
<td>0.55</td>
<td></td>
</tr>
<tr>
<td>6. To participate in research projects.</td>
<td>0.50</td>
<td></td>
</tr>
</tbody>
</table>

Because of the relative high correlation between the two factors (0.70), oblimin rotation was also carried out. The result (see Appendix Table 4.3) was essentially the same two-factor model but the factor *self-efficacy in lower order research activities* emerged first.

The factor scores of *self-efficacy in lower order research activities* and *self-efficacy in higher order research activities* were obtained for each respondent using SPSS.
4.2.3. Factor analysis of collective-efficacy for research items

The correlation matrix of the collective-efficacy for research items revealed that most variables were highly correlated, with all correlations exceeding 0.5. Bartlett’s test of sphericity was 2446.4 (p<0.001) and the KMO was 0.88, which suggested suitability for factor analysis.

Principal axis factoring of the collective-efficacy for research items was performed and one factor was extracted, accounting for 66.6% of the variance. The scree plot (see Figure 4.4) also suggested that there was one factor.

An examination of the factor matrix (see Table 4.3) indicated that all the
items were highly loaded on this factor, which strongly suggested that this measure was unidimensional. The reliability coefficient for this factor was 0.94. This factor was named *collective efficacy in departmental research*.

**Table 4.3 Principal axis final solution for collective-efficacy in research items**

<table>
<thead>
<tr>
<th>Factor / Item</th>
<th>Loading</th>
<th>Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Factor 1 Collective-efficacy in departmental research</strong></td>
<td></td>
<td>0.94</td>
</tr>
<tr>
<td>4. To undertake leading national research projects.</td>
<td>0.87</td>
<td></td>
</tr>
<tr>
<td>2. To encourage academic creativity.</td>
<td>0.84</td>
<td></td>
</tr>
<tr>
<td>9. To reach advanced national standard in its research area.</td>
<td>0.83</td>
<td></td>
</tr>
<tr>
<td>3. To establish and improve academic atmosphere.</td>
<td>0.80</td>
<td></td>
</tr>
<tr>
<td>5. To undertake leading international research projects.</td>
<td>0.80</td>
<td></td>
</tr>
<tr>
<td>10. To reach advanced international standard in its research area.</td>
<td>0.78</td>
<td></td>
</tr>
<tr>
<td>1. To initiate and develop research interests.</td>
<td>0.78</td>
<td></td>
</tr>
<tr>
<td>6. To obtain research funds.</td>
<td>0.75</td>
<td></td>
</tr>
<tr>
<td>8. To carry out academic discussion and communication</td>
<td>0.75</td>
<td></td>
</tr>
<tr>
<td>7. To allocate research funds reasonably.</td>
<td>0.73</td>
<td></td>
</tr>
</tbody>
</table>

The factor scores of *collective-efficacy in departmental research* were generated for each respondent using SPSS. It was decided to use individual members of perceived collective efficacy in departmental research, rather than calculating an average for each department, because not all departmental members participated in the research, and such averages could be misleading.
4.2.4. Singelis’ Self-construal Scale items

Factor analysis was carried out with Singelis’ Self-construal Scale items, which included 15 independent self-construal items and 15 interdependent self-construal items. Independent self-construal and interdependent self-construal items were analysed together. It was reasonable to expect that the independent self-construal items and interdependent self-construal items would cluster into the subcategories of independent self-construal and interdependent self-construal respectively (Singelis, 1994). Neither independent self-construal items nor interdependent self-construal items were reverse coded. In the factor analysis procedure, the independent and interdependent self-construal items were denoted by abbreviations “inde” and “inter” respectively in order to identify their clusters.

*Factor analysis procedure for independent-interdependent self-construal items*

The data were analysed using principal axis factoring. The same factor extraction criteria were applied as before, including eigenvalues greater than one, scree test and interpretation. An orthogonal rotation was initially used based on the supposition that the factors were not interrelated.

Bartlett’s test statistic was 1963.6 (p<0.001) and the KMO measure of sampling adequacy was 0.78. This provided evidence that factor analysis was appropriate for these data.
Principal axis factoring for self-construal items produced nine “possible” factors with an eigenvalue over 1. The scree test (see Figure 4.5) suggested five factors might be appropriate. However, seven were considered since items in the sixth and seventh “possible” factors made sense.

![Scree Plot](image)

**Figure 4.5 First factor scree for self-construal items**

An orthogonal rotated solution (see Appendix Table 4.4) revealed that all these seven factors had a number of strong loadings (higher than 0.3). Inter 3 “I respect people who are modest about themselves” had a loading of 0.48 on factor 3, an independent-item-dominant factor, and a loading of 0.40 on factor 5, an interdependent-item-dominant factor (For the sake of this discussion, an independent-item-dominant factor refers to a factor for which most items were independent self-construal items. An
interdependent-item-dominant factor refers to a factor for which most items were interdependent self-construal items). The cross loadings suggested this item was problematic.

Factor 2 was composed of two independent items and two interdependent items, all positively loading on this factor, and was not interpretable. For example, independent item 9 "speaking up during a meeting is not a problem for me" might not reflect an independent identity in this context because the ability to speak in public is a characteristic of academic work.

Inde 2, "I can talk openly with a person whom I meet for the first time, even when this person is much older than I am", had cross loadings on factor 1 (0.35) and factor 5 (0.32). Inde 8, "I am comfortable with being singled out for praise or rewards", have a low loading on factor 4 and was not interpretable within this factor. Inter 8 "if my brother or sister fails, I feel responsible" was also not consistent with other items in factor 5. Inde 3, "I do my own thing, regardless of what others think", was the only independent item loading negatively on factor 6, an interdependent-item-dominant factor.

In order to improve the integrity and interpretability of the factor solution the items discussed above were removed before further analysis. A second factor analysis of self-construal items was conducted without inde 1, inde 2, inde 3, inde 8, inde 9, inde 11, inter 1, inter 3, inter 5, inter 8, inter 13. Principal axis factoring extracted five factors. The scree test shown in
Figure 4.6 also suggested five factors could be appropriate.

![Scree Plot](image)

**Figure 4.6 Second factor scree for self-construal items**

The orthogonal rotation solution was shown in Appendix Table 4.5. Factor 1 consisted of three independent items, inde 7, 10 and 15, and four interdependent items, inter 6, 7, 14 and 15. The independent items were not interpretable with those interdependent items in this factor. Although it was expected that interdependent items might make more sense in a Chinese context, inter 14 “It is important for me to maintain harmony within my group” and inter 15 “I usually go along with what others want to do, even when I would rather do something different”, had cross loadings with the second factor, an independent factor. It is possible they were inappropriate for the context of this study, and removed for further analysis.
Factor 4 included four interdependent items that related to different aspects. Inter 2 “I have respect for the authority figures with whom I interact” and inter 10 “I would offer my seat in a bus to my boss”, related to hierarchal respect, while inter 6 “I feel my fate is intertwined with the fate of those around me” and inter 11 “My happiness depends on the happiness of those around me”, related to horizontal relationships. Inter 6 had cross loading on factor 4 (0.41) and factor 1 (0.31). Some respondents said they never had a chance to meet their bosses or supervisors on the bus because most of them hardly use public transport. So inter 6 and inter 10 were removed before further analysis.

Although having close loadings on factor 4 (0.32) and factor 5 (0.37), item 4, “I will sacrifice my self interest for the benefit of the group I am in” was interpretable in factor 5 (0.37). This item was retained for further analysis.

*Factor solution of independent-interdependent self-construal items*

A third factor analysis was conducted without inde 1, inde 2, inde 3, inde 8, inde 9, inde 11, inter 1, inter 2, inter 3, inter 5, inter 8, inter 10, inter 13, inter 14 and inter 15. Principal axis factoring produced five interpretable factors with eigenvalues of 3.22, 1.84, 1.62, 1.18, and 1.08, accounting for 21.5%, 12.3%, 10.8%, 7.9% and 7.2% of the variance respectively. The scree test (see Figure 4.7) also suggested that a five-factor solution was appropriate.
This factor solution (see Table 4.4) suggested three independent self-construal factors and two interdependent self-construal factors. According to self-construal dimensions, independent self-construal factors were *self-expression, self-concern* and *independent identity*, and interdependent self-construal factors were *interdependence* and *obligation*. Some previously identified interdependent self-construal values, such as harmony and hierarchal orientation, did not emerge in the factor analysis, perhaps because of the context of the study.

Regression factor scores of these five factors were generated for each respondent using SPSS.
Table 4.4 Principal axis final solution for self-construal items

<table>
<thead>
<tr>
<th>Factor/Item</th>
<th>Loading</th>
<th>Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Factor 1 Self-expression</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inde 10 I act the same way no matter who I am</td>
<td>0.78</td>
<td>0.65</td>
</tr>
<tr>
<td>Inde 15 I act the same way at home that I do at work</td>
<td>0.51</td>
<td></td>
</tr>
<tr>
<td>Inde 7 I prefer to be direct and forthright when dealing with people I’ve just met</td>
<td>0.51</td>
<td></td>
</tr>
<tr>
<td><strong>Factor 2 Self-concern</strong></td>
<td></td>
<td>0.67</td>
</tr>
<tr>
<td>Inde 13. Being able to take care of myself is a primary concern for me.</td>
<td>0.84</td>
<td></td>
</tr>
<tr>
<td>Inde 12. I try to do what is best for me, regardless of how that might affect others.</td>
<td>0.63</td>
<td></td>
</tr>
<tr>
<td><strong>Factor 3 Independent identity</strong></td>
<td></td>
<td>0.59</td>
</tr>
<tr>
<td>Inde 4. I feel it is important for me to act as an independent person.</td>
<td>0.65</td>
<td></td>
</tr>
<tr>
<td>Inde 6. Having a lively imagination is important to me.</td>
<td>0.54</td>
<td></td>
</tr>
<tr>
<td>Inde 5. I'd rather say &quot;No&quot; directly, than risk being misunderstood.</td>
<td>0.52</td>
<td></td>
</tr>
<tr>
<td>Inde 14. My personal identity, independent of others, is very important to me.</td>
<td>0.37</td>
<td></td>
</tr>
<tr>
<td><strong>Factor 4 Interdependence</strong></td>
<td></td>
<td>0.60</td>
</tr>
<tr>
<td>Inter 7. I feel good when I cooperate with others.</td>
<td>0.64</td>
<td></td>
</tr>
<tr>
<td>Inter 6. I feel my fate is intertwined with the fate of those around me.</td>
<td>0.54</td>
<td></td>
</tr>
<tr>
<td>Inter 11. My happiness depends on the happiness of those around me.</td>
<td>0.44</td>
<td></td>
</tr>
<tr>
<td><strong>Factor 5 Obligation</strong></td>
<td></td>
<td>0.53</td>
</tr>
<tr>
<td>Inter 9. I often have the feeling that my relationships with others are more important than my own accomplishments.</td>
<td>0.63</td>
<td></td>
</tr>
<tr>
<td>Inter 12. I will stay in a group if they need me, even when I am not happy with the group.</td>
<td>0.57</td>
<td></td>
</tr>
<tr>
<td>Inter 4. I will sacrifice my self interest for the benefit of the group I am in.</td>
<td>0.38</td>
<td></td>
</tr>
</tbody>
</table>

Note: a. Inter means interdependent self-construal and Inde means independent self-construal
b. Varimax rotation was applied
4.2.5. Factor analysis of co-worker allocentrism items

*Factor analysis procedure of co-worker allocentrism items*

The co-worker allocentrism scale consisted of 11 items, with items 1, 2, 4, 5, 6, 10 and 11 reverse coded before the factor analysis. The correlation matrix revealed some correlations exceeded 0.3. The Bartlett’s test of sphericity was 486.9 (p<0.001) and the KMO was 0.71. Both suggested that factor analysis was suitable.

Principal axis factoring initially produced three factors. The scree test (see Figure 4.8) suggested three factors extracted were appropriate.

![Scree Plot](image)

**Figure 4.8 First factor scree for co-worker allocentrism items**

The orthogonal rotation (see Appendix Table 4.6) suggested a possible
three-factor solution. Item 6, “One should indicate his opinion when discussing with other colleagues, and then take action”, negatively loaded on factor 1 although it had already been reverse coded. Item 7, “The subordinate should obey the supervisor”, negatively loaded on factor 2 and was not consistent with other items within the factor. These two items were removed for further analysis.

**Factor solution of co-worker allocentrism items**

A second factor analysis of co-worker allocentrism was conducted without items 6 and 7 in order to increase interpretability of the factors. The same procedure and criteria were adopted as in the first analysis.

Principal axis factoring produced three interpretable factors with eigenvalues of 2.26, 1.84 and 1.04, accounting for 25.1%, 20.4% and 11.5%. The scree test (see Figure 4.9) suggested that three factors were appropriate.

The orthogonal solution is shown in Table 4.5. Factor 1 included four significant loadings, items 2, 4, 1 and 5. Items 2, 4 and 5 addressed the horizontal distance between colleagues. Item 1 concerned the vertical distance between supervisor and subordinate. Factor 1 was named **collegial distance**. Factor 2, comprising items 9, 8 and 3, was related to colleagues’ assisting each other and named **collegial contribution**. Factor 3 comprised two items concerned with willingness to cooperate and was named **collegial collaboration**.
Figure 4.9 Second factor scree for co-worker allocentrism items

It should be noted that the factor *collegial collaboration* has a relative low reliability coefficient (r=0.47). However, because it is interpretable, it was retained for further analysis.

The factor scores of the three co-worker allocentrism factors were generated for each respondent using SPSS.
### Table 4.5 Principal axis final solution for co-worker allocentrism items

<table>
<thead>
<tr>
<th>Factor/ Item</th>
<th>Loading</th>
<th>Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Factor 1 Collegial distance</strong></td>
<td></td>
<td>0.66</td>
</tr>
<tr>
<td><em>2. When I am among my colleagues, I do my own thing without minding about</em></td>
<td>0.67</td>
<td></td>
</tr>
<tr>
<td>*4. I have never loaned my camera/coat to any colleagues.</td>
<td>0.53</td>
<td></td>
</tr>
<tr>
<td><em>1. It is inappropriate for a supervisor to ask subordinate about their</em></td>
<td>0.53</td>
<td></td>
</tr>
<tr>
<td><em>5. We ought to develop the character of independence among colleagues,</em></td>
<td>0.49</td>
<td></td>
</tr>
<tr>
<td><strong>Factor 2 Collegial contribution</strong></td>
<td></td>
<td>0.62</td>
</tr>
<tr>
<td>9. I would help if a colleague at work told me that he/she needed money*</td>
<td>0.70</td>
<td></td>
</tr>
<tr>
<td>8. Colleagues’ assistance is indispensable to getting success.</td>
<td>0.55</td>
<td></td>
</tr>
<tr>
<td>3. One needs return a favour if a colleague lends a helping hand.</td>
<td>0.54</td>
<td></td>
</tr>
<tr>
<td><strong>Factor 3 Collegial collaboration</strong></td>
<td></td>
<td>0.47</td>
</tr>
<tr>
<td><em>11. Do you agree with the proverb “Too many cooks spoil the broth.”</em></td>
<td>0.69</td>
<td></td>
</tr>
<tr>
<td><em>10. In most cases, to cooperate with someone whose ability is lower</em></td>
<td>0.41</td>
<td></td>
</tr>
<tr>
<td><strong>Note:</strong> a. Item denoted by* were reverse coded</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>b.</strong> Varimax rotation was applied</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.3. Research productivity

Research productivity of academics was calculated according to the criteria published in the DEST Higher Education Research Data Collection and the UNSW Research and Publications Report (2002). One academic book was given five points. One chapter of the book was given one point. One article published in international journals was given one point and one article published in a local journal was given 0.5 point. One international conference publication was given one point and one domestic conference publication was given 0.5 point. Supervising one PhD student was given one point and one Masters degree student was given 0.5 point. The eleventh item “The funds received” was excluded from the calculation because it was difficult to encode it into scores corresponding to other research activities.

According to the above guidelines, a total score for research activities was calculated for each respondent. The scale of research productivity was designed to measure academics’ performance in the last five years, so the research productivity score was obtained by dividing the total score by five. However, for academics who had been in an academic position for less than five years, the measure was obtained by dividing the total score by tenure in the university.

4.4. Intercorrelations of factors

The correlations between factors were examined and the results are shown
in Table 4.6. The factor, *preference for group research*, was significantly related to a considerable number of allocentrism factors as expected. *Preference for group research* was positively significantly related to *interdependence* and *collegial contribution* ($r = 0.32$ respectively). *Interdependence* was an interdependent self-construal factor that emphasized a self inseparable from others. *Collegial contribution* was an allocentrism factor that emphasized the importance of helping colleagues. An academic who is willing to be involved in group research activities may be more interdependent, in general, and more likely to help her/his colleagues and vice versa. It is interesting to note that *preference for group research* was significantly positively related to independent self-construal factors, *self-expression* and *independent identity* (both $r = 0.13$), albeit, mildly. *Self-expression* was an independent self-construal factor that emphasized expressing oneself directly and forthrightly. *Independent identity* was an independent self-construal factor that emphasized independence from others, acting or thinking independently. This result suggests that an academic who preferred group research activities might express her/him self more strongly and identify her/him self more independently than others and vice versa.

The independent self-construal factor *self-expression* had a moderate significant positive relationship with the co-worker allocentrism factor, *collegial contribution* ($r=0.30$), and mild positive relationships with interdependent self-construal factors, *interdependence* and *obligation*. 
A possible explanation is that independent self-construal and interdependent self-construal coexist in one individual academic.

The independent self-construal factor self-concern, as expected, was significantly negatively related to co-worker allocentrism factors, collegial distance, collegial contribution and collegial collaboration \((r=0.33, r=0.21\) and \(r=0.19\) respectively). Self-concern was an independent self-construal factor that emphasized valuing oneself above others. Collegial distance was a co-worker allocentrism factor that emphasized distance and space between colleagues. Collegial contribution was a factor that focused on the importance of colleagues helping each other (Hui, 1988). For example, the view that colleagues’ help is indispensable for individual success. Collegial collaboration was a co-worker allocentrism factor that emphasized the preference for cooperation between colleagues.

Collegial contribution was significantly related to independent identity and obligation \((r=0.28\) and \(r=0.35\) respectively) and collegial distance was negatively related to self-expression and obligation \((r=0.19\) and \(r=0.18\) respectively). A positive significant relationship between collegial distance and collegial collaboration suggests that the more academics were close to colleagues the more likely they were to prefer to cooperate with colleagues, and vice versa.
### Table 4.6 Intercorrelation of factors

<table>
<thead>
<tr>
<th></th>
<th>PGR(^a)</th>
<th>SE(^b)</th>
<th>SC(^c)</th>
<th>ID(^d)</th>
<th>ID(^e)</th>
<th>OB(^f)</th>
<th>CD(^g)</th>
<th>CC1(^h)</th>
<th>CC2(^i)</th>
<th>SEHO(^j)</th>
<th>SELO(^k)</th>
<th>RP(^l)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Self expression</strong></td>
<td>0.13*</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Self concern</strong></td>
<td>-0.16*</td>
<td>0.00</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Independent identity</strong></td>
<td>0.13*</td>
<td>0.07</td>
<td>-0.01</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Interdependence</strong></td>
<td>0.32**</td>
<td>0.16**</td>
<td>-0.02</td>
<td>0.11</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Obligation</strong></td>
<td>0.07</td>
<td>0.14*</td>
<td>0.02</td>
<td>-0.03</td>
<td>0.08</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Collegial distance</strong></td>
<td>0.13*</td>
<td>-0.19**</td>
<td>-0.33*</td>
<td>-0.05</td>
<td>0.01</td>
<td>-0.18**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Collegial contribution</strong></td>
<td>0.32**</td>
<td>0.30**</td>
<td>-0.21**</td>
<td>0.28**</td>
<td>0.35**</td>
<td>0.07</td>
<td>0.05</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Collegial collaboration</strong></td>
<td>0.10</td>
<td>-0.04</td>
<td>-0.19**</td>
<td>-0.06</td>
<td>0.05</td>
<td>-0.10</td>
<td>0.23**</td>
<td>-0.04</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Self-efficacy in higher order research activities</strong></td>
<td>0.14*</td>
<td>0.08</td>
<td>-0.05</td>
<td>0.09</td>
<td>0.20*</td>
<td>0.09</td>
<td>0.07</td>
<td>0.12*</td>
<td>0.08</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Self-efficacy in lower order research activities</strong></td>
<td>-0.03</td>
<td>0.08</td>
<td>0.09</td>
<td>0.09</td>
<td>0.07</td>
<td>0.20**</td>
<td>-0.11</td>
<td>-0.02</td>
<td>-0.12</td>
<td>0.17**</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td><strong>Research productivity</strong></td>
<td>-0.01</td>
<td>0.07</td>
<td>0.11</td>
<td>-0.01</td>
<td>-0.02</td>
<td>0.06</td>
<td>-0.04</td>
<td>-0.06</td>
<td>-0.01</td>
<td>0.13*</td>
<td>0.09</td>
<td>1.00</td>
</tr>
<tr>
<td><strong>Collective-efficacy in departmental research</strong></td>
<td>0.13*</td>
<td>0.15*</td>
<td>-0.04</td>
<td>0.13*</td>
<td>0.21**</td>
<td>0.12</td>
<td>0.09</td>
<td>0.13*</td>
<td>0.13*</td>
<td>0.57**</td>
<td>0.50**</td>
<td>0.08</td>
</tr>
</tbody>
</table>

**Note:**
- a PGR= Preference for group research
- b SE= Self expression
- c SC= Self-concern
- d ID= Independent Identity
- e ID= Interdependence
- f OB= Obligation
- g CD= Collegial distance
- h CC1= Collegial contribution
- i CC2= Collegial collaboration
- j SEHO= Self-efficacy in higher order research activities
- k SELO= Self-efficacy in lower order research activities
- l RP= Research productivity

* p <0.05 \ ** p <0.01
Self-efficacy in higher order research activities, as expected, had a significant positive but mild relationship with self-efficacy in lower order research activities \((r=0.17)\). Both self-efficacy factors have a moderately high relationship with collective-efficacy in departmental research \((r=0.57\) and \(r=0.50\) respectively). This suggests that the more efficacious an academic were in research, the more efficacious he or she perceived the collective departmental research to be, and vice versa.

Perhaps the most interesting aspect of the relationships discussed above is the number of positive relationships between what are conceptually independent and interdependent variables. Although speculative, this may be explained by the context of this study. Perhaps, academic work in universities requires a certain degree of independence of academics whilst still being embedded in an interdependent work culture. Consequently, these competing requirements may accommodate each other to some extent.

### 4.5. Multiple Regression Analyses

The non-metric demographic data were transformed into dummy variables in order to carry out the multiple regression analyses. The non-metric data included gender, age, rank, tenure in higher education and discipline (social sciences or natural sciences). One category dummy variable was generated for gender, seven for age, three for rank, eleven for tenure and one for discipline. According to information provided by the respondents, Social Sciences included Economics, Linguistics, Journalism, Management, Law
and Education. Natural Sciences included Technology, Physics, Chemistry, Engineering and Telecommunications.

The dummy variables were forced into the regression model in order before other independent variables input. The order was gender first, then age, rank, tenure in higher education and finally discipline. The order was determined hierarchically. The sex of a person is established at birth and is likely to have wider influence on life experiences. The other variables are in the order that they may be predated to have the greatest effect on dependent variables.

Stepwise multiple regression analyses were used to build five models with self-efficacy in higher order research activities, self-efficacy in lower order research activities, collective-efficacy in departmental research, research productivity and preference for group research as dependent variables. The second was to examine how well the factor preference for group research, self-construal factors and co-worker allocentrism factors predicted self-efficacy in research factors. The third was to examine how well the self-efficacy in research factors, the factor preference for group research, self-construal factors and co-worker allocentrism factors predicted the factor collective-efficacy in departmental research. The fourth was to examine how well the self-construal factors and co-worker allocentrism factors predicted the factor preference for group research.
4.5.1. Regression with *self-efficacy in higher order research activities* as dependent variable

*Preference for group research*, self-construal factors and co-worker allocentrism factors were treated as independent variables. The multiple regression model is shown in Table 4.7.

Table 4.7 Multiple regression with *self-efficacy in higher order research activities* as dependent variable

<table>
<thead>
<tr>
<th>Step</th>
<th>Variables</th>
<th>R Square</th>
<th>R Square Change</th>
<th>F (Eqn)</th>
<th>Beta</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Gender</td>
<td>0.10</td>
<td>0.10</td>
<td>28.72</td>
<td>***</td>
</tr>
<tr>
<td>2</td>
<td>Age</td>
<td>0.14</td>
<td>0.04</td>
<td>1.48</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Rank</td>
<td>0.22</td>
<td>0.08</td>
<td>7.94</td>
<td>***</td>
</tr>
<tr>
<td>4</td>
<td>Tenure</td>
<td>0.27</td>
<td>0.05</td>
<td>1.53</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Discipline</td>
<td>0.34</td>
<td>0.07</td>
<td>22.53</td>
<td>***</td>
</tr>
<tr>
<td>6</td>
<td>Independent Identity</td>
<td>0.35</td>
<td>0.01</td>
<td>4.80</td>
<td>*</td>
</tr>
</tbody>
</table>

Note: *p<0.05, **p<0.01, ***p<0.001

Multiple regression analysis indicated that gender was the best predictor of *self-efficacy in higher research activities*, accounting for 10% of the variance. Rank was the second best predictor, explaining 8% of the variance. The third significant predictor, discipline, accounted for 7% of the variance. The only non-demographic variable that entered the multiple regression model was *independent identity*, accounting for a low but significant 1% of the variance.
Mean comparison of self-efficacy in higher order research activities by gender

An examination of the mean male and female cores (see Appendix Table 4.7) for self-efficacy in higher lower research activities revealed that male academics reported being more self-efficacious than female academics with higher order research activities (M=0.33 for male and M=-0.27 for female). And this is illustrated in Figure 4.10. This is consistent with other research suggesting that male members of faculty are more likely to have a higher self-efficacy in carrying out research than females (Vasil, 1992).

Figure 4.10 Self-efficacy in higher order research activities mean scores by gender
Mean comparison of self-efficacy in higher order research activities by rank

There were significant differences for self-efficacy in higher order research activities by rank (see Appendix Table 4.7). Professors had the highest mean score ($M=0.52$) and Lecturers the lowest mean score ($M=-0.28$). Means are illustrated in Figure 4.11.

A Scheffe’s post hoc test (see Table 4.8) identified the significant differences for self-efficacy in higher order research activities by rank. Professors were significantly different from Lecturers, Senior Lecturers and
Associate Professors. This result is not surprising given the well-known link between rank and research activity.

Table 4.8 Scheffe’s post hoc test for rank with self-efficacy in higher order research activities

<table>
<thead>
<tr>
<th>Between rank groups</th>
<th>Mean difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecturer and Professor</td>
<td>0.80 ***</td>
</tr>
<tr>
<td>Senior lecturer and Professor</td>
<td>0.51 **</td>
</tr>
<tr>
<td>Associate professor and Professor</td>
<td>0.59 **</td>
</tr>
</tbody>
</table>

Note: *p<0.05, **p<0.01, ***p<0.001

Mean comparison of self-efficacy in higher order research activities by discipline

The mean scores (see Appendix Table 4.7) revealed that academics in the Social Sciences (M=-0.28) generally reported lower levels of self-efficacy in higher order research activities than those in the Natural Sciences (M=0.56). This is illustrated in Figure 4.12.

There may be more than one explanation for this finding. For example, research activities in the Social Sciences had been interrupted and disturbed more frequently than those in the Natural Sciences in the recent history of China (Fairbank, 1987). In addition, long-term centralized ideology may
have influenced Social Sciences activities more than in the Natural Sciences in Mainland China (Fairbank, 1987). It may be more difficult for academics in the Social Sciences than those in the Natural Sciences to achieve internationally-accepted standards in research due to limited experience and inconsistent local standards.

Figure 4.12 Self-efficacy in higher order research activities mean scores by discipline

Another possible explanation that is more immediately related to this study is culture. As mentioned before, the Social Sciences are more culturally relevant than the Natural Sciences (Park, 1994). Collectivism in China may have more influence on research activities in the Social Sciences than those in the Natural Sciences. For example, research activities generally require
more independent thinking and acting, which are not promoted generally in a collectivist culture (Singelis, 1994).

4.5.2. Regression with *self-efficacy in lower order research activities* as dependent variable

*Preference for group research*, self-construal factors and co-worker allocentrism factors were treated as independent variables.

The multiple regression model (see Table 4.9) indicated that age was the best predictor of *self-efficacy in lower research activities*, accounting for 14% of the variance. Gender was the second best predictor, explaining 10% of the variance. The non-demographic variables in the multiple regression model were *collegial collaboration* and *independent identity*, accounting for a low but significant 2% and 1% of the variance respectively.

*Mean comparison of self-efficacy in lower order research activities by gender*

An examination of the mean scores of *self-efficacy in lower order research activities* (see Appendix Table 4.8) for males and females revealed that male academics (M=0.33) reported higher levels of self-efficacy in lower order research activities than female academics (M=-0.25) and this is shown in Figure 4.13. This is again consistent with earlier results that male academics are generally more self-efficacious than females in research activities (Vasil, 1992).
Table 4.9 Multiple regression with *self-efficacy in lower order research activities* as dependent variable

<table>
<thead>
<tr>
<th>Step</th>
<th>Variables</th>
<th>R Square</th>
<th>R Square Change</th>
<th>F (Eqn)</th>
<th>Beta</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Gender</td>
<td>0.10</td>
<td>0.10</td>
<td>27.82</td>
<td>***</td>
</tr>
<tr>
<td>2</td>
<td>Age</td>
<td>0.24</td>
<td>0.14</td>
<td>6.20</td>
<td>***</td>
</tr>
<tr>
<td>3</td>
<td>Rank</td>
<td>0.25</td>
<td>0.02</td>
<td>1.85</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Tenure</td>
<td>0.31</td>
<td>0.06</td>
<td>1.70</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Discipline</td>
<td>0.32</td>
<td>0.01</td>
<td>1.69</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Collegial</td>
<td>0.33</td>
<td>0.02</td>
<td>5.82</td>
<td>*</td>
</tr>
<tr>
<td></td>
<td>collaboration</td>
<td></td>
<td></td>
<td></td>
<td>-0.14</td>
</tr>
<tr>
<td>7</td>
<td>Independent</td>
<td>0.34</td>
<td>0.01</td>
<td>4.04</td>
<td>*</td>
</tr>
<tr>
<td></td>
<td>Identity</td>
<td></td>
<td></td>
<td></td>
<td>0.11</td>
</tr>
</tbody>
</table>

Note: *p<0.05, **p<0.01, ***p<0.001

In summary, male academics in Beijing reported higher levels of self-efficacy in research than female academics for both difficult tasks and less difficult tasks. Female academics in universities in China tend to assume more teaching activities than research activities, especially in a teaching-focused university. Limited practice in research may prevent them from enhancing self-efficacy in research. In addition, it is difficult for female academics to strengthen their self-efficacy in research by modelling someone similar, since there are more successful male academics.
Mean comparison of self-efficacy in lower order research activities by age

The differences (see Appendix Table 4.8) in self-efficacy in lower order research activities by age group were examined. Academics aged below 30 reported the lowest level (M=-0.34) of self-efficacy in lower order research activities. Academics aged 56-60 reported the highest level (M=0.63) of self-efficacy in lower order research activities. Mean scores are illustrated in Figure 4.14.
A Scheffe’s post hoc test was carried out to identify significant differences between age groups. Significant differences (see Table 4.10) were found between academics below 30 and those aged 36-40, and between below 30 and 46-50. Academics below 30 tended to be less self-efficacious than others. These findings are not surprising given most academics below 30 are newly graduated and have limited experience in research.

The differences in self-efficacy found between age groups suggested that older academics tended to be more self-efficacious in lower order research activities. This is probably because older academics have more experience in research that helps enhance their self-efficacy in research.
Table 4.10 Scheffe’s post hoc test for age with *self-efficacy in lower order research activities*

<table>
<thead>
<tr>
<th>Between age groups</th>
<th>Mean difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 30 and 36-40</td>
<td>0.79 ***</td>
</tr>
<tr>
<td>Below 30 and 46-50</td>
<td>0.95 **</td>
</tr>
<tr>
<td>31-35 and 36-40</td>
<td>0.65 **</td>
</tr>
</tbody>
</table>

Note: *p<0.05, **p<0.01, ***p<0.001

It is interesting to note that academics from 41 to 45 years of age reported lower self-efficacy than those from 36 to 40 in lower order research activities. Many academics from 41 to 45 were caught up in the end of the Cultural Revolution, during which most higher education systems were closed in Mainland China (Fairbank, 1987), and there were fewer opportunities to develop academic skills.

*Mean comparison of self-efficacy in lower order research activities by discipline*

The mean scores (see Appendix Table 4.8) revealed that academics in the Social Sciences reported lower levels of self-efficacy (M=-0.07) in lower order research activities than those in the Natural Sciences (M=0.15), which was similar to the result for *self-efficacy in higher order research activities*. This is illustrated in Figure 4.15.
It may be concluded that academics in the Social Sciences perceived themselves to be generally less efficacious in carrying out research than those in the Natural Sciences. As mentioned early, one plausible explanation is that the Social Sciences are more cultural laden, in the sense that academics may have perceived they had less personal control over their behaviours, than their colleagues in the Natural Sciences (Park, 1994).

4.5.3. Regression with collective-efficacy in departmental research as dependent variable

Self-efficacy in research factors, preference for group research, self-
construal factors and co-worker allocentrism factors were treated as independent variables.

The multiple regression model (see Table 4.11) indicated that *self-efficacy in higher order research activities* was the best predictor of *collective-efficacy in departmental research*, accounting for 16% of the variance. The second best predictor was *self-efficacy in lower order research activities*, explaining 12% of the variance. Gender was the third best predictor, accounting for 10% of the variance. Rank and discipline significantly accounted for 6% and 2% of the variance respectively. *Self-expression* explained a low but significant 1% of the variance.

This analysis revealed a close relationship between individual academics’ self-efficacy in research and their perceived collective efficacy in departmental research. Departments play a key role in academics’ behaviour in China, in terms of allocation of funds or research tasks. The result is not surprising given this context.

*Collective-efficacy in departmental research* was also found to be related to *Self-expression*. It is reasonable that academics who are more efficacious in their department research are more likely to express themselves directly and clearly at work.
Table 4.11 Multiple regression with collective-efficacy in departmental research as dependent variable

<table>
<thead>
<tr>
<th>Step</th>
<th>Variables</th>
<th>R Square</th>
<th>R Square Change</th>
<th>F (Eqn)</th>
<th>Beta</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Gender</td>
<td>0.10</td>
<td>0.10</td>
<td>27.82 ***</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Age</td>
<td>0.14</td>
<td>0.04</td>
<td>1.34</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Rank</td>
<td>0.20</td>
<td>0.06</td>
<td>5.50 **</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Tenure</td>
<td>0.25</td>
<td>0.05</td>
<td>1.43</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Discipline</td>
<td>0.27</td>
<td>0.02</td>
<td>5.41 *</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Self-efficacy in higher order research activities</td>
<td>0.43</td>
<td>0.16</td>
<td>59.19 ***</td>
<td>0.44</td>
</tr>
<tr>
<td>7</td>
<td>Self-efficacy in lower order research activities</td>
<td>0.55</td>
<td>0.12</td>
<td>58.41 ***</td>
<td>0.43</td>
</tr>
<tr>
<td>8</td>
<td>Self-expression</td>
<td>0.56</td>
<td>0.01</td>
<td>5.27 *</td>
<td>0.12</td>
</tr>
</tbody>
</table>

Note: *p<0.05, **p<0.01, ***p<0.001

Mean comparison of perceived collective-efficacy in departmental research by gender

The mean scores (see Appendix Table 4.9) for collective-efficacy in departmental research revealed that male academics (M=0.36) perceived their departments to be more collectively efficacious than female academics (M=-0.29) and this is illustrated in Figure 4.16. This result is similar to the finding in self-efficacy analysis that male academics reported higher self-efficacy in research than females.
Figure 4.16 Collective-efficacy in departmental research mean scores by gender

Mean comparison of perceived collective-efficacy in departmental research by rank

The mean scores (see Appendix Table 4.9) of collective-efficacy in departmental research activities by rank indicated that Lecturers reported perceptions of relatively low departmental efficacy for research (M=−0.03) and Professors reported perception of relatively high departmental efficacious for research (M=0.61). This is illustrated in Figure 4.17. Rank was positively related to the strength of perceived departmental research efficacy.
Scheffe's post hoc test (see Table 4.12) indicated significant differences of collective-efficacy in departmental research between Lectures and Professors, Senior Lecturers and Professors, and Associate Professors and Professors. Professors perceived their departments to be more efficacious than others. This result is similar to the corresponding self-efficacy results.

Mean comparison of collective-efficacy in departmental research by discipline

The mean scores (see Appendix Table 4.8) of collective-efficacy in departmental research by discipline indicated that academics in the Social
Table 4.12 Scheffe's post hoc test for rank with collective-efficacy in departmental research

<table>
<thead>
<tr>
<th>Between rank groups</th>
<th>Mean difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecturer and Professor</td>
<td>0.95 ***</td>
</tr>
<tr>
<td>Senior lecturer and Professor</td>
<td>0.71 **</td>
</tr>
<tr>
<td>Associate professor and Professor</td>
<td>0.55 *</td>
</tr>
</tbody>
</table>

Note: *p<0.05, **p<0.01, ***p<0.001

Figure 4.18 Collective-efficacy in departmental research mean scores by discipline

Social Sciences (M=-0.22) perceived lower collective efficacy in departmental research.
research than those in the Natural Sciences (M=0.43). This is illustrated in Figure 4.18. This result is similar to that of the self-efficacy analyses that academics in the Natural Sciences reported being more self-efficacious in research than those in the Natural Sciences.

4.5.4. Regression with research productivity as dependent variable

Self-efficacy in higher order research activities, self-efficacy in lower order research activities and collective-efficacy in departmental research were treated as independent variables.

The multiple regression model (see Table 4.13) indicated that rank was the only significant predictor, accounting for 7% of the variance.

Table 4.13 Multiple regression with research productivity as dependent variable

<table>
<thead>
<tr>
<th>Step</th>
<th>Variables</th>
<th>R Square</th>
<th>R Square Change</th>
<th>F (Eqn)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Gender</td>
<td>0.004</td>
<td>0.004</td>
<td>1.00</td>
</tr>
<tr>
<td>2</td>
<td>Age</td>
<td>0.06</td>
<td>0.06</td>
<td>1.97</td>
</tr>
<tr>
<td>3</td>
<td>Rank</td>
<td>0.13</td>
<td>0.07</td>
<td>6.57 ***</td>
</tr>
<tr>
<td>4</td>
<td>Tenure</td>
<td>0.19</td>
<td>0.05</td>
<td>1.32</td>
</tr>
<tr>
<td>5</td>
<td>Discipline</td>
<td>0.19</td>
<td>0.002</td>
<td>0.65</td>
</tr>
</tbody>
</table>

Note: *p<0.05, **p<0.01, ***p<0.001

Mean comparison of research productivity by rank

The mean scores for research productivity (see Appendix Table 4.10)
indicated that academics with a higher rank reported being more productive in research. For example, Professors (M=5.62) were the most productive and Lecturers (M=2.63) were the least productive. Senior Lecturers and Associate Professors were in the middle with mean scores 2.87 and 3.05 respectively. Figure 4.19 illustrates that the higher academics were in rank, the more productive they were in research. The result is not surprising given the well-known link between rank and research activities.

Figure 4.19 Research productivity mean scores by rank
4.5.5. Regression with *preference for group research* as dependent variable

Self-construal factors and co-worker allocentrism factors were treated as independent variables.

The multiple regression model (see Table 4.14) indicated that discipline was the best predictor of *preference for group research*, accounting for 12% of the variance. The second best predictor was *interdependence*, explaining 6% of the variance. The third best predictor was *collegial contribution*, accounting for 3% of the variance.

Table 4.14 Multiple regression with *preference for group research* as dependent variable

<table>
<thead>
<tr>
<th>Step</th>
<th>Variables</th>
<th>R Square</th>
<th>R Square Change</th>
<th>F (Eqn)</th>
<th>Beta</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Gender</td>
<td>0.003</td>
<td>0.003</td>
<td>0.70</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Age</td>
<td>0.02</td>
<td>0.15</td>
<td>0.56</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Rank</td>
<td>0.03</td>
<td>0.10</td>
<td>0.85</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Tenure</td>
<td>0.08</td>
<td>0.05</td>
<td>1.26</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Discipline</td>
<td>0.20</td>
<td>0.12</td>
<td>36.60</td>
<td>***</td>
</tr>
<tr>
<td>6</td>
<td>Interdependence</td>
<td>0.26</td>
<td>0.06</td>
<td>19.32</td>
<td>***</td>
</tr>
<tr>
<td>7</td>
<td>Collegial</td>
<td>0.29</td>
<td>0.03</td>
<td>9.72</td>
<td>**</td>
</tr>
</tbody>
</table>

Note: *p<0.05, **p<0.01, ***p<0.001

*Preference for group research* was found to be related to *interdependence*
and collegial contribution. It is not surprising that academics who value inseparation from others and helping each other are more likely to carry out research cooperatively. They are more likely to believe research activities could be conducted better by groups or cooperatively than individually.

**Mean comparison of preference for group research by discipline**

The mean scores for *preference for group research* by discipline (see Appendix Table 4.11) indicated that academics in the Social Sciences (M=-0.22) reported much lower level of *preference for group research* than those in the Natural Sciences (M=0.39). This is illustrated in Figure 4.20.

![Figure 4.20 Preference for group research mean scores by discipline](image)
It is surprising to find that academics in the Natural Sciences, less culture-laden areas, were more like to carry out research cooperatively than those in the Social Sciences. It should be emphasized that this study did not differentiate in-groups from out-groups for the group research. One possible explanation is that academics in the Social Sciences may have perceived less personal control in a group, which may include out-groups, than those in the Natural Sciences.
Chapter Five: Conclusions

5.1. Limitations of the study

This study has some limitations, in particular, related to the instruments, sample and methodology.

Although this study is not cross-cultural but rather intracultural, two instruments selected were developed for the purpose of cross-cultural research, namely, Singelis’ Self-construal Scale (1994) and Hui’s co-worker allocentrism (1988). It cannot be guaranteed that translated instruments retained the original meaning, although, some precautions against this problem were taken, such as back translation, and peer and expert checking.

The sample is a relatively small subset of the population, which suggests we should be cautious generalizing this study to all academics in Beijing. The population from which the sample was drawn is large and varied in terms of demographics. To collect a more extensive sample was impractical due to time pressure, financial constraints and the scope required for Masters level research.

It should be emphasized that this research is correlational. Relationships found between the variables do not provide causal explanations. Future studies could examine causal relationships.
5.2. Hypothesis one

The first hypothesis, “self-efficacy in research will be positively related to research productivity” was not supported. Two self-efficacy in research factors were identified in this study, and neither was found to relate to research productivity.

Bandura (1997) argued that some factors might undermine or even eliminate the predictive functioning of self-efficacy on performance. One explanation for the outcome of the study could be that in this case, research productivity is not equivalent to research performance. This study focused on the quantity of academics’ research rather than quality because it was impractical to assess the quality of publications within the framework of this study. It may be argued that it is quality not quantity that really reflects the performance of researchers. This is one possible reason for the failure to find an association between self-efficacy in research and research productivity.

5.3. Hypotheses two and three

The second hypothesis, “self-efficacy in research will be positively related to independent self-construal and idiocentrism” was supported in so far as self-efficacy in research was positively related to independent identity. Three independent self-construal factors were identified in this study, namely, self-expression, self-concern and independent identity. Both self-efficacy in research factors were found to be positively related to
independent identity.

Independent identity is an independent self-construal factor related to independence from others and acting or thinking independently. As mentioned earlier, a positive view of independent individuals is being an independent self, more specifically, being unique, expressing one’s inner attributes and asserting oneself (Markus & Kitayama, 1991). This result suggests that, the more independently these academics thought and acted, the more efficacious they perceived themselves to be in research, and vice versa.

The third hypothesis, “self-efficacy in research will be negatively related to interdependent self-construal and allocentrism” was supported in so far as self-efficacy in lower order research activities was negatively related to collegial collaboration. Three co-worker allocentrism factors, collegial distance, collegial contribution and collegial collaboration were identified in this study. Self-efficacy in lower research activities was found to be negatively related to collegial collaboration.

Collegial collaboration is an allocentrism factor that represents the extent to which academics would like to work collaboratively with colleagues. The less inclined to collaborate academics were with colleagues, the more self-efficacious they perceived themselves to be in carrying out lower order research activities, and vice versa.

Although at the very least, the result above provided some evidence for the
argument that lower self-efficacy was related to allocentrism (Lam et al., 2002), it should be emphasized that a considerable number of allocentrism and interdependent self-construal factors were found not to predict self-efficacy in research in this way. For example, *self-efficacy in lower order research activities* was found to be positively related to *obligation*, an interdependent self-construal factor, in the intercorrelational analysis of factors (see Table 4.6). Therefore, one may only cautiously conclude that allocentric academics are more likely to be less efficacious in research than idiocentrics in Beijing.

5.4. Hypothesis four

Perceived collective efficacy in departmental research was found to be positively related to both self-efficacy in research factors. Therefore, hypothesis four “collective efficacy in departmental research will be positively related to self-efficacy in research” was supported. That is, the more self-efficacious academics perceived themselves to be in research, the more they perceived their departments to be collectively efficacious in research, and vice versa.

This result confirms the anticipated close relationship between self-efficacy and collective efficacy. As mentioned before, collective efficacy is rooted in self-efficacy (Bandura, 1997). Bandura’s theory (1997) suggested that enhancing self-efficacy could contribute to collective efficacy, although it should be noted that this study only provides correlational evidence and the
measure of collective efficacy is at the individual level. This result is particular interesting because the context of the study is embedded in a collectivist culture.

Furthermore, university departments in China play key roles in academics’ activities, in terms of allocating research funding and tasks. This result suggests that collective efficacy in research may be enhanced by improving individual academics’ self-efficacy in research, and vice versa.

5.5. Hypotheses five and six

The fifth hypothesis, “preference for group research will be positively related to interdependent self-construal and co-worker allocentrism”, was supported in so far as preference for group research was positively related to interdependence and collegial contribution. The sixth hypothesis, “preference for group research will be negatively related to independent self-construal and idiocentrism” was not supported.

Two interdependent self-construal factors, interdependence and obligation, were identified in this study. The factor interdependence focuses on the connectedness between self and others, reflecting a meaningful self in the group (Markus & Kitayama, 1991). This result suggests that, the more interdependent these academics were, the more likely they were to prefer group research, and vice versa.

Collegial contribution is a factor that focuses on the importance of
colleagues helping each other (Hui, 1988). For example, the view that colleagues’ help is indispensable for individual success. This result suggests that, the more academics preferred to help others or appreciate others’ help, the more likely they were to prefer group research, and vice versa.

These results demonstrated positive relationships between preference for group work and allocentrism factors.

5.6. Other findings

5.6.1. Self-efficacy in research: Gender effect

The analysis suggested that male academics generally perceived themselves to be more efficacious than did female academics, in both individual research activities and cooperative research activities. This is consistent with Vasil’s (1992) argument that male academics were more likely to have a higher self-efficacy in carrying out research than females.

It has been argued that males are more likely to be encouraged to be achieving, dominant and competitive and females to be obedient and responsible in most cultures (Best & Williams, 1997). Research is a creative area that may involve more challenging goals and is generally believed to be male dominant (Bandura, 1997). As mentioned early, role modeling is an important source of self-efficacy (Bandura, 1997). However, female academics may find relatively few role models in south-east Asian
higher education (Luke, 1999).

Since the People’s Republic of China was established in 1949, females have been given more rights and opportunities in various areas than had previously been the case. Females now have the same opportunities as males in education and career selection. More and more females are employed in academic position in universities, which were male dominated before 1949. However, although there is no objective evidence, this researcher has observed that many females tend to assume teaching rather than research tasks, especially in teaching-focused universities. It is possible that female academics may have fewer opportunities to conduct research than males, which may contribute to female academics’ lower perceived self-efficacy in Beijing.

5.6.2. Self-efficacy in research: Discipline effect

The analyses suggested that academics in the Natural Sciences were more likely to be self-efficacious in research than those in the Social Sciences.

A possible explanation is that the Natural Sciences are relatively culture-free whilst the Social Sciences are more “culture-laden” areas (Bandura, 1997). It can be postulated that academics might perceive they have less personal control in the Social Sciences than in the Natural Sciences (Park, 1994). Therefore, this perception may undermine their perceived efficacy in their capabilities in research.
Additionally, greater emphasis has been given to research activities in the Natural Sciences than those in the Social Sciences in China since the People’s Republic of China was established (The Ministry of Education of the People’s Republic of China, 2000). For example, more funds are allocated to the Natural Sciences than the Social Sciences. As a result, academics in the Natural Sciences may have more opportunities for mastery experiences and vicarious experiences in research than those in the Social Sciences in Beijing.

5.6.3. Self-efficacy in research: Rank effect

The study suggested that Professors were more self-efficacious than Lecturers, Senior Lecturers and Associate Professors in higher order research activities. No significant differences were found for self-efficacy in lower order research activities between ranks although older academics were relatively more self-efficacious than younger academics in lower order research activities. This result suggests that experience in research may enhance the strength of self-efficacy in research among academics in Beijing, or more able researchers have higher self-efficacy and consequently, higher ranks.

It is interesting to note that Associate Professors had relatively lower self-efficacy than Senior Lecturers in higher order research activities. Actually, many Associate Professors who age from 40 to 45 have quite limited higher education because of the Cultural Revolution (Fairbank,
Poorly developed research skills might account for their lower self-efficacy in research.

5.7. Implications for theory

The present study has some implications for self-efficacy theory. First, it provides some evidence that the demographic characteristics are related to self-efficacy, in particular, gender and discipline.

Consistent with the literature (Taylor et al., 1984; Vasil, 1992), a self-efficacy gender effect was found in this study. Clearly, these female academics tended to report lower levels of self-efficacy in research than males. One significance of this finding is that it supports empirically the argument in a collectivist culture that females tend to be less efficacious than males. This also provides evidence for Bandura’s (1997) argument that gender difference has an effect on self-efficacy in career development. Researchers have explored what factors may inhibit females from achieving as much as males in academic work (Deane, Johnson, Jones & Lengkeek, 1996). Further investigation of self-efficacy may provide a possible explanation.

Secondly, a self-efficacy discipline effect was also found in this study. That is academics in the Natural Sciences reported higher levels of self-efficacy in research than those in the Social Sciences. It may be true that more than one factors contribute to this result. As mentioned early, academics in the Social Sciences have fewer opportunities for mastery experiences and
vicarious experiences than those in the Natural Science in the context of this study. For example, research activities in the Social Sciences had been disturbed more frequently than those in the Natural Sciences in political movements in China (Fairbank, 1987). Greater emphasis has been given to research activities in the Natural Sciences than those in the Social Sciences since the People’s Republic of China was established (The Ministry of Education of the People’s Republic of China, 2000).

Additionally, the study sheds light on the possible influence of culture on self-efficacy in research as academics in the Natural Sciences generally reported higher levels of self-efficacy in research than colleagues in the Social Sciences. The Social Sciences tend to be more “culture-laden” domains and the Natural Sciences are less “culture-laden” domains (Bandura, 1997; Park, 1994). Collectivism in China may have more influence on research activities in the Social Sciences than those in the Natural Sciences. For example, research activities generally require more independent thinking and acting, which are not promoted generally in a collectivist culture (Singelis, 1994). Furthermore, academics might have perceived they had less personal control in the Social Sciences than in the Natural Sciences (Park, 1994) which may have undermined their perceived efficacy in research.

Finally, the results of the present study suggest that allocentrism and idiocentrism are related to the level of self-efficacy in research. At the very least, this study provided some evidence that self-efficacy was negatively
related to allocentrism and positively related to idiocentrism. That is, *independent identity* positively correlated with the level of self-efficacy in research while *collegial collaboration* negatively correlated with the level of *self-efficacy in lower order research activities*. Furthermore, this study found variation in allocentrism and idiocentrism among individuals in a collectivist culture. This supports the view that allocentrism and idiocentrism coexist within cultures (Bond & Smith, 1999; Triandis, 2001).

### 5.8. Implications for policy

The findings in the present study should draw policymakers’ attention to the generally lower self-efficacy in research among female academics. Enhancing female academics’ self-efficacy in research is likely to be important for the overall quality of research activity in Beijing, since more and more females are employed in academic positions in universities.

Female academics’ self-efficacy may be enhanced by some methods addressed in self-efficacy theory. First, some policies should be made to encourage female academics to participate in more research activities since mastery experiences are the most robust and effective sources of self-efficacy (Bandura, 1997). One possible reason for females’ lower self-efficacy is that they carry out more teaching than research work in universities. More participation in research activities may enhance females’ self-efficacy.

A second way to enhance female academics’ self-efficacy in research is
modelling. It is probably difficult for female academics to find successful role models from similar backgrounds and it is more likely that female academics find successful male colleagues around them. Policymakers should promote successful female models to female academics. Exposure to female role models from similar backgrounds could enhance females' self-efficacy in research activities.

A third approach is to initiate policies to provide female academics mentoring and training programs in research. A research advisor who is an expert in research could assist in guiding female academics' research activities within a department or faculty. The research adviser could be consulted by academics about research skills and methods, or any other research issues. In addition, good feedback from the adviser could assist female academics to build their confidence and persistence in research. To foster the strength of self-efficacy in research, it is necessary for academics to keep up with the development of research skills. Research training programs may enhance female academics' self-efficacy by teaching more research skills and strategies.

This study suggests a need to establish an effective and consistent assessment system of research performance at both the theoretical and practical levels in China. It should be acknowledged that research performance is not measured easily in any country (Deane, et. al., 1996). However, policymakers in China should be aware that catching up with internationally accepted standards for research output is the first step to
assessing research performance properly. Peer and expert evaluation may compensate for the limitations of quantity-focused measurement of research performance.

5.9. Implications for practice

The present study has two implications for practice: one is for the individual academic and the other is for the heads of faculties or departments in universities.

Female academics should participate in more research activities in order to attain more experience in research, which is the main means of enhancing their self-efficacy in research. Bandura (1997) argued that males and females are not much different initially in capability for academic work. Enhancing female academics’ self-efficacy may help them improve research performance. In addition, female academics should participate in more research training programs in order to keep up with progress in this area.

The head of the department or faculty should be aware that collective efficacy in departmental research may be enhanced by individual academics’ self-efficacy, and vice versa. For example, the department may foster academics’ self-efficacy in research by improving interactive and communicative procedures regarding research activities within the department.
5.10. Implications for future research

This study found a relationship between gender and self-efficacy. That is, female academics reported lower levels of self-efficacy in research than males. However, as correlational research, the present study could not identify the causal factors associated with this phenomenon. Future research is needed to examine what causes lower self-efficacy among female academics. The possible causal factors of lower self-efficacy among female academics may be identified in terms of cultural constraints (Earley, 1993), family expectations (Luke, 1999), inequitable incentive systems in universities (Deane, et. al., 1996), or gender bias in the main social systems (Bandura, 1997).

This study also suggests that future research should take some factors into account to measure self-efficacy. Self-efficacy might not predict performance if performance were constrained by other factors (Bandura, 1997). For example, in this case it could be lack of resources. Academics may believe they are very capable of conducting some research tasks and report a higher level of self-efficacy in these tasks. However, they might actually perform poorly because some circumstances inhibit them, for example, weak library support, poor equipment or lack of training.

The present study also has implication for Singelis’ Self-construal Scale (Singelis, 1994) used in this study. The analysis found some independent and interdependent items positively loading on the same factor, which
suggests more caution needs to be taken when categorizing independent and interdependent self-construal items in intracultural research. In a collectivist culture, P. R. China in this case, which is situation-specific and situation-sensitive (Triandis, 2001), some items might not be worded clearly enough for respondents to answer properly. In addition, some independent self-construal items may not be as meaningful in a collectivist culture as an individualist culture. Further studies of independent and interdependent self-construal scales in other collectivist cultures are needed to suggest empirically how to revise and improve the measurement of independent and interdependent self-construal.
References


Cross, S. E., Morris, M. L. & Gore, J. S., (2002). Thinking about oneself and others: The relational-interdependent self-construal and social


Appendix A: Additional Tables

Appendix Table 4.1 Principal axis first solution for preference for group research items

<table>
<thead>
<tr>
<th>Factor/Item</th>
<th>Factor 1</th>
<th>Factor 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Factor 1</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. I prefer to work in a team rather than individually.</td>
<td>0.91</td>
<td></td>
</tr>
<tr>
<td>3. Carrying out research in a group is better than working alone.</td>
<td>0.78</td>
<td></td>
</tr>
<tr>
<td>1. When I have a choice, I try to carry out research with others instead of by myself.</td>
<td>0.66 0.32</td>
<td></td>
</tr>
<tr>
<td><strong>Factor 2</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. I personally enjoy carrying research with others</td>
<td>0.32</td>
<td>0.82</td>
</tr>
<tr>
<td>6. I like to interact with others when carrying out research cooperatively.</td>
<td></td>
<td>0.56</td>
</tr>
<tr>
<td>*5. If I were in a research team, I would prefer to do my own job and let others do theirs.</td>
<td></td>
<td>0.39</td>
</tr>
<tr>
<td>*4. Given the choice, I would rather select a research task where I can work alone rather than do a task where I have to work with others.</td>
<td>0.31</td>
<td>0.36</td>
</tr>
</tbody>
</table>

Note: a. The loadings lower than 0.3 were excluded.
b. Items denoted by * were reverse coded.
c. Varimax rotation was applied
Appendix Table 4.2 Principal axis second solution for preference for group research items

<table>
<thead>
<tr>
<th>Factor/Item</th>
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<th>Factor2</th>
<th>Alpha</th>
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</thead>
<tbody>
<tr>
<td><strong>Factor 1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. I prefer to work in a team rather than individually.</td>
<td>0.93</td>
<td></td>
<td>0.86</td>
</tr>
<tr>
<td>3. Carrying out research in a group is better than working alone.</td>
<td>0.77</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. When I have a choice, I try to carry out research with others instead of by myself.</td>
<td>0.66</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Factor 2</strong></td>
<td>0.31</td>
<td>0.88</td>
<td>0.58</td>
</tr>
<tr>
<td>7. I personally enjoy carrying research with others</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. I like to interact with others when carrying out research cooperatively.</td>
<td></td>
<td>0.56</td>
<td></td>
</tr>
<tr>
<td>*5. If I were in a research team, I would prefer to do my own job and let others do theirs.</td>
<td>0.32</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: a. The loadings lower than 0.3 were excluded.

b. Items denoted by * were reverse coded.

c. Varimax rotation was applied
Appendix Table 4.3 Principal axis first solution for self-efficacy in research items

<table>
<thead>
<tr>
<th>Factor/Item</th>
<th>Factor 1</th>
<th>Factor 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Factor 1</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. To publish textbooks</td>
<td>0.78</td>
<td></td>
</tr>
<tr>
<td>2. To publish academic books</td>
<td>0.71</td>
<td></td>
</tr>
<tr>
<td>3. To publish articles in domestic journals</td>
<td>0.66</td>
<td></td>
</tr>
<tr>
<td>8. To present papers in domestic conferences</td>
<td>0.62</td>
<td></td>
</tr>
<tr>
<td>11. To supervise Master degree candidates</td>
<td>0.56</td>
<td></td>
</tr>
<tr>
<td>5. To take charge of research projects</td>
<td>0.53</td>
<td>-0.36</td>
</tr>
<tr>
<td>12. To obtain research funds</td>
<td>0.52</td>
<td></td>
</tr>
<tr>
<td>6. To participate research projects</td>
<td>0.48</td>
<td></td>
</tr>
<tr>
<td><strong>Factor 2</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. To publish articles in international journals</td>
<td></td>
<td>-0.90</td>
</tr>
<tr>
<td>9. To present papers in international conferences</td>
<td></td>
<td>-0.87</td>
</tr>
<tr>
<td>10. To supervise Doctoral degree candidates</td>
<td></td>
<td>-0.66</td>
</tr>
<tr>
<td>7. To initiate and develop research interests</td>
<td>0.40</td>
<td>-0.43</td>
</tr>
</tbody>
</table>

Note: a. The loadings lower than 0.3 were excluded.
b. Oblimin rotation was applied.
### Appendix Table 4.4 Principal axis first solution for self-construal items

<table>
<thead>
<tr>
<th>Factor/Item</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
<th>Factor 4</th>
<th>Factor 5</th>
<th>Factor 6</th>
<th>Factor 7</th>
</tr>
</thead>
<tbody>
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<td><strong>Factor 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inde 10. I act the same way no matter whom I am with.</td>
<td>0.69</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.32</td>
</tr>
<tr>
<td>Inde 7. I prefer to be direct and forthright when dealing with people I've just met.</td>
<td>0.59</td>
<td>0.69</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inde 15. I act the same way at home that I do at work.</td>
<td>0.53</td>
<td>0.59</td>
<td>0.69</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inde 2. I can talk openly with a person whom I meet for the first time, even when this person is much older than I am.</td>
<td>0.35</td>
<td>0.53</td>
<td>0.69</td>
<td>0.69</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Factor 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inter 14. It is important for me to maintain harmony within my group.</td>
<td></td>
<td>0.66</td>
<td>0.62</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inde 11. I value being in good health above everything.</td>
<td></td>
<td>0.62</td>
<td>0.66</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inter 15. I usually go along with what others want to do, even when I would rather do something different.</td>
<td></td>
<td>0.47</td>
<td>0.62</td>
<td>0.66</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inde 9. Speaking up during a class (or a meeting) is not a problem for me.</td>
<td></td>
<td>0.42</td>
<td>0.62</td>
<td>0.66</td>
<td>0.69</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Factor 3</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inde 4. I feel it is important for me to act as an independent person.</td>
<td></td>
<td></td>
<td></td>
<td>0.59</td>
<td>0.56</td>
<td>0.40</td>
<td>0.40</td>
</tr>
<tr>
<td>Inde 6. Having a lively imagination is important to me.</td>
<td></td>
<td></td>
<td></td>
<td>0.56</td>
<td>0.48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inter 3. I respect people who are modest about themselves.</td>
<td></td>
<td></td>
<td></td>
<td>0.56</td>
<td>0.48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inde 5. I'd rather say &quot;No&quot; directly, than risk being misunderstood.</td>
<td></td>
<td></td>
<td></td>
<td>0.48</td>
<td>0.44</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inde 14. My personal identity, independent of others, is very important to me.</td>
<td></td>
<td></td>
<td></td>
<td>0.48</td>
<td>0.44</td>
<td>0.40</td>
<td>0.40</td>
</tr>
</tbody>
</table>
Appendix Table 4.4 Principal axis first solution for self-construal items (continued)

<table>
<thead>
<tr>
<th>Factor/Item</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
<th>Factor 4</th>
<th>Factor 5</th>
<th>Factor 6</th>
<th>Factor 7</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Factor 4</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inde 13. Being able to take care of myself is a primary concern for me.</td>
<td></td>
<td></td>
<td></td>
<td>0.83</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inde 12. I try to do what is best for me, regardless of how that might affect others.</td>
<td></td>
<td></td>
<td></td>
<td>0.63</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inde 8. I am comfortable with being singled out for praise or rewards.</td>
<td></td>
<td></td>
<td></td>
<td>0.31</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Factor 5</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inter 2. I have respect for the authority figures with whom I interact.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.66</td>
</tr>
<tr>
<td>Inter 10. I would offer my seat in a bus to my boss.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.34</td>
<td>0.41</td>
</tr>
<tr>
<td>Inter 8. If my brother or sister fails, I feel responsible.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.37</td>
<td></td>
</tr>
<tr>
<td><strong>Factor 6</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.36</td>
<td></td>
<td>0.55</td>
</tr>
<tr>
<td>Inter 7. I feel good when I cooperate with others.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.36</td>
<td></td>
<td>0.47</td>
</tr>
<tr>
<td>Inter 6. I feel my fate is intertwined with the fate of those around me.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.36</td>
<td>0.41</td>
<td>0.41</td>
</tr>
<tr>
<td>Inter 11. My happiness depends on the happiness of those around me.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.39</td>
</tr>
<tr>
<td>Inde 3. I do my own thing, regardless of what others think.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Factor 7</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inter 12. I will stay in a group if they need me, even when I am not happy with the group.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.69</td>
</tr>
<tr>
<td>Inter 9. I often have the feeling that my relationships with others are more important than my own accomplishments.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.60</td>
</tr>
<tr>
<td>Inter 4. I will sacrifice my self interest for the benefit of the group I am in.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.35</td>
</tr>
</tbody>
</table>

Note: a. The Loadings lower than 0.3 were excluded
b. Inter means interdependent self-construal and Inde means independent self-construal
c. Varimax rotation was applied
Appendix Table 4.5 Principal axis second solution for self-construal items

<table>
<thead>
<tr>
<th>Factor/Item</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
<th>Factor 4</th>
<th>Factor 5</th>
</tr>
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<tbody>
<tr>
<td><strong>Factor 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inde 15. I act the same way at home that I do at work.</td>
<td>0.62</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inde 10. I act the same way no matter who I am with.</td>
<td>0.60</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inter 7. I feel good when I cooperate with others.</td>
<td>0.55</td>
<td>0.42</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inde 7. I prefer to be direct and forthright when dealing with people I've just met.</td>
<td>0.54</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inter 15. I usually go along with what others want to do, even when I would rather do something different.</td>
<td>0.47</td>
<td>0.38</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inter 14. It is important for me to maintain harmony within my group.</td>
<td>0.46</td>
<td>0.30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Factor 2</strong></td>
<td>0.70</td>
<td></td>
<td></td>
<td>0.46</td>
<td>0.44</td>
</tr>
<tr>
<td>Inde 4. I feel it is important for me to act as an independent person.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inde 6. Having a lively imagination is important to me.</td>
<td></td>
<td></td>
<td>0.46</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inde 14. My personal identity, independent of others, is very important to me.</td>
<td>0.36</td>
<td>0.44</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inde 5. I'd rather say &quot;No&quot; directly, than risk being misunderstood.</td>
<td></td>
<td></td>
<td></td>
<td>0.43</td>
<td></td>
</tr>
</tbody>
</table>
### Appendix Table 4.5 Principal axis second solution for self-construal items (continued)

<table>
<thead>
<tr>
<th>Factor/Item</th>
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<th>Factor 2</th>
<th>Factor 3</th>
<th>Factor 4</th>
<th>Factor 5</th>
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<td></td>
<td></td>
</tr>
<tr>
<td>Inde 13. Being able to take care of myself is a primary concern for me.</td>
<td></td>
<td></td>
<td>0.73</td>
<td></td>
<td>0.70</td>
</tr>
<tr>
<td>Inde 12. I try to do what is best for me, regardless of how that might affect others.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Factor 4</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inter 2. I have respect for the authority figures with whom I interact.</td>
<td></td>
<td></td>
<td></td>
<td>0.53</td>
<td></td>
</tr>
<tr>
<td>Inter 11. My happiness depends on the happiness of those around me.</td>
<td></td>
<td></td>
<td></td>
<td>0.44</td>
<td></td>
</tr>
<tr>
<td>Inter 6. I feel my fate is intertwined with the fate of those around me.</td>
<td></td>
<td></td>
<td></td>
<td>0.41</td>
<td></td>
</tr>
<tr>
<td>Inter 10. I would offer my seat in a bus to my boss.</td>
<td></td>
<td></td>
<td></td>
<td>0.36</td>
<td></td>
</tr>
<tr>
<td><strong>Factor 5</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inter 12. I will stay in a group if they need me, even when I am not happy with the group.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.61</td>
</tr>
<tr>
<td>Inter 9. I often have the feeling that my relationships with others are more important than my own accomplishments.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.57</td>
</tr>
<tr>
<td>Inter 4. I will sacrifice my self interest for the benefit of the group I am in.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.32</td>
</tr>
</tbody>
</table>

Note:  
- a. The Loadings lower than 0.3 were excluded  
- b. Inter means interdependent self-construal and Inde means independent self-construal  
- c. Varimax rotation was applied
## Appendix Table 4.6 Principal axis first solution for co-worker allocentrism items

<table>
<thead>
<tr>
<th>Factor/Item</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Factor 1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. I would help if a colleague at work told me that he /she needed money to pay utility bills.</td>
<td>0.65</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Colleagues’ assistance is indispensable to getting success.</td>
<td>0.61</td>
<td></td>
<td></td>
</tr>
<tr>
<td>*6. One should indicate his opinion when discussing with the other colleagues, and then take into action.</td>
<td>-0.60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. One needs return a favour if a colleague lends a helping hand.</td>
<td>0.54</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Factor 2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*2. When I am among my colleagues, I do my own thing without minding about them.</td>
<td></td>
<td>0.62</td>
<td></td>
</tr>
<tr>
<td>*4. I have never loaned my camera/coat to any colleagues.</td>
<td></td>
<td>0.61</td>
<td></td>
</tr>
<tr>
<td>*1. It is inappropriate for a supervisor to ask subordinate about their personal life (such as where one plans to go for the next vacation).</td>
<td></td>
<td>0.50</td>
<td></td>
</tr>
<tr>
<td>*5. We ought to develop the character of independence among colleagues, so that they do not rely much on others’ help.</td>
<td></td>
<td>0.43</td>
<td>0.33</td>
</tr>
<tr>
<td>7. The subordinate should obey the supervisor.</td>
<td></td>
<td>-0.32</td>
<td></td>
</tr>
<tr>
<td><strong>Factor 3</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*11. Do you agree with the proverb “Too many cooks spoil the broth.”</td>
<td></td>
<td></td>
<td>0.51</td>
</tr>
<tr>
<td>*10. In most cases, to cooperate with someone whose ability is lower than one’s own is not as desirable as doing the thing alone.</td>
<td></td>
<td></td>
<td>0.51</td>
</tr>
</tbody>
</table>

Note: 
- Items denoted by * were reverse coded.
- The loadings lower than 0.3 were excluded.
- Varimax rotation was applied.
Appendix Table 4.7  Means and Standard Deviation of significant dummy variables in multiple regression model with *self-efficacy in higher order research activities*

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>119</td>
<td>0.33</td>
<td>0.91</td>
</tr>
<tr>
<td>Female</td>
<td>148</td>
<td>-0.27</td>
<td>0.84</td>
</tr>
<tr>
<td><strong>Rank</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lecturer</td>
<td>64</td>
<td>-0.28</td>
<td>0.73</td>
</tr>
<tr>
<td>Senior lecturer</td>
<td>90</td>
<td>0.01</td>
<td>0.89</td>
</tr>
<tr>
<td>Associate Professor</td>
<td>69</td>
<td>-0.07</td>
<td>0.97</td>
</tr>
<tr>
<td>Professor</td>
<td>40</td>
<td>0.52</td>
<td>0.97</td>
</tr>
<tr>
<td><strong>Discipline</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social Science</td>
<td>182</td>
<td>-0.28</td>
<td>0.80</td>
</tr>
<tr>
<td>Natural Science</td>
<td>89</td>
<td>0.56</td>
<td>0.86</td>
</tr>
</tbody>
</table>
Appendix Table 4.8 Means and Standard Deviation of significant dummy variables in multiple regression model with *self-efficacy in lower order research activities*

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>119</td>
<td>0.33</td>
<td>0.66</td>
</tr>
<tr>
<td>Female</td>
<td>148</td>
<td>-0.25</td>
<td>0.96</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Below 30</td>
<td>97</td>
<td>-0.34</td>
<td>0.87</td>
</tr>
<tr>
<td>31-35</td>
<td>56</td>
<td>-0.20</td>
<td>0.83</td>
</tr>
<tr>
<td>36-40</td>
<td>44</td>
<td>0.45</td>
<td>0.64</td>
</tr>
<tr>
<td>41-45</td>
<td>22</td>
<td>-0.02</td>
<td>0.99</td>
</tr>
<tr>
<td>46-50</td>
<td>15</td>
<td>0.60</td>
<td>0.59</td>
</tr>
<tr>
<td>51-55</td>
<td>13</td>
<td>0.44</td>
<td>0.71</td>
</tr>
<tr>
<td>56-60</td>
<td>9</td>
<td>0.63</td>
<td>0.78</td>
</tr>
<tr>
<td>Over 61</td>
<td>12</td>
<td>0.51</td>
<td>0.87</td>
</tr>
<tr>
<td><strong>Discipline</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social science</td>
<td>182</td>
<td>-0.07</td>
<td>0.93</td>
</tr>
<tr>
<td>Natural science</td>
<td>89</td>
<td>0.15</td>
<td>0.76</td>
</tr>
</tbody>
</table>
Appendix Table 4.9 Means and Standard Deviation of significant dummy variables in multiple regression model with collective-efficacy in departmental research

<table>
<thead>
<tr>
<th>Gender</th>
<th>N</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>124</td>
<td>0.36</td>
<td>0.88</td>
</tr>
<tr>
<td>Female</td>
<td>146</td>
<td>-0.29</td>
<td>0.96</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rank</th>
<th>N</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecturer</td>
<td>61</td>
<td>-0.33</td>
<td>1.01</td>
</tr>
<tr>
<td>Senior lecturer</td>
<td>91</td>
<td>0.09</td>
<td>0.99</td>
</tr>
<tr>
<td>Associate professor</td>
<td>72</td>
<td>-0.07</td>
<td>0.90</td>
</tr>
<tr>
<td>Professor</td>
<td>42</td>
<td>0.61</td>
<td>0.73</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Discipline</th>
<th>N</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social science</td>
<td>182</td>
<td>-0.22</td>
<td>0.90</td>
</tr>
<tr>
<td>Natural science</td>
<td>92</td>
<td>0.43</td>
<td>0.97</td>
</tr>
</tbody>
</table>
Appendix Table 4.10  Means and Standard Deviation of significant dummy variables in multiple regression model with *research productivity*

<table>
<thead>
<tr>
<th>Rank</th>
<th>N</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecturer</td>
<td>64</td>
<td>2.63</td>
<td>5.25</td>
</tr>
<tr>
<td>Senior lecturer</td>
<td>91</td>
<td>2.87</td>
<td>8.22</td>
</tr>
<tr>
<td>Associate professor</td>
<td>76</td>
<td>3.05</td>
<td>2.42</td>
</tr>
<tr>
<td>Professor</td>
<td>41</td>
<td>5.62</td>
<td>5.09</td>
</tr>
</tbody>
</table>
Appendix Table 4.11  Means and Standard Deviation of significant dummy variables in multiple regression model with preference for group research

<table>
<thead>
<tr>
<th>Discipline</th>
<th>N</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social science</td>
<td>182</td>
<td>-0.22</td>
<td>0.84</td>
</tr>
<tr>
<td>Natural science</td>
<td>82</td>
<td>-0.39</td>
<td>0.77</td>
</tr>
</tbody>
</table>
Appendix B: Questionnaire (Chinese version)

致参与此问卷调查的科研人员:

此项问卷调查旨在了解中国北京高等学校科研人员的科研活动倾向。答案没有对错之分，请如实回答。

您提供的信息将直接送往澳大利亚新南威尔士大学教育系，只用于教育领域研究，并绝对保密。

请不要在问卷上留下您的姓名或特殊记号，多谢合作。
调查问卷

第 A-1 部分：科研活动的自我效能

这部分问卷是用来了解你从事科研工作的自信心的。举例说明，如果您对从事某一项科研活动非常有信心，那么请划 100%；如果您对从事某项科研活动没有一点信心，请划 0%；如果您的自信心处于 0%和 100%之间，请划最符合您自信心的百分比。

1. 撰写本专业教材。
2. 撰写本专业学术专著。
3. 在国内刊物上发表论文。
4. 在国际刊物上发表论文。
5. 负责科研项目。
6. 参与科研项目。
7. 开发科研兴趣或启动科研项目。
8. 发表国内学术会议论文。
9. 发表国际学术会议论文。
10. 指导博士学位研究生。
11. 指导硕士学位研究生。
12. 申请科研经费。
第 A-2 部分：科研成果

这部分问卷是了解您近几年的研究成果，请划出你在近五年完成各项成果的数量。

1. 撰写的教材。
2. 独立发表的学术专著。
3. 与他人合作发表的学术专著。
4. 在国内杂志上发表的学术论文。
5. 在国际杂志上发表的学术论文。
6. 参加国内学术会议。
7. 参加国际学术会议。
8. 得到国家认证的科研项目。
9. 您指导的已毕业博士研究生。
10. 您指导的已毕业硕士研究生。
11. 您获得的科研经费总额(人民币)。
   □没有经费 □5 千或低于 5 千元 □5 千以上至1 万元（含） □1 万以上至5 万元（含）
   □5 万以上至10 万元（含） □10 万元以上
第 A-3 部分：科研活动的集体效能

这部分是了解您对所在系科研能力的信心。举例说明，如果您对所在系从事某项科研活动非常有信心，请划 100%；如果您对所在系从事某项科研活动一点信心都没有，请划 0%；如果您的信心处于 0%和 100%之间，那么请划相应的百分比。

1. 开发科研兴趣，启动科研项目。
2. 激励研究人员的科研兴趣，学术创造力。
3. 形成良好的学术气氛。
4. 承担本领域国内领先科研项目。
5. 承担本领域国际领先科研项目。
6. 获得足够的科研经费。
7. 合理地分配研究经费。
8. 学术讨论和交流。
9. 代表本领域科研国内先进水平。
10. 代表本领域科研国际先进水平。
第 A-4 部分：对科研小组（或合作研究）的倾向性

这部分是为您了解您愿意与其他研究人员合作搞科研的程度，请您在多大程度上同意下列观点。

1. 如果我可以选择，我尽力和其他研究人员一起合作搞科研而不是自己独立做。
   1□非常不同意  2□不同意  3□不确定  4□同意  5□非常同意

2. 我倾向于在一个科研小组从事科研活动，而不是自己独立进行科研活动。
   1□非常不同意  2□不同意  3□不确定  4□同意  5□非常同意

3. 在一个科研小组里从事科研活动好于独立搞科研。
   1□非常不同意  2□不同意  3□不确定  4□同意  5□非常同意

4. 如果可以选择，我宁愿选择一个可以独立从事的科研任务，而避免选择必须和别人合作的科研任务。
   1□非常不同意  2□不同意  3□不确定  4□同意  5□非常同意

5. 如果我在一个科研小组里搞科研，我更愿意自己干自己的工作，让别人做他们的事情。
   1□非常不同意  2□不同意  3□不确定  4□同意  5□非常同意

6. 当与别的研究人员合作时，我愿意经常和他们交流。
   1□非常不同意  2□不同意  3□不确定  4□同意  5□非常同意

7. 我个人非常愿意和其他研究人员一起合作搞科研。
   1□非常不同意  2□不同意  3□不确定  4□同意  5□非常同意
第 B-1 部分：自我评析（独立自我和相互依存自我）

这部分问卷是了解您与人交往的一般观点的，请划出您在多大程度上同意下列观点。

1. 我喜欢标新立异，与众不同。
   1□非常不同意  2□颇不同意  3□不同意  4□不确定  5□同意  6□比较同意
   7□非常同意

2. 我能和初次见面的人坦诚交谈，即使这个人年龄比我大得多。
   1□非常不同意  2□颇不同意  3□不同意  4□不确定  5□同意  6□比较同意
   7□非常同意

3. 即使非常不同意我所在集体的意见，我也尽量避免发生争论。
   1□非常不同意  2□颇不同意  3□不同意  4□不确定  5□同意  6□比较同意
   7□非常同意

4. 我对和我交往的权威人物怀有敬意。
   1□非常不同意  2□颇不同意  3□不同意  4□不确定  5□同意  6□比较同意
   7□非常同意

5. 不管别人怎么看，我只管我行我素。
   1□非常不同意  2□颇不同意  3□不同意  4□不确定  5□同意  6□比较同意
   7□非常同意

6. 我尊敬那些谦虚的人。
   1□非常不同意  2□颇不同意  3□不同意  4□不确定  5□同意  6□比较同意
   7□非常同意

7. 做一个独立的人对我来说意义重大。
   1□非常不同意  2□颇不同意  3□不同意  4□不确定  5□同意  6□比较同意
   7□非常同意

8. 我会为了所在集体的利益而牺牲自己的利益。
   1□非常不同意  2□颇不同意  3□不同意  4□不确定  5□同意  6□比较同意
   7□非常同意

9. 与其可能被误解，不如直接说“不”。
   1□非常不同意  2□颇不同意  3□不同意  4□不确定  5□同意  6□比较同意
   7□非常同意

10. 生动的想象力对于我来说非常重要。
    1□非常不同意  2□颇不同意  3□不同意  4□不确定  5□同意  6□比较同意
    7□非常同意

11. 在制定教育或职业计划时，我会考虑父母的意见。
    1□非常不同意  2□颇不同意  3□不同意  4□不确定  5□同意  6□比较同意
    7□非常同意

12. 我个人的命运和周围人的命运是紧密相连。
    1□非常不同意  2□颇不同意  3□不同意  4□不确定  5□同意  6□比较同意
    7□非常同意

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13. 和刚接触的人交往时，我喜欢采取直接坦率的方式。
    1□非常不同意  2□不同意  3□不同意  4□不确定  5□同意  6□比较同意
           7□非常同意

14. 与人合作时，我感觉愉快。
    1□非常不同意  2□不同意  3□不同意  4□不确定  5□同意  6□比较同意
           7□非常同意

15. 当被单独提名表扬或奖励时，我觉得舒服自在。
    1□非常不同意  2□不同意  3□不同意  4□不确定  5□同意  6□比较同意
           7□非常同意

16. 如果我的兄弟姐妹有困难了，我觉得有责任帮助他们。
    1□非常不同意  2□不同意  3□不同意  4□不确定  5□同意  6□比较同意
           7□非常同意

17. 和别人的关系比我自己的成就更重要。
    1□非常不同意  2□不同意  3□不同意  4□不确定  5□同意  6□比较同意
           7□非常同意

18. 在会议上大声发言对我来说不成问题。
    1□非常不同意  2□不同意  3□不同意  4□不确定  5□同意  6□比较同意
           7□非常同意

19. 在公共汽车上，我会把座位让给我的领导。
    1□非常不同意  2□不同意  3□不同意  4□不确定  5□同意  6□比较同意
           7□非常同意

20. 无论和谁在一起，我的行为举止都一样。
    1□非常不同意  2□不同意  3□不同意  4□不确定  5□同意  6□比较同意
           7□非常同意

21. 我是否快乐要看周围的人是不是快乐。
    1□非常不同意  2□不同意  3□不同意  4□不确定  5□同意  6□比较同意
           7□非常同意

22. 我视良好的健康状况高于一切。
    1□非常不同意  2□不同意  3□不同意  4□不确定  5□同意  6□比较同意
           7□非常同意

23. 我会留在一个需要我的集体里，即使我在这个集体里并不愉快。
    1□非常不同意  2□不同意  3□不同意  4□不确定  5□同意  6□比较同意
           7□非常同意

24. 我尽量做些我有益的事，而不管这会给别人造成什么影响。
    1□非常不同意  2□不同意  3□不同意  4□不确定  5□同意  6□比较同意
           7□非常同意

25. 我最关心的是能把自己照顾好。
    1□非常不同意  2□不同意  3□不同意  4□不确定  5□同意  6□比较同意
           7□非常同意
26. 遵从集体的决定对我来说很重要。
   1□非常不同意 2□颇不同意 3□不同意 4□不确定 5□同意 6□比较同意
   7□非常同意

27. 我看重自己的个人身份，不愿意借别人来抬高自己。
   1□非常不同意 2□颇不同意 3□不同意 4□不确定 5□同意 6□比较同意
   7□非常同意

28. 维持所在集体的和谐对我是很重要的。
   1□非常不同意 2□颇不同意 3□不同意 4□不确定 5□同意 6□比较同意
   7□非常同意

29. 我在家里和在工作单位（公司）表现一致。
   1□非常不同意 2□颇不同意 3□不同意 4□不确定 5□同意 6□比较同意
   7□非常同意

30. 我经常能理解其他人的做法，尽管我的做法和他们不同。
   1□非常不同意 2□颇不同意 3□不同意 4□不确定 5□同意 6□比较同意
   7□非常同意
第B-2部分：集体主义倾向性

这部分问卷是用来了解您对同事间关系的一般观点，请划出您在多大程度上同意下列观点。

1. 上下级之间不宜谈论一些私人问题，例如恋爱婚姻，如何支配业余时间，家庭情况等。
   1□非常不同意 2□颇不同意 3□不同意 4□同意 5□比较同意 6□非常同意

2. 和同事相处，我只做好自己的事情而不关心别人的事。
   1□非常不同意 2□颇不同意 3□不同意 4□同意 5□比较同意 6□非常同意

3. 如果同事帮了你的忙，你应该回报他。
   1□非常不同意 2□颇不同意 3□不同意 4□同意 5□比较同意 6□非常同意

4. 我从不把自己的钱借给同事。
   1□非常不同意 2□颇不同意 3□不同意 4□同意 5□比较同意 6□非常同意

5. 同事应该独立自主，在事业上不依靠别人的帮助。
   1□非常不同意 2□颇不同意 3□不同意 4□同意 5□比较同意 6□非常同意

6. 一个人在同事面前应该表明自己的观点态度，并付诸行动。
   1□非常不同意 2□颇不同意 3□不同意 4□同意 5□比较同意 6□非常同意

7. 下级应该服从上级的领导。
   1□非常不同意 2□颇不同意 3□不同意 4□同意 5□比较同意 6□非常同意

8. 一个人要取得好成绩，同事的帮助是必不可少的。
   1□非常不同意 2□颇不同意 3□不同意 4□同意 5□比较同意 6□非常同意

9. 如果同事告诉我经济有困难，我会尽力帮助他。
   1□非常不同意 2□颇不同意 3□不同意 4□同意 5□比较同意 6□非常同意

10. 一般来说，与其和能力比自己低的人合作办事，不如自己单独去做。
    1□非常不同意 2□颇不同意 3□不同意 4□同意 5□比较同意 6□非常同意

11. 一个和尚挑水喝，两个和尚抬水喝，三个和尚没水喝。
    1□非常不同意 2□颇不同意 3□不同意 4□同意 5□比较同意 6□非常同意
调查问卷到此结束，请留下您的部分个人信息：

性别： 1□男 □2女

年龄： 1□30 岁及以下 2□31 岁-35 岁 3□36 岁-40 岁
       4□41 岁-45 岁 5□46 岁-50 岁 6□51 岁-55 岁
       7□56 岁-60 岁 8□61 岁及以上

职称： 1□助教 2□讲师（助研） 3□副教授（副研究员）4□教授（研究员）

任现职称年限： 1□一年及以下 2□二年及以下 3□三年及以下
                 4□四年及以下 5□五年及以下 6□五年以上

高校教龄： 1□一年及以下 2□二年及以下 3□三年及以下
            4□四年及以下 5□五年及以下 6□六年及以下
            7□七年及以下 8□八年及以下 9□九年及以下
            10□十年及以下 11□十一年及以下 12□十一年以上

研究领域：

谢谢合作！
Appendix C: Questionnaire (English version)

To the academic who intends to take part in this survey,

This survey aims to learn the group preference of research activities in Beijing. There are no right or wrong answers. Please give your opinions.

The information that you provide will be sent directly to the School of Education at UNSW, and will be used only for the purpose of educational research. All the information you provide will be absolutely confidential.

Please don’t leave your name or special mark on the questionnaire. Thanks for your cooperation.
Section A-1 Self-efficacy in research

This part is designed to learn how confident you are to carry out research. For example, if you feel completely confident of performing an activity, then tick 100%; if you feel no confident of performing an activity, tick 0%; if your confidence lies somewhere between them, Please tick the percentage that matches your confidence the most.

- To publish textbooks.
- To publish academic books.
- To publish articles in domestic journals
- To publish articles in international journals.
- To take charge of research projects.
- To participate research projects.
- To initiate research interests
- To present papers in domestic conferences.
- To present papers in international conferences
- To supervise Doctoral degree candidates
- To supervising Master degree candidates.
- To obtain research funds.
Section A-2: Research performance (Research productivity)

The survey is designed to know how productive you are in research recently. Please tick the number you have finished in last five years.

- Textbooks written on your own.
- Academic books published on your own.
- Academic books published cooperatively.
- Articles published in domestic journals.
- Articles published in international journals.
- Publications in domestic conferences.
- Publications in international conferences.
- Certified experiment or project reports.
- Graduated Doctors you supervised.
- Graduated Masters you supervised.
- The funds received.
Section A-3: Collective efficacy

The part is designed to learn how confident you are in the research ability of the department you belong to. For example, if you feel completely confident that your department can perform an activity, then tick 100%; if you feel no confident of it to perform an activity, tick 0%; if your confidence lies somewhere between them, Please tick the percentage that matches your confidence the most.

1. To initiate research interests.
2. To encourage academic creativity.
3. To establish and improve academic atmosphere.
4. To undertake leading national research projects.
5. To undertake leading international research projects.
6. To obtain research funds.
7. To allocate research funds reasonably.
8. To carry out academic discussion and communication.
9. To reach advanced national standard in its research area.
10. To reach advanced international standard in its research area.
Section A-4: Preference for group research

There are no right or wrong answers. Please tick how do you agree with the following statements on research.

- When I have a choice, I try to carry out research cooperatively with others instead of by myself.
- I prefer to work in a research team rather than individually.
- Carrying out research in a group is better than working alone.
- Given the choice, I would rather select a research task where I can work alone rather than do a research task where I have to work with others in a group.
- If I were in a research team, I would prefer to do my own work and let others do theirs.
- I like to interact with others when carrying out research cooperatively.
- I personally enjoy carrying out research with others.
Section B-1: Singelis Self-Construal Scale (SCS)

This is a questionnaire that measures a variety of feelings and behaviors in various situations. Listed below are a number of statements. Read each one as if it referred to you. Beside each statement tick the number that best matches your agreement or disagreement. Please respond to every statement. Thank you.

1=STRONGLY DISAGREE  4=DON’T AGREE OR  5=AGREE SOMEWHAT
2=DISAGREE              6=AGREE
3=SOMEWHAT DISAGREE    7=STRONGLY AGREE

1. I enjoy being unique and different from others in many respects.

2. I can talk openly with a person whom I meet for the first time, even when this person is much older than I am.

3. Even when I strongly disagree with group members, I avoid an argument.

4. I have respect for the authority figures with whom I interact.

5. I do my own thing, regardless of what others think.

6. I respect people who are modest about themselves.

7. I feel it is important for me to act as an independent person.

8. I will sacrifice my self interest for the benefit of the group I am in.

9. I'd rather say "No" directly, than risk being misunderstood.

10. Having a lively imagination is important to me.

11. I should take into consideration my parents' advice when making education/career plans.

12. I feel my fate is intertwined with the fate of those around me.

13. I prefer to be direct and forthright when dealing with people I've just met.

14. I feel good when I cooperate with others.

15. I am comfortable with being singled out for praise or rewards.
16. If my brother or sister fails, I feel responsible.

17. I often have the feeling that my relationships with others are more important than my own accomplishments.

18. Speaking up during a class (or a meeting) is not a problem for me.

19. I would offer my seat in a bus to my boss.

20. I act the same way no matter whom I am with.

21. My happiness depends on the happiness of those around me.

22. I value being in good health above everything.

23. I will stay in a group if they need me, even when I am not happy with the group.

24. I try to do what is best for me, regardless of how that might affect others.

25. Being able to take care of myself is a primary concern for me.

26. It is important to me to respect decisions made by the group.

27. My personal identity, independent of others, is very important to me.

28. It is important for me to maintain harmony within my group.

29. I act the same way at home that I do at work.

30. I usually go along with what others want to do, even when I would rather do something different.
Section B-2: Co-worker allocentrism

This part is designed to learn your general opinion on the relationship with colleagues. Please tick the scale the most representing your opinions.

1. It is inappropriate for a supervisor to ask subordinates about their personal life (such as where one plans to go for the next vacation).

2. When I am among my colleagues, I do my own thing without minding about them.

3. One needs return a favour if a colleague lends a helping hand.

4. I have never loaned my camera/coat to any colleagues.

5. We ought to develop the character of independence among colleagues, so that they do not rely much on others’ help.

6. One should indicate his opinion when discussing with other colleagues, and then take action.

7. The subordinate should obey the supervisor.

8. Colleagues’ assistance is indispensable to getting success.

9. I would help if a colleague at work told me that he/she needed money to pay utility bills.

10. In most cases, to cooperate with someone whose ability is lower than one’s own is not as desirable as doing the thing alone.

11. Do you agree with the proverb “Too many cooks spoil the broth”?