Contextual effects on food consumption: The influence of tableware aesthetics and package colour

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CONTEXTUAL EFFECTS ON FOOD CONSUMPTION:
THE INFLUENCE OF TABLEWARE AESTHETICS AND
PACKAGE COLOUR

Chi Pham

A thesis in fulfilment of the requirements for the degree of

Doctor of Philosophy

School of Marketing, UNSW Business School
August 2018
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**Abstract**

Research in food consumption has emphasized the importance of the contextual factors such as advertising, emotions, portion size, and restaurant ambiance in influencing food decisions. Seemingly small shifts in the contextual environment can significantly influence perceptions and behaviour, making consumers more vulnerable to food consumption context than they realise due to their proximity to the food and direct interaction with the serving and eating experience. Both product packaging and tableware can exert powerful influence on consumers’ food decision. Given the potentially important role of tableware and packaging design, this thesis aims to extend the food consumption literature by examining the influence of these factors on food perception, buying intention, and amount consumed, as well as the mediators and moderators of these relationships.

Across two essays with ten studies in different settings (online panels, lab, and field experiment), using different subject populations (students, non-students), and focusing on different outcome variables (perceptions, buying intention, and amount consumed), this thesis examines the role of contextual cues in food consumption. The first essay examines the effect of tableware aesthetics on actual food consumption and finds that while aesthetically pleasing (versus plain) tableware increases the amount of hedonic food consumed among males, it triggers monitoring among females which leads to reduced consumption. The second essay identifies dark versus bright package colour as a contextual cue that influences individuals’ perception such that dark is perceived as tastier and bright is perceived as healthier. Further, consumers perceive higher level of congruency with hedonic food in dark package and healthy food in bright package, which leads to greater intention to buy. Overall, this thesis provides strong empirical evidence to support the premise that contextual factors can significantly influence perceptions and decision making, which has significant implications for researchers, consumers, as well as practitioners. These implications are also developed and discussed in detail in the thesis.

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I began my PhD study with the most unexpected yet truly memorable advice from my supervisor Associate Professor Nitika Garg, who suggested that I should never choose a trendy research topic. Instead, I should focus on something which I am genuinely interested in, a research area that I can live and breathe with, and that I can still find curious to learn even after a long time. Through the four years of this doctorate, I have come to appreciate the meaning behind this simple yet incredibly valuable advice, not only for the purpose of this degree, but also for my academic career and other aspects of my life. I want to thank Nitika for her guidance and patience, which gave me a clear, purposeful direction in this long journey. She understands my struggle, listens to my ideas, gives me insightful feedback, and supports me all the way. I am grateful to have you as my supervisor and my mentor.

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ABSTRACT

Research in food consumption has emphasised the importance of the contextual factors such as advertising, emotions, portion size, and restaurant ambience in influencing food decisions. Seemingly small shifts in the contextual environment can significantly influence perceptions and behaviour, making consumers more vulnerable to food consumption context than they realise. Due to their proximity to the food and direct interaction with the buying and eating experience, both product packaging and tableware can exert powerful influence on consumers’ food decision. Given the potentially important role of tableware and packaging design, this thesis aims to extend the food consumption literature by examining the influence of these factors on food perception, buying intention, and amount consumed, as well as the mediators and moderators of these relationships.

Across two essays with ten studies in different settings (online panels, lab and field experiment), using different subject populations (students, non-students), and focusing on different outcome variables (perceptions, buying intention, and amount consumed), this thesis examines the role of contextual cues in food consumption. The first essay examines the effect of tableware aesthetics on actual food consumption and finds that while aesthetically pleasing (versus plain) tableware increases the amount of hedonic food consumed among males, it triggers monitoring among females which leads to reduced consumption. The second essay identifies dark versus bright package colour as a contextual cue that influences individuals’ perception such that dark is perceived as tastier and bright is perceived as healthier. Further, consumers perceive higher level of congruency with hedonic food in dark package and healthy food in bright package, which leads to greater intention to buy. Overall, this thesis provides strong empirical evidence to support the premise that contextual factors can
significantly influence perceptions and decision making, which has significant implications for researchers, consumers, as well as practitioners. These implications are also developed and discussed in detail in the thesis.
# TABLE OF CONTENTS

ACKNOWLEDGEMENTS ......................................................... iv
ABSTRACT ................................................................. v
TABLE OF CONTENTS .............................................................. vii
LIST OF TABLES AND FIGURES ........................................ viii
CHAPTER 1: INTRODUCTION ..................................................... 1
CHAPTER 2: LITERATURE REVIEW ........................................... 8
CHAPTER 3: THE INFLUENCE OF TABLEWARE AESTHETICS ON FOOD CONSUMPTION ............................................................ 27
  Study 1: Tableware Aesthetics and Gender Differences ..................... 46
  Study 2: Examining the serial mediation effects .......................... 50
  Study 3: Understanding the Impact of Consumption Goals ............. 54
  Study 4: The Moderating Role of Food Type ................................ 60
CHAPTER 4: THE INFLUENCE OF PACKAGE COLOUR ON CONSUMERS’ PERCEPTION AND BUYING INTENTION ........................................ 69
  Study 1: A field experiment to examine package colour effects ........ 87
  Study 2: The mediating role of congruency on buying intention ........ 93
  Study 3: Package colour and tasting experience .......................... 99
  Study 4: Introducing new product with health claim ..................... 107
  Study 5: Brand familiarity as the moderator ................................ 113
CHAPTER 5: CONCLUSION ......................................................... 125
APPENDIX ........................................................................ 135
REFERENCES ....................................................................... 142
LIST OF TABLES AND FIGURES

Figure 1: Factors influencing food consumption.......................................................... 8
Figure 2: Essay 1 Conceptual Model.............................................................................. 42
Figure 3: Essay 1 Study 1.............................................................................................. 49
Figure 4: Essay 1 Study 2.............................................................................................. 52
Figure 5: Essay 1 Study 3.............................................................................................. 58
Figure 6: Essay 1 Study 4.............................................................................................. 63
Figure 7: Essay 2 Conceptual Model.............................................................................. 83
Figure 8: Essay 2 Study 1.............................................................................................. 90
Figure 9: Essay 2 Study 2.............................................................................................. 97
Figure 10: Essay 2 Study 3 Before tasting ................................................................. 101
Figure 11: Essay 2 Study 3 Post tasting ................................................................. 103
Figure 12: Essay 2 Study 3 Post delay ................................................................. 105
Figure 13: Essay 2 Study 4........................................................................................... 111
Figure 14: Essay 2 Study 5........................................................................................... 116

Table 1: Essay 1 Study Summary Statistics ............................................................... 61
Table 2: Essay 2 Study Summary Statistics............................................................... 122
CHAPTER 1: INTRODUCTION

Past research has examined a wide array of factors that influence food choice and consumption, including internal physiological factors such as emotions (Garg, Wansink, and Inman 2007; Winterich and Haws 2011) and self-regulation (Muraven and Baumeister 2000), and external contextual cues such as portion size (Zlatevska, Dubelaar, and Holden 2014), nutrition information (Kozup, Creyer and Burton 2003), packaging (Deng and Srinivasan 2013) and restaurant ambience (Milliman 1986; Wansink and van Ittersum 2012). While it is broadly accepted that contextual factors influence what we buy, how we eat and how much we eat (Wansink 2004), consumers are not always aware of these influences and often inaccurately predict their behaviour (Van Ittersum and Wansink 2012; Sevilla and Kahn 2014).

Seemingly small changes in the contextual environment can significantly influence behaviour, making consumers more vulnerable to the food consumption context than they believe (Wansink and Chandon 2014). This suggests that there are influences that people are either not aware of or do not monitor (Wansink 2004). For example, in examining the influence of contextual factors on actual consumption, past research found that distractions such as listening to a detective story can increase food intake by 15% (Bellisle and Dalix 2001) and doubling portion size can increase consumption by 35% (Zlatevska, Dubelaar and Holden 2014). In addition, contextual elements such as the number of product units displayed on a package can bias perceptions, with consumers believing that the package with the image of seven cookies is bigger than the one with only four cookies (Madzharov and Block 2010). Thus, understanding why and how contextual factors drive food choice and
consumption is of interest to various stakeholders including researchers, businesses, policy makers and consumers.

Given the wide variety of contextual factors that influence food decision, Cardello and Meiselman (2018) categorised them into four specific environments, including the information environment, physical environment, social environment and the meal environment. Among these environments, the physical environment, which consists of packaging, tableware and other elements, is particularly important. Due to their physical proximity to the food and their functionality to contain and serve the food, product packaging and tableware are directly associated with the buying and eating experience. Recent research supports this idea where it found that the physical environment, as compared to online shopping environment, presented the products more vividly and hence often nudged customers to choose relatively more hedonic food (Huyghe et al. 2017). As both package colour and tableware can be important influencers of the consumption experience, depending on the context. Specifically, while tableware and its aesthetics can influence a sit down eating (non-packaged food) experience, package colour can play an important role where packaged foods are concerned. Across these two unique eating contexts, my research considers distinct factors that influence consumption as well as explain it.

Given the potentially important role of tableware and packaging design in influencing food consumption decisions, this thesis examines the influence of these factors on a variety of food decision making outcomes such as perception, buying intention, and actual consumption, as well as the mediators and moderators of these relationships. The thesis comprises two essays that examine tableware aesthetics (Essay 1) and package colour (Essay 2), and their influence on food consumption, in depth. Essay 1 investigates how tableware aesthetics influence actual food
consumption while Essay 2 examines how package colour influences consumers’ perception of the food product and intention to buy. In both essays, hedonic and healthy food were examined and contrasted.

Essay 1 examines the influence of tableware aesthetics on actual food consumption. Tableware is an important and essential element of the meal, which contributes to the quality of the entire dining experience (Boothroyd 2014). Tableware is used to serve food and is visible throughout the consumption process. Diners also use the tableware as indicator of consumption quantity, such as how much they initially have on their plates, how much they should take, or how much has been eaten (Wansink and Chandon 2014). Tableware can also influence expectations, as well as diners’ sensory and affective judgments of the food, whether it is at home or in a restaurant (for review, see Spence, Harrar and Piqueras-Fiszman 2012).

Existing research often focuses on the functional aspects of tableware, such as its size, colour contrast, and weight (Mishra, Mishra, and Masters 2012; Piqueras-Fiszman et al. 2011; Wansink and Van Ittersum 2005), while neglecting its aesthetic aspect. In addition, due to its direct association with the eating experience, the impact of the tableware aesthetics goes beyond perception and intention. As a result, this research addresses the research gap by focusing on how tableware aesthetics influence actual consumption and the drivers of this relationship.

It is argued that tableware aesthetics present two opposing effects on consumption. The aesthetics of tableware enhances the salience of the food, which has been shown to increase food intake (Wansink 2004). However, just as tableware aesthetics can initiate interest in consumption, it can also direct consumers’ attention toward monitoring their intake. The amount of food consumed depends largely on whether consumers monitor their consumption – that is, whether they pay attention to
how much they are eating (Polivy et al. 1986). If tableware aesthetics increases monitoring, then it should lead to reduced food intake.

In consumption research, there is evidence that women are more concerned with dieting and healthy eating than men (Rozin, Bauer, and Catanese 2003), and that women often feel the obligation to eat according to social norms, making them more cautious of their eating habits (Chaiken and Pliner 1987). In addition to such consumption norms, recent research also finds that males and females process information related to product designs differently (Meyers-Levy and Maheswaran 1991). For example, in different conditions of room ambience such as lightning and music, males and females have been found to differentially perceive the flavour intensity of a food and in turn, express liking differently (Spence, Velasco, and Knoeferle 2014). Thus, while both males and females are impacted by environmental cues (Wansink 2004), the process and the degree of this influence might be unique across the genders (Patrick and Hagtvedt 2011; Spence, Velasco, and Knoeferle 2014). Thus, it is argued that product design and aesthetics, as an environmental cue, might also impact both genders differently.

In a series of four experiments, actual food was used and actual consumption was recorded. It was found that while aesthetically pleasing tableware increases consumption of hedonic food among men, it triggers monitoring among women, which in turn reduces their food intake. However, the effect of tableware aesthetics across genders is attenuated when less-hedonic food is consumed or when plain plates are used, or when health goal is activated.

The main objective of Essay 2 is to investigate the influence of dark versus bright package colour on consumers’ perceptions and intention to purchase food products. Colour is an important element of the package design and is usually the first
element that consumers notice and recognise when shopping in the grocery store. Package colour has also been used by many businesses as a tool of communication. Past research has supported this practice by illustrating how colours carry meanings that can have important influence on people’s perception and behaviour (for review, see Elliot and Maier 2014). However, majority of the colour research to date has focused on three basic colours of red, blue and green with little attention to the effect of achromatic colours such as dark and bright (Meier et al. 2004).

Based on the conceptual metaphor theory (Lakoff & Johnson 1980), it is argued that colour’s ability to carry symbolic meanings can trigger association with perceptions of tastiness and healthiness. In a series of six studies – including a field experiment – it was demonstrated that food is perceived as tastier in a dark package and healthier in a bright package. Importantly, this research finds that the higher likelihood to purchase hedonic food in dark packages, and healthy food in bright packages, is mediated by the perceived congruency (dark-hedonic and bright-healthy) between package colour and food type. Actual tasting weakens the influence of package colour; however, this shift is not stable and the colour effect reemerges after a time delay. Essay 2 also tests the boundary condition of the effect by examining the role of brand familiarity and health claims. Adding a health claim strengthens the influence of the package colour effect, particularly making the hedonic food with a health claim in dark package most attractive to consumers. Brand familiarity attenuates the colour effect such that the colour effect is most effective when the brand is unknown, or when consumers are less familiar with the brand.

This thesis makes important theoretical contributions to the literature in food consumption and decision making. It provides strong empirical evidence of how changes in the contextual environment such as the aesthetics of tableware and package
colour can significantly influence perception, buying intention and actual consumption. In addition, by identifying the underlying mechanism driving these contextual effects, this research explains unique pathways via which tableware aesthetics influences hedonic consumption between males and females, and how the congruency between dark-hedonic food and bright-healthy food drives the package colour effect on perception and buying intention.

Across both essays and a variety of contexts, food type (hedonic, healthy/ less hedonic) is found to be an important moderator in the relationship between contextual factors and food decision. In particular, the effect of tableware aesthetics on actual consumption is only evident when the food is hedonic. When food is less hedonic, it is perceived as less tasty by males, and less harmful by females, attenuating the effect of tableware on consumption. Similarly, Essay 2 identifies how package colour influences buying intention differently for different types of food. When the food is hedonic (non-hedonic), consumers are more likely to purchase the product in a dark (bright) package colour. The finding of the thesis is consistent with past literature, which has also found evidence of asymmetric consumption effects due to variations in food type (hedonic versus less hedonic) (e.g., Garg Wansink and Inman 2007). As the effect of contextual factors on food decision could be attenuated or even changed in opposite directions depending on the nature of food type, this thesis contributes to current literature by emphasising the role of distinguishing different food types in consumption research.

In addition to the theoretical contributions, the implications of this thesis are valuable for businesses in the food industry such as restaurants and food manufacturers. Understanding the colour effect can enable food manufacturers to strategically match package colours to food types and enhance their attractiveness
while effectively communicating a product’s value to customers. Similarly, take-away restaurants might consider using suitable colours for their take-away boxes in order to influence customer perceptions of tastiness and healthiness in their favour. Depending on the restaurant’s positioning (hedonic versus healthy) that either dark or bright take-away boxes may be more effective.

Contextual factors such as tableware aesthetics and package colour are proximal to the eating and buying experience and thus especially important. Overall, this thesis demonstrates their powerful influence on food choice and consumption, which is of interest to not only researchers and marketers, but also the general public. As Wansink and colleagues (2006) concluded, “It is easier to change our food environment than to change our mind,” understanding the influence of aesthetically pleasing tableware on hedonic consumption and the influence of dark versus bright package colour on perception and buying intention can help consumers avoid impulsive purchases of hedonic food and overconsumption of these unhealthy options.

The thesis is structured as follows. In Chapter 2, a comprehensive review of the current literature on drivers of food decision, covering both individual and contextual factors, is discussed. The two essays are then presented as Chapters 3 and 4, respectively. Finally, Chapter 5 presents the conclusions, contributions as well as implications for various stakeholders such as consumers and businesses of this research along with its limitations and directions for future research.
CHAPTER 2: LITERATURE REVIEW

While consumers may genuinely want to make healthier food decisions, intentions and actual behaviours are not always in alignment. Several factors, individual and situational, can influence consumers’ food decisions. This chapter starts by reviewing the current literature on individual factors such as emotion, self-control and gender. Next, it reviews the four dimensions of the contextual environment that can influence food perceptions, buying intentions, and actual food consumption, namely the information environment, physical environment, social environment and the meal environment.

**Figure 1: Factors influencing food consumption**

**INDIVIDUAL FACTORS**

**Emotions**

Due to the sensory nature of food, taste perceptions and consumption decisions are sensitive to the affective feedback in the decision context (Bublitz, Peracchio and Block 2010). A positive mood has been found to promote effective self-regulation and resistance to temptation (Isen 2000). Experiments with consumption of M&M’s (as a
more hedonic and desirable snack) and grapes showed that participants in a positive mood were less likely to choose M&M’s compared to those in a neutral mood state under baseline arousal. Further, after choosing M&M’s, those in the positive baseline arousal mood state consumed fewer than those in the neutral mood state (Fedorikhin and Patrick 2010).

As humans, we often eat to soothe our feelings. As a result, researchers have been increasingly interested in understanding the role of negative emotions on food choice and consumption. In a study that followed 801 children from the age of 4 until they turned 10 years old, researchers found that children who experienced more negative emotions were more likely to engage in emotional eating (Silje Steinsbekk et al. 2017). With 65 per cent of the children displaying "some" emotional eating, it was the parents who tried to use food to comfort their upset children to make them feel better.

Tice, Bratslavsky and Baumeister (2001) identified the link between distress and consumption by arguing that eating fattening, unhealthy but tasty foods is an affect regulation strategy. Their experiment showed that under normal circumstances where mood and emotional states can be changed, distress increases consumption of unhealthy snack foods. This behavioural pattern is suggested to be driven by people’s expectation that the enjoyment of such treats will make them feel better.

Research also found that while negative emotion leads to increased consumption of hedonic food as compared to positive emotion, this effect can be attenuated (Garg, Wansink, and Inman 2007). Specifically, sad people consumed more hedonic food such as buttered popcorn and M&M’s candies than happy people but this effect was mitigated when nutritional information was provided to participants (Garg, Wansink, and Imman 2007). It is argued that when feeling happy, people are
more likely to want to maintain their positive state and thus, avoid consuming hedonic foods for two main reasons. First, they do not need food to feel emotionally better, and second, they understand that the consequence of over-eating such foods might make them feel emotionally worse. Interestingly, decision makers can experience these undesirable consumption effects of sadness without being aware of them (Garg and Lerner 2013).

**Self-control**

It is surprising that both the intuitive idea and scientific evidence that eating slowly leads to more satisfaction is not always applied by consumers. Scientists have shown that a full stomach is only part of what causes an individual to feel satisfied after a meal; the brain must also receive a series of signals from digestive hormones secreted by the gastrointestinal tract (MacDonald 2010). Therefore, by eating too quickly, one may not give this intricate hormonal cross-talk system enough time to work, resulting in lower enjoyment. However, people often choose to consume what they enjoy as quickly as possible (Galak, Kruger and Loewenstein 2013), and avoid breaks in positive experiences despite the finding that such breaks improve such experiences (Nelson and Meyvis 2008).

One reason why consumers may not set their speed of consumption to maximise their satisfaction and enjoyment, and specifically choose quite short intervals between each bite is a failure of self-control (Galak, Kruger and Loewenstein 2013). In such a situation, the desire to indulge immediately overpowers the willpower necessary to slow consumption down (Hoch and Loewenstein 1991), even with the payoff in the future.
The failure of self-control can also lead to higher consumption of unhealthy foods. As discussed above, emotional distress can lead to greater consumption of unhealthy food as a self-regulation or coping strategy. Under emotional distress, self-control can easily break down (Baumeister, Heatherton, and Tice 1993). The short-term goal of feeling better may be prioritised at the cost of long-term goals such as maintaining long-term health.

**Gender**

Gender differences are also relevant to consumption research. Women (versus men) tend to be more concerned with dieting and eating healthily (Rozin, Bauer, and Catanese 2003), and feel more obligated to eat according to societal food consumption expectations, making them more cautious in their eating habits (Chaiken and Pliner 1987). Compared to men, they are better at delaying gratification and resisting temptation (Silverman 2003). Women are also more likely than men to be taught to take small bites, which would decrease the intervals between bites, decrease eating rate, and reduce total food intake (Rolls, Fedoroff, and Guthrie 1991). In addition, women usually have better knowledge of nutrition (Johansson and Andersen 1998) and are more conscientious about health and diets than men (Roininen and Tuorila 1999). As a result, they often consume more healthful foods and rate such foods as tastier (Rapoport et al. 1993).

In a large study conducted on young adults from 23 countries, the results showed that women were more likely than men to avoid high-fat foods, to be dieting, and to attach greater importance to healthy eating (Wardle et al. 2004). Women’s greater weight-control involvement and stronger belief in healthy eating account for these gender differences in food choices.
CONTEXTUAL FACTORS

Given the considerable research examining the effect of contextual factors on food consumption, Cardello and Meiselman (2018) categorised these factors into four categories: information environment, meal environment, social environment, and the physical environment.

The information environment consists of different elements that provide information about the product and its quality to consumers, for example the product type, the product’s name and nutrition label.

The meal environment is everything related to the food itself, how the food is presented and served in a meal. Research about the meal environment includes variety, assortment, food presentation and portion size.

The social environment, as suggested by its name, involves human interaction in a dining experience, whether it is at home, with family members, or in a restaurant with a potentially wider group of people.

Finally, the physical environment in the context of consumption includes the packaging design, the tableware, and the servicescape surrounding the eating experience, such as music and lighting.

Information environment

Two important sources of information that are often relied upon by consumers include elements of the product itself, as well as the information disseminated by the marketer. This information can potentially influence consumers’ decision making process. This section discusses how the information that consumers perceive from product and marketer advertising can influence their behaviour.
Product

The nature of the product itself carries information. Research has focused on understanding how such information provided by the food is interpreted and whether it results in corresponding changes in consumers’ behaviour.

Many people classify foods as a good/bad dichotomy, perceiving most foods as either good or bad for health (Rozin, Ashmore and Markwith 1996). Good (or healthy) foods such as vegetables and fruits are options that may not offer immediate gratification but are consistent with long-term self-control goals (Read, Loewenstein, and Kalyanaraman 1999). Consumers also have a strong tendency to categorise food as either tasty or healthy (Chandon 2013).

On the other hand, bad foods such as chocolate or potato chips, which are considered inherently unhealthy, tend to be perceived as indulgent options. This implicit belief of “unhealthy=tasty” was examined in a series of experiments, which showed that less healthy food items are portrayed to be better in taste, more enjoyable during actual consumption, and more attractive to choose (Raghunathan, Naylor, and Hoyer 2006). Unhealthy but tasty foods are usually termed “hedonic food” in research.

The opposite perception of healthy versus hedonic food can lead to misperceptions about one’s appetite. Finkelstein and Fishbach (2010) demonstrated that consumers who were asked to sample a healthy food item may believe that their health goal was met and were, thus, more motivated to fulfil their hedonic goal. They later reported being hungrier and consumed more food than those who previously sampled a tasty item or did not eat at all.

The name of the food can also provide consumers with information that influences, and sometimes biases their perception. Studies have shown that dieters
rate foods that have been assigned unhealthy names (e.g., pasta, candy chews) as lower in perceived healthfulness than do non-dieters, while identical foods that are assigned healthier names (e.g., salad, fruit chews) are perceived as equally healthful by dieters and non-dieters (Irmak, Vallen, and Robinson 2011). This effect even results in differences in actual consumption quantity as dieters (but not non-dieters) are likely to consume more food when it is assigned a healthier product name.

**Nutritional Labels**

The nutrition information label, mandatory in many countries, was designed to help consumers make more informed food choices based on quantitative nutrition information. Nutrition information is considered to be objective by consumers (Ford et al. 1996) and often trumps other contextual (e.g., Garg et al. 2007) and product-based information (Garretson and Burton 2000). For example, Garg et al. (2007) found that emotion effects on hedonic consumption were attenuated in the presence of nutritional information. Similarly, when the information provided by the product’s health claim conflicted with the Nutrition Facts panel, consumers relied on the latter to make their purchase decision (Garretson and Burton 2000). When there was no perceived conflict between these two sources of information, consumers interpret the nutrition information independently from the health claim. That is, the effect of nutrition information on consumers’ judgement of the product’s healthiness is not influenced by the presence of the health claim (Ford et al. 1996).

Prior research has further extended the examination of nutrition labels beyond the context of packaging. When nutrition information is presented at the point-of-sale, consumers tend to make healthier food choices and become less price sensitive (Nikolova and Inman 2015). In addition, in subsequent purchases, the shoppers’
promotion sensitivity increases by a whopping 73.3% (ibid.). It is suggested that by examining the newly available nutrition available, consumers use up their cognitive resources and therefore, rely on choice tactics such as promotion to simplify their decision making. Past research has also examined the effect of nutrition information in a restaurant context. Kozup, Creyer, and Burton (2003) found that favourable nutrition information (lower levels of fat, saturated fat and cholesterol) presented on a Nutrition Facts panel leads to more favourable attitudes toward the product, the nutrition, and purchase intention, as well as lower perceived risk of heart diseases. These effects were even more pronounced in the restaurant context than in the package context, even though the nutrition information was identical.

**Marketer Information**

Early research in sensory perception has demonstrated the influence of information on consumers’ perception and evaluation about the food product. For example, in a sample testing study, subjects who were told that coffee would have “no bitterness” rated the coffee in the taste test as less bitter compared to subjects who were not given any information (Olson and Dover 1978). In another experiment that involved blind beer tasting, the outcome was similar. The preference for the “secret ingredient” brew was higher in the blind condition than in both of the disclosure conditions, and revelation of the secret ingredient significantly decreased preference only when it happened before tasting (Lee, Frederick, and Ariely 2006). While the role of non-health information as demonstrated in the above examples is strongly influential, this research is particularly interested in understanding how health-related information about food products and certain characteristics of food products that
define them as either healthy or not healthy, moderate preference and consumption of a food product.

In addition to foods perceived as having inherently hedonic or healthy characteristics, many products could be represented as either hedonic or healthy based on the contextual description. The majority of past studies have found that consumers tend to use ad-based claims to process that information (Andrews, Netemeyer, and Burton 1998). For instance, in a study that examined ground beef labelled “25% fat” or “75% lean”, Levin and Gaeth (1988) found that label information influences the perception of the fattiness and greasiness of the product in the direction suggested by the labels. Similarly, fat and sugar content labels affect the evaluation of sweetness and viscosity (Shepherd et al. 1991), and light or reduced-salt labels on cheese decrease the perceived fat and perceived saltiness of the cheese (Schouteten et al. 2015). In the same vein, food options described as "organic," "light," "fat-free," and "low-fat" tend to be classified as better for health than their “regular” counterpart (Chernev and Gal 2010).

While the effect of marketer claims and labels on consumer perceptions is usually intuitive, contrasting effects have been found in some studies. Research has found a positive link between healthy labels and consumption (Provencher, Polivy and Herman 2009; Cavanagh and Forestell 2013). Specifically, participants rated the foods with the healthful brand label as more satisfying, tastier and greater in flavour (Cavanagh and Forestell 2013) and consumed approximately 35% more when food was labelled as healthy (versus unhealthy) (Provencher, Polivy and Herman 2009). Similarly, Wansink and Chandon (2006) found that low-fat labels increased consumption in a variety of snack foods, and Bowen et al. (1992) showed that participants consumed a larger amount of high fat ice cream compared to low fat ones.
Again, this suggests that food consumption patterns might move in different directions, depending on how consumers perceive the information cues provided by the product and marketers.

Advertising has also been found to have a strong impact on food consumption behaviours. Past research with children has shown that exposure to food advertising during television viewing may trigger automatic snacking of available food, which then increases food consumption (Harris, Bargh, and Brownell 2009). When comparing the influence of candy versus fruit advertising on children’s choice of related foods, Gorn and Goldberg (1982) found similar results. Children who viewed candy commercials chose significantly more candy over fruit, while children who viewed fruit commercials (and those in no-message condition) selected more orange juice. Moreover, these advertising effects are not limited to children. Adult consumers tend to generalise health claims, disregarding whether that claim is specific ("no cholesterol") or general ("healthy") (Andrews, Netemeyer, and Burton 1998). Consumers who were exposed to either the “no cholesterol” or “healthy” ad claim mistakenly perceived the advertised product as significantly lower in fat and significantly healthier than those who were in a control advertising condition, in which the message was simply about “delicious eating”.

**The meal environment**

The meal environment refers to everything related to the context in which the food is served. In this section, two aspects of the meal environment will be discussed; portion size, and food presentation.
Portion size

Portion size has been studied in consumption research in recent years, as it is directly related to how much consumers are going to eat, and hence is a potentially important contributing factor to rising overweight and obesity rates (Wansink 2004; Wansink, Brian, Van Ittersum, and Painter 2006; Zlatevska, Dubelaar, and Holden 2014; WHO 2016). “Super” portion sizes reflect many global fast food chains’ strategy in encouraging customers to upsize their meals for a small amount of money, in order to increase the value perception of their offerings. Research has shown that consumers eat and drink more when larger portion sizes are served (e.g. Zlatevska, Dubelaar and Holden 2014). Specifically, Zlatevska, Dubelaar and Holden (2014) conducted a meta-analysis on how much consumption has changed as a function of increasing portion size. Based on 104 unique studies, they found that on average, consumption increases by 35% for a doubling of portion size. However, this effect was weaker when individuals paid more attention to the food being consumed, and among children, women, and overweight participants.

According to existing research, the portion size effect might be caused by factors such as the Delboeuf illusion and tableware size. Van Ittersum and Wansink (2012) attributed the serving size bias to the Delboeuf illusion, in which two identical circles of food were perceived differently in size when one was placed on a larger round plate and the other one was contained by only a slightly larger plate. The theory behind the Delboeuf illusion was reassessed in another research that tested whether a plate’s rim width and colouring influence perceptual bias and perceived food portion size. In their research, McClain et al. (2014) found that participants overestimated the diameter of food portions and the visual area of food portions on plates with wider (versus very thin) rims and on plates with rim colouring (versus no colouring).
Tableware size also accounts for serving larger portion sizes to oneself and hence greater consumption. In a study conducted in a natural environment, Wansink, van Ittersum, and Painter (2006) found that nutrition experts served themselves 31% more when given a larger bowl and 14.5% more when given a larger serving spoon. Similarly, by using a larger fork, participants ate more pasta than those using a smaller fork (Mishra, Mishra, and Masters 2011). Nevertheless, when people have a well-defined hunger goal and aim to accomplish that goal, the effect was reversed. In the same paper that studied real customers in a restaurant setting, fork size was found to decrease consumption quantity. Mishra, Mishra, and Masters (2011) argued that by investing effort into visiting a specific restaurant and paying for the meal, consumers set a clear goal of hunger satiation for their experience. By using a smaller fork, diners took small bites, which gave them a feeling that they were not making progress in satiating their hunger, resulting in greater food consumption.

**Food presentation**

The presentation of food can influence consumer perceptions and consumption behaviours. Simple changes such as stacking the food on the plate or spreading it across the plate can make a difference. Szocs and Lefebvre (2017) found that when foods were stacked on the plate (presented vertically), consumers perceived the same portion as smaller and ate more than when foods were spread across the plate (presented horizontally). Consumers use the surface area of the food portion as a cue for estimating portion size and consequently, their consumption.

Presenting food in an aesthetically pleasing manner can enhance the overall evaluation and experience of the dish. Based on prior empirical evidence showing that people prefer horizontal and vertical lines to their oblique counterparts, Youssef et al.
(2015) investigated whether linear or circular presentations of a dish with the same ingredients can influence consumer ratings. Their experiment illustrated that while both food presentations were highly artistic, participants preferred the linear over the circular presentation, rating it as significantly more artistic and expecting it to taste significantly more savoury.

Food presentation is also a work of art, as seen in high-end restaurants and reality cooking shows all over the world. Michel et al. (2014) examined the art of plating by creating a salad dish with ingredients arranged to look like one of Kandinsky’s paintings. The researchers found that consumers rated the food more favourably (more artistic and more complex) and they were also willing to pay more. Interestingly, consumers also gave the dish higher tastiness ratings after they had the chance to try it.

Social environment

While eating often happens in a social or public setting, there is limited research examining the role of the social environment on food consumption. Past research has shown that in a social context, people increase total their food intake. Data collected for three consecutive 24-hour periods from a hospital shows that patients ate more at a group table than when they ate alone in their beds (Edwards and Hartwell 2004). Although this is a small study, the results provide evidence of how an individual’s consumption decisions might be influenced by the presence of others.

Furthermore, our food decisions are also influenced by the choices of people present in the dining place. McFerran, Dahl, Fitzsimons, and Morales (2009) show that while people are more likely to eat larger food portions if the other person chooses a large quantity, these consumption differences are accentuated by the physical weight
of dining partners. Specifically, a portion is significantly larger if the other person is thin rather than obese. Respondents use a quantity anchor set up by others to determine how much they should eat themselves. As a result, it is considered normal to see a heavy person taking a large quantity of food and a thin person selecting a small portion. Nevertheless, seeing a thin person take a large serving may license people to eat more. The effect is even stronger when consumers have low appearance self-esteem.

While the above studies show that consumers might be influenced by people they do not know personally, past research has also examined whether this effect is enhanced or attenuated if the other person is known, such as a romantic partner. In a series of four studies, including a field study at a national restaurant chain, Hasford, Kidwell and Lopez-Kidwell (2017) show that when relationship formation motives are active, females are more likely to select an unhealthier (healthier) meal when their partner chooses an unhealthy (healthy) meal. In contrast, when a relationship maintenance motive is active, males are more likely to be influenced by the eating patterns of females.

In a study that examines the impact of the dynamic decision process in the social context of eating, Ariely and Levav (2000) investigate how individuals make sequential choices in a group context. Their findings indicate that consumers balance their individual-alone goals (such as satisfying one’s taste) and individual-group goals, which are triggered by the existence of a group (such as minimising regret and avoiding losses, information gathering and self-presentation) when making food and drink choices in social settings. That is, while individuals make choices that produce greater variety at the group level, they scarify their personal taste satisfaction and minimise any regret that might occur, for the sake of group level variety. Nevertheless,
satisfaction of other individual-group goals, such as gathering information and presenting one’s self as interesting and unique might offset the sacrifice they made earlier.

Physical environment

In this thesis, I mainly focus on the physical environment in the food consumption context. The physical environment refers to the surrounding elements of the meal, except the food itself. Thus, the physical environment consists of various factors such as tableware, table setting, room ambience, packaging, and even the presence of other people (Cardello and Meiselman 2018). In this chapter, I review current literature on two such factors that could be important to the consumption experience - tableware and packaging - depending on the consumption context. They both exhibit two common characteristics, that is, proximity to the food and direct interaction with the eating experience.

Tableware

There are different approaches in tableware research. The majority of previous studies have addressed the physical aspects and their effects on food decisions, with tableware colour and size being the most common physical elements to have been examined.

Research in colour has suggested a link between tableware colour and the taste of the food. In a series of collaborative works, authors showed that white (versus black) plates enhanced the sweetness of a strawberry mousse (Piqueras-Fiszman and Spence 2015); that cream-coloured cups can enhance the sweetness and chocolate aroma of coffee (Piqueras-Fiszman and Spence 2015); and that the colour of the
serving bowl can affect the perceived taste of popcorn (Harrar, Piqueras-Fiszman, and Spence 2011).

The size of tableware is another contextual variable that can influence behaviour. In a series of papers, Wansink and colleagues showed that larger plates lead to larger food intake, mainly due to the “portion size effect” as people tend to take a greater portion size when the larger plate or bowl is given to them (e.g., Wansink and van Ittersum 2003; 2005, Wansink 2004). This effect also extends to other types of tableware. Past studies have illustrated that both children and adults pour and drink more beverages when given a short, wide glass compared to those given a tall, slender glass (Wansink and van Ittersum 2003).

Past research has also examined other elements of tableware, including the container’s shape (Folkes and Matta 2004; Raghubir and Krishna 1999) and the weight of the tableware (Piqueras-Fiszman et al. 2011). For example, food was rated as being of higher quality and more pleasant when a heavier metallic spoon (versus plastic spoon) was used (Piqueras-Fiszman et al. 2011). Other research examining the weight of the bowl found that yoghurt sampled from a heavier bowl was rated as more intense, denser, more expensive, and was preferred more than the same yoghurt from a lighter bowl (Piqueras-Fiszman et al. 2011). Evidence from this stream of research confirms the important impact that tableware can have on consumption, where small variations in tableware can have a significant influence on consumers’ perceptions and behaviour.
Packaging

There is evidence in practice and theory about the link between packaging colour and perception. In Cheskin’s (1957) book, the author discussed a classic example of the drink 7-Up getting rated as more lemony when it was served in a can that was more yellow in colour. In a more recent campaign, Coca-Cola's white Christmas cans resulted in a disappointed and short-lived launch. Many consumers felt that the regular Coke taste was different in the white packaging (Esterl 2011). For these examples and most beverages available on the market, the can serves as both the package and the servingware at the same time. Research in a laboratory setting also found the effect of package colour on flavour. Studies across four different types of food (breakfast cereal, ice-cream, iced tea, and yoghurt) showed that food contained in red packages were perceived as sweeter than those in blue or green (Huang and Lu 2016). The main underlying idea of this effect is colour’s ability to carry symbolic meanings, which is automatically transferred to the food product and sets expectations about the taste in the mind of consumers (for review, see Piqueras-Fiszman and Spence 2015).

In a similar vein to studies looking at the effect tableware size, Do Vale, Pieters and Zeelenberg (2008) investigated the impact of package size on food decisions. They found that under certain conditions, smaller packaging may cause greater consumption despite consumers’ belief that small packaging formats of hedonic products may help to regulate consumption. Consistent with this research, Argo and White (2012) found that people with low self-esteem are highly sensitive to the external control properties that small packages offer and, as a result, increase their consumption when the packages are small.
In addition to research examining the physical elements of packaging, Orth and Malkewitz (2008) took a holistic approach to packaging design research and suggested that brands can intentionally design their package in five holistic styles that convey relevant branding messages. For example, it was recommended that sincere brands and sophisticated brands should have natural designs, competent brands should have delicate designs, while exciting brands and rugged brands should consider contrasting designs. Similar to this approach, the notion of appropriateness was also found in tableware research. Research has also suggested that beverages should be served in an appropriate container, as studies found that hot chocolate served in a ceramic cup was rated higher in pleasantness than in a glass or a bottle (Raudenbush, Meyer, Eppich, Corley, and Petterson 2002).

In other packaging design research, various elements of design such as product pictures (Underwood and Klein 2002), the number of product units (Madzharov and Block 2010), logo location (Sundar and Noseworthy 2014), and the transparency of package (Deng and Srinivasan 2013) have been discussed and found to influence food perception and consumption. For example, a study on logo location indicates that a small change in the position of the logo on packaging might impact consumers’ preferences, depending on the strength of the brand (Sundar and Noseworthy 2014). While powerful brands are preferred when the brand logo is located high rather than low on the packaging, less powerful brands benefit from setting their brand logo lower on the packaging.

This chapter has identified some of the key individual and contextual factors influencing consumers’ food decisions. While this is not a comprehensive review of all factors that can potentially influence consumption, the research discussed here does highlight the high degree of susceptibility that food consumption behaviours can
exhibit in response to various elements in the consumer’s environment. Chapters 3 and 4 build on this literature review and further discuss the specific literature relevant for the research area examined (tableware aesthetics in Chapter 3 and package colour in Chapter 4) along with the key moderators and mediators of food consumption in those contexts, and develop relevant hypotheses.
CHAPTER 3: THE INFLUENCE OF TABLEWARE AESTHETICS ON FOOD CONSUMPTION

Imagine eating out in a high-end restaurant or celebrating a special occasion at a friend’s house. What kind of tableware would you expect to see? Do you expect your consumption to be influenced by the tableware? Nicely designed tableware enhances our overall impression of the dining experience. However, existing research does not answer the question regarding whether the aesthetics of the tableware would influence actual consumption. Specifically, whether using beautifully designed tableware increases or decreases a person’s consumption of different types of food, or when different eating goals (such as the desire to eat healthy) are salient.

Businesses and researchers alike understand that aesthetics have crucial value in consumer and buyer decision making (Kumar and Noble 2016; Patrick and Hagtvedt 2011; Reimann et al. 2010). Beautiful objects capture our attention, deliver powerful messages (Garber 1995), evoke more favourable aesthetic responses, and lend sensory pleasure to the whole consumption experience (Bloch 1995). Consumers increasingly look for tableware—plates, utensils, serving items, and glassware—that has an aesthetic design, considering these items to be a fashion statement rather than just a necessity (Bowry 2016). In fact, the global tableware market is predicted to exceed US$41 billion by 2020 (Global Industry Analysts Inc. 2016). Higher living standards and growing sophistication in the practice of fine dining are among the drivers of growing demand for aesthetically pleasing tableware.

Insights into the connection between tableware aesthetics and consumption behaviour have important managerial implications. In the hospitality business, it has long been recognized that tableware is no longer just a vehicle for food but an
important part of the dining experience (Boothroyd 2014). Chefs at high-end restaurants collaborate with designers to create tableware that reflects their aesthetic values (McBride 2014). Top airlines use fine bone china to serve first and business class customers, while gradually replacing economy meals’ disposable serving ware with high-quality plates and bowls (Schneider 2014). Research also shows that high-quality tableware, attractive linens, and visually attractive table settings lead consumers to perceive their overall dining experience to be better than expected, thereby positively enhancing satisfaction (Ryu and Han 2011).

Given that tableware aesthetics are so closely associated with actual consumption and its experience, there is a surprising dearth of research linking the two. An investigation of tableware aesthetics and food consumption seems particularly important given the push to understand consumption and the numerous factors that influence it in order to tackle the alarming rise in global obesity. In this research, I aim to establish a relationship between tableware aesthetics and food consumption and to examine different moderator(s) and mediator(s) of this relationship. Particularly, I look at how tableware aesthetics (more aesthetically pleasing versus plain tableware) influence consumption and whether this relationship is moderated by food type (hedonic versus less hedonic food), gender, and consumption goals (healthy versus hedonic).

This essay makes three important contributions. First, I offer an examination of tableware aesthetics as a contextual factor that influences food consumption. As outlined in Chapter 2, prior research has examined various factors influencing food consumption, such as assortment variety (Kahn and Wansink 2004), food shape (Sevilla and Kahn 2014), portion size (Zlatevska, Dubelaar, and Holden 2014), labelling (Wansink and Chandon 2006), emotions (Garg, Wansink, and Inman 2007),
and packaging (Deng and Srinivasan 2013). A number of recent studies have highlighted the importance of tableware on perceptions of and intended behaviour toward food (for reviews, see Spence, Harrar, and Piqueras-Fiszman 2012). However, current research often focuses piecemeal (rather than holistically) on the functional aspects of tableware, such as its size, colour contrast, and weight (Mishra, Mishra, and Masters 2012; Piqueras-Fiszman et al. 2011; Wansink and Van Ittersum 2005), while neglecting its aesthetic aspect. Our research attempts to address this literature gap.

Second, I establish gender as an important moderator of the relationship between tableware aesthetics and consumption. Existing research in aesthetics either does not report any gender differences in response to product form (Bloch, Brunel, and Arnold 2003) or does not find any significant relationship between gender and aesthetic activities (e.g., going to the theatre, reading or playing musical instruments) (McManus and Furnham 2006). More recently, however, studies have highlighted important emerging issues with regard to the role of gender in aesthetics that remain to be investigated (e.g. Patrick and Hagtvedt 2011). For example, a tasting experiment revealed that males and females reported different perceptions of flavour intensity and liking in different conditions of room ambience (lighting and music) (Spence, Velasco, and Knoeferle 2014). In examining responses to fashion items that were aesthetically incongruent with the existing wardrobe, Patrick and Hagtvedt (2011) found that women exhibited a stronger intent to buy more new items, whereas men (versus women) exhibited a stronger intent to return the incongruous item. The current research is also a response to the call for further investigation into gender differences in different disciplines by researchers such as Meyers-Levy and Loken (2015).

Finally, I develop important implications based on the findings that will be of interest to marketers and health professionals, as well as consumers who are interested
in managing their food consumption while balancing satisfaction and health concerns. Overall, this research aims to present a more holistic perspective on aesthetics and its link to consumption, especially of hedonic food products.

This essay consists of four studies examining actual food consumption. Study 1 examines the effect of aesthetically pleasing (versus plain) tableware on the consumption of hedonic food and the moderating role of gender on this relationship. Next, Study 2 establishes the underlying mechanism driving the differences in consumption between males and females across different tableware aesthetic conditions. Specifically, it tests the double mediating function of food salience and perceived taste and of food salience and consumption monitoring. Studies 3 and 4 further test other key moderators of the effect, namely the role that consumption goals (health, hedonic, and neutral goal) and the nature of the food product (more versus less hedonic food) might play in influencing the effect of tableware aesthetics on consumption.

In the next section, I begin by summarizing the relevant literature on product aesthetics, tableware design, and food consumption, and develop our hypotheses. I then present the studies and their findings, followed by a discussion of the implications of the findings for consumers and health professionals.
HYPOTHESES DEVELOPMENT

What are product aesthetics?

The term “aesthetic” is often used to express sensory forms of perception as opposed to strict reasoning or logical thinking (Reimann et al. 2010). Today, the concept of aesthetics is no longer limited to cultural products or artistic experiences, and can be used to refer to sensitivity to beauty in general (Holbrook 1981). A consumer may value the aesthetically pleasing appearance of a product purely for its own sake, as looking at something beautiful is enjoyable and rewarding (Creusen and Schoormans 2005). Many beautifully designed objects can promote positive experiences, such as the joy of seeing a beautiful product or pleasant feeling when choosing a product with a desirable and inspiring design (Desmet and Hekkert 2009). In the market today, where products and services are rapidly commoditised and many alternatives have similar function and price, those with an aesthetic design stand out. These products are perceived to be more valuable, which translates into new sales and greater success in the marketplace (Raghubir and Greenleaf 2006).

It is important to distinguish between product design and a product’s aesthetic value. While product design is a more general concept that encompasses all aspects of product appearance and materials, aesthetic value refers to the more hedonic aspect of the design that triggers a sensory response (Noble and Kumar 2010). Aesthetic properties go beyond single technical elements such as size, colour, weight and shape. In this research, I adopt a viewpoint of aesthetics as the compositional characteristics of a design (Kumar and Garg 2010) and, as such, equate the aesthetic value of a product to the overall impression of its visual appearance.

Tableware and Consumption
Food consumption research has increasingly focused on tableware design in recent years. Research shows that both visual aspects (such as material, colour, and size) and non-visual aspects (weight) of tableware affect people’s perception of the food placed on it (Spence, Harrar, and Piqueras-Fiszman 2012). People rate food as significantly more pleasant, and of higher quality when they taste it with a heavier metallic spoon as compared to a metallic-looking plastic spoon (Piqueras-Fiszman et al. 2011). The authors suggest that participants’ implicit judgments - that stainless-steel spoons are of higher quality than plastic spoons - might have transferred to the food, causing it to be perceived as higher quality when eaten using the stainless-steel spoon. This transferring effect was once again used to explain why research participants rate yoghurt sampled from the heaviest bowl (out of three bowls) as 13% more intense, 25% denser, 25% more expensive, and 13% more preferable than the same yoghurt from the lightest bowl (Piqueras-Fiszman et al. 2011). In another study which asked participants to rate sample drinks tasted from different containers, they reported hot chocolate to be more pleasant tasting when served in a ceramic cup than when served in either a glass or a bottle (Raudenbush et al. 2002). The anticipated taste resulted from the perceived appropriateness of the container for a particular drink.

To extend our understanding of the effect of tableware, researchers have further examined changes in quantity of food or drink consumed with changes in shape or size of the tableware. Past studies illustrate that both children and adults pour and drink more juice when given a short, wide glass as compared to a tall, slender glass (Wansink and Van Ittersum 2003); consumers serve themselves more food when using larger plates and bowls (Van Ittersum and Wansink 2012); and diners
overconsume from smaller rather than larger forks (Mishra, Mishra, and Masters 2012).

While it is generally agreed that well-designed products add value by improving the quality of the users’ experiences with them (Bloch 1995), far less research has empirically examined this question. In the present research, I look specifically at tableware aesthetics and their influence on consumption. Aesthetics draw attention, but does this attention transfer to food and influence consumption? The following section develops our hypotheses and explains the rationale behind them.

**Tableware aesthetics and consumption**

The presence of food, if attractive, can easily stimulate people to eat (Wansink 2004). Exposure to food presentation increases reported hunger (Fedoroff, Polivy, and Herman 2003), salivation (Christensen and Navazesh 1984), and the desire to eat (Hill, Magson, and Blundell 1984). These behaviours are directly associated with the motivation to eat, and they explain why the best way to reduce the consumption of food is to not see it. Non-obese secretaries ate 5.6 times more Hershey’s Kisses chocolate candies when the Kisses were placed on their desks than when Kisses were two metres away from them (Painter, Wansink, and Hieggelke 2002). Food products stockpiled at home are also visible, salient, and convenient to consume, leading them to be consumed at a higher frequency (Wansink and Deshpande 1994).

Beautiful objects capture our attention (Garber 1995). When a product is more visually pleasing than everyday items, or similar items of the same category, consumers are more likely to pay attention to it. For food products, attractive packaging can draw attention to them and increase the likelihood of purchase (Garber
It is argued that, compared to plain white tableware, aesthetically pleasing tableware might make the food salient and signal something that is worthy of attention. As a result, it is predicted that consumers will be more likely to pay attention to the food served on aesthetically pleasing tableware.

However, just as tableware aesthetics may initiate interest in consumption, they may also direct consumers’ attention toward monitoring their food intake. The amount of food people consume depends largely on whether they monitor their consumption – that is, whether they pay attention to how much they are eating and have eaten (Polivy et al. 1986). Distractions, such as watching television or listening to a story, reduce monitoring effort, resulting in consumption of hedonic, familiar foods at a faster rate and for a longer period of time (Blass et al. 2006). Through focused attention on the food, people may be able to keep their consumption under control. Certain cues can act as reminders to restore consumption monitoring. For example, transparent food packaging allows consumers to see how much food is left and guess how much they have eaten, which in turn influences their consumption (Deng and Srinivasan 2013). If a food represents a threat to consumers’ healthy diet, it can also motivate them to control their intake (Trope and Fishbach 2000). Furthermore, people can draw opposing inferences from the same cue (Deng and Srinivasan 2013).

In the current research, it is thus argued that tableware aesthetics can have two opposing effects on consumption. First, aesthetically pleasing tableware draws greater attention to the food, leading to higher consumption. On the other hand, those who pay more attention to tableware (and thereby to the food on it) might also evaluate the food more carefully, and in particular, how much they have eaten and how much is
left. That is, the aesthetically pleasing tableware may activate a monitoring mechanism and reduce consumption (i.e. monitoring effect).

**Gender Differences**

Not everyone reacts to aesthetically pleasing tableware in the same way. By nature, the meaning of visual aesthetics is subjective and largely contributes to the fact that what is pleasing to the eye is a personal, individual perception (Kumar and Garg, 2010). The level of significance depends on the perceived value consumers attach to superior visual aesthetics and their ability to recognise, appreciate and evaluate it (Bloch, Brunel and Arnold 2003). In this research, gender differences are of interest as males and females often react differently to aesthetic (Meyers-Levy and Zhu, 2010), leading to different perceptions and hence different decisions (Martin, 2003). In addition, consumption norms around food can vary significantly across males and females (Chaiken and Pliner 1987), resulting in different patterns of food choice and consumption behaviour.

While we can argue that human interest in and fascination with aesthetics “is pursued by and directed to all, regardless of age and gender” (Davies et al. (2009, p. 260), their response in terms of subsequent behaviours might vary. That is, both males and females equally share an interest and appreciation of beautifully designed products; nevertheless their actions such as buying and using the products might not be the same. In a study that examines consumers’ response to a new product when its appearance does not aesthetically match the customer’s existing products, Patrick and Hagtvedt (2011) found that women versus men exhibited a stronger intent to buy more whereas men (vs. women) exhibited a stronger intent to return. While women might consider buying additional products to match their new incongruent product, men tend
to avoid such complexity by returning the aesthetically incongruent product. Possible reasons include females’ stronger sensitivity to aesthetic incongruities, higher involvement in product purchase on the basis of aesthetic and greater extent of confidence about their aesthetic judgement. This finding as well as authors’ arguments are in line with Meyers-Levy’s theory of selectivity hypotheses (Meyers-Levy, 1989; Meyers-Levy and Loken, 2015) which suggested that gender differences are conditional, depending on certain triggers in the environmental context.

It has also been well documented that men and women process information related to product designs differently (Meyers-Levy and Sternthal 1991). While men tend to process objects in terms of physical attributes, women are more likely to process visual information comprehensively and to look for interpretive concepts and structural interrelationships (Jaušovec and Jaušovec 2009). Women treat products’ design as an environmental cue and react more strongly than men when they see something out of the ordinary, both above and below standard (Patrick and Hagtvedt 2011; Shao, Baker, and Wagner 2004). In their research, Patrick and Hagtvedt (2011) discussed females’ stronger sensitivity to aesthetic incongruities, higher involvement in product purchase on the basis of aesthetics, and greater confidence in their aesthetic judgment.

The topic of gender differences is also relevant in consumption research. There is evidence that women are more concerned with dieting and healthy eating than men (Rozin, Bauer and Catanese, 2003) and that women often feel the obligation to eat according to the societal food consumption expectations, leading them to become more cautious of their eating habits (Chaiken and Pliner, 1987). Compared to men, women can easily delay gratification and resist temptation (Silverman, 2003). Women may have been taught to take small bites which would decrease the intervals between
bites, decrease eating rate, and reduce total intake (Rolls, Fedoroff, and Guthrie 1991). In addition, females usually have better knowledge of nutrition (Johansson & Andersen, 1998) and are more conscientious about health and diets (Gerend, 2009; Roininen & Lahteenmaki, 1999; Wyant & Meiselman, 1984). As a result, females often consume more healthful foods and rate such foods as tastier (Digby & Stewart, 1996; Rappoport, Peters, Peters, McCann, & Huff-Corzine, 1993; Duffy & Bartoshuk, 2000).

Given the gender effects found in both aesthetics and food consumption domains, it is predicted that there is a moderating role of gender in the relationship between tableware aesthetics and consumption. Due to the differences in response to aesthetics by males and females, along with females’ greater interest in a healthy diet and perceived norms to stay fit, it is predicted that females will consume less hedonic, unhealthy, and tasty food when aesthetically pleasing tableware is used.

While aesthetically pleasing tableware increases the salience of the food for both males and females, this increased salience might lead to unique pathways across genders. Specifically, it is expected that for males, increased food salience of hedonic, tasty (but fatty) food salience can trigger increased taste perceptions and thereby, increase the amount they consume compared to when the food is served in a plain plate. In contrast, increased salience of hedonic food might trigger increased monitoring of consumption in females, as prior research has shown that females feel more commitment to take control of their diet, especially when it threatens their eating goal and body image (Chaiken and Pliner 1987, Rozin, Bauer, and Catanese 2003). Thus, it is expected that for females, salience will lead to increased monitoring when using aesthetically pleasing tableware, leading to a decrease in amount consumed. That is, there are two unique pathways via which tableware aesthetics will influence
males and females in their consumption of hedonic foods leading to different consumption patterns.

Based on the above arguments, it is hypothesised that:

**H1:** A significant interaction will emerge between gender and tableware aesthetics such that females (males) will consume less (more) when hedonic food is presented in aesthetically pleasing tableware versus plain tableware.

**H2:** Highly aesthetic (vs. plain) tableware will increase food salience which will lead to,

a) Increased perceptions of taste for the hedonic food which will increase the amount consumed in males but not females

b) Increased monitoring of the consumption of hedonic food which will decrease the amount consumed in females but not males.

**The Moderating Function of Consumption Goal**

Exposure to food cues activates the temptation and desire to eat, which eventually increases eating (Fedoroff, Polivy, and Herman 2003; Hill, Magson, and Blundell 1984). Consumers’ efforts to manage their food intake are threatened when food is made more salient (Chandon and Wansink 2002). As a result, food temptations created by greater attention towards food may be detrimental to the goal of monitoring food intake, leading to an increase in indulgent consumption (Kroese et al. 2011). Our argument so far is in line with this literature.

However, recent research suggests that temptations may enhance self-control and hence help reduce consumption of hedonic food (Fishbach, Friedman, and Kruglanski 2003). This line of research is based on the counter-active control theory
(Trope and Fishbach 2000), which provides evidence that temptations may be able to support rather than inhibit goal salience and goal-directed behaviour (Kroese et al. 2011). Participants who were exposed to food temptations reported higher goal importance and goal intentions, and more often chose healthy over unhealthy snacks, as compared to those in the control condition. Trope and Fishbach (2000) proposed that people can recognize the threat that immediate temptation poses to their long-term goals; consequently, goal-directed behaviours are automatically activated. The authors found in a field study that priming pleasure from social activities enhanced rather than reduced students’ motivation to study and therefore enabled them to prepare for and perform better in an examination. However, when studying is no longer a prominent goal (such as after the examination), the same priming no longer produces counter-active bolstering of the value of studying.

As discussed above, men and women differ in their implicit consumption goals. Compared to males, females are more concerned with health and diet (Rozin, Bauer, and Catanese 2003), and can more easily delay gratification and resist temptation (Silverman 2003). When being were exposed to pictures or samples of palatable and tempting food, normal-weight women reported a decreased motivation to eat (Ouwehand and Ridder 2008). It is also consistent with previous research on the counter-active process of temptation for people with a long-term self-control goal (Fishbach and Trope 2005). The salience of food that triggers temptations may automatically help women recall their future goal of maintaining a normal weight and healthy diet (Fishbach, Friedman, and Kruglanski 2003). While enduring a long-term goal of healthy eating, the activation of hedonic goal might therefore present a goal conflicting scenario for females. In that situation, the presence of an actual temptation (such as hedonic food, or thinking about hedonic activities) may lead to an activation
of the higher priority goal, which then overrides the temptation’s influence (Fishbach, Friedman, and Kruglanski 2003). Taken together, it is proposed that when a plain tableware is used, a hedonic goal will act as a consumption monitoring cue which reinforces females’ efforts to monitor their intake of unhealthy food. Food becomes more apparent as a negative temptation for women, triggering increased goal to stay healthy and thus leading to reduced consumption. When an aesthetically pleasing tableware is used, the pattern of consumption remains similarly between different goal conditions. Tableware aesthetics act as a boundary condition where regardless of the goal activated, increased food salience and consequent monitoring lead to reduced intake of hedonic food.

In contrast, for males, the presence of hedonic goal does not represent an apparent conflict. When aesthetically pleasing tableware is accompanied by a hedonic goal, it is expected to amplify each other’s effect by increasing food consumption among males. Both the tableware and hedonic goal are likely to direct men’s attention toward enjoying the food, leading to greater consumption.

When a healthy goal is active, however, it will assist both males and females in reducing their consumption by reminding them of the long-term health benefits of avoiding overconsumption of hedonic food. Formally stated:

**H3:**

A significant three-way interaction will emerge between gender, tableware aesthetics and consumption goal such that:

a) A healthy consumption (versus neutral or hedonic) goal will reduce hedonic food consumption among males using more aesthetically pleasing tableware,
b) Both a hedonic and a healthy consumption (versus neutral) goal will reduce hedonic food consumption among females using plain tableware.

**The Nature of Food Type**

Food’s appearance contributes significantly to its appeal to diners. Observers usually perceive hedonic food to be tastier and more enjoyable than less hedonic food (Raghunathan et al. 2006). While it is expected tableware aesthetics to increase attention toward eating, the unattractiveness of a food mitigates such interest. Less hedonic foods that do not appeal to taste perception also do not appeal to consumers’ eyes (Sørensen et al. 2003).

Regarding health concerns, consumers perceive less hedonic food to be less harmful to their well-being and less tempting, compared to hedonic food. When the perceived strength of the temptation is low, the level of self-control is also reduced (Trope and Fishbach 2000). Consumption monitoring is however, only triggered when the act of consumption appears to be a threat to self-control to consumers (Fishbach and Shah 2006)—that is, only when unhealthy, hedonic food is presented to them. As a result, consumers will minimise or tend not to activate consumption monitoring when eating less hedonic food, leading to similar consumption patterns across different types of tableware.

Taken together, it is argued that aesthetically pleasing tableware is likely to have a stronger effect on food consumption when food is hedonic and might get attenuated when less hedonic food is served. That is,

**H4:** A significant three-way interaction will emerge between food types (hedonic versus less hedonic), gender, and tableware aesthetics such that the differences in consumption between males and females across
aesthetically varying tableware is only evident when food is perceived as hedonic (but not when it is relatively less hedonic).

**OVERVIEW OF STUDIES**

Four experiments were designed to test our hypotheses. I used actual food products and measured actual consumption in our studies. Research has shown that the presence of actual food matters, as participants may exhibit a stronger reaction when eating rather than seeing food (Jimenez et al. 2015). In addition, evaluating food once it is eaten is different from merely viewing it on paper or on a computer screen (Zellner et al. 2003).

![Figure 2: Essay 1 Conceptual Model](image)
Study 1 provides initial evidence of the influence of tableware aesthetics on consumption of hedonic food and the moderating role of gender. Study 2 replicates the findings of Study 1 and further investigates the underlying mechanism of the differential influence of tableware aesthetics on food consumption between males and females. Studies 3 and 4 examine the moderating functions of consumption goals (hedonic versus healthy) and food type (hedonic versus less hedonic), while replicating the results from Studies 1 and 2 to further provide evidence of the robustness of the findings. Figure 1 describes the conceptual model of the current research.

Pre-test

I ran a preliminary test to choose two designs of tableware for our main studies, in which one is designed to be perceived as more aesthetically pleasing than the other. Six ceramic plates of different designs and aesthetics were selected for this study.

Method and procedure

One hundred and sixty-four undergraduate students (66.5% female, $M_{age} = 19.2$) from a large university were invited to participate in a 20-minute online study in exchange for course credit. Participants first saw and assessed a total number of six plates. The order of images was randomized to ensure that participants looked and evaluated the tableware images in each question carefully. Participants were asked to rate the appearance of each of these plates on a 7-point semantic differential scale with
six items anchored by “inexpensive/expensive,” “everyday use/special occasion use,” “basic design/creative design,” “common/uncommon,” “mass produced/designer,” and “overall unattractive/overall attractive” (α = .93). They were then asked to indicate their preferred choice of a plate from six plates. Participants were asked to choose one plate for everyday use at home and one for use on special occasions at home, if price was not a constraint, and one they expected to see and use in a high-end restaurant. The most (least) aesthetically pleasing tableware is the one with the highest (lowest) score and the most (least) frequently chosen to use on a special occasion or in a restaurant. The choice questions were expected to provide another measure of the aesthetic value of different tableware and provides validity to the evaluation measures preceding them.

I also collected information about participants’ perceptions of tableware design and consumption. A 7-point Likert scale was employed (1 = strongly disagree, 7 = strongly agree), in which participants reflected on whether they “care about the appearance of the tableware used at home,” “care about the appearance of the tableware in a restaurant,” “believe that the design of the tableware affects how much people enjoy the food or drink,” “enjoy the meal more if it is served in attractive tableware,” “will be more likely to eat less if the meal is served in attractive tableware,” “will more likely to eat and drink slower when using attractive tableware,” and that “the design of the tableware affects how much I enjoy the meal at home” and “in a restaurant.” Finally, participants provided demographic information, such as age, gender, occupation, average monthly expenditure, and race/ethnicity background.

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1 I have also repeated the analyses with three out of six items (“basic design/creative design,” “mass produced/designer,” and “overall unattractive/overall attractive”) (α = .95) and the results replicate.
**Results**

Among the six plates, the plain plate was rated as the least aesthetic \( (p_s < .001) \), while the platinum-design plate was rated more aesthetically pleasing than all other plates \( (p, < .001) \) except P5 \( (p = .7524) \) and P6 \( (p = .08) \) \( (M_{\text{aesthetic}} = 4.51, M_{\text{plain}} = 1.63, t(163) = -24.13, p < .01) \). The platinum plate was also most frequently chosen for use at home for a special occasion (by 85 out of 164 participants) and in a restaurant (by 64 out of 164 participants), while the plain white plate was most frequently chosen to use at home for everyday use (by 100 out of 164 participants). In order to test whether there are significant differences in the proportion of participants choosing the platinum versus the plain plate for the same occasion (in a restaurant, at home for everyday use or at home for special occasion), three chi-square tests were run; all comparisons were significantly different \[ \chi^2 = 152.7974, \ p < .001; \ \chi^2 = 22.9213, \ p < .001; \ \text{and special occasion use versus in restaurant results in } \chi^2 = 77.6757, \ p < .001 \].

According to the survey, both males and females believed that they would eat more \( (M_{\text{male}} = 4.65, M_{\text{female}} = 4.75, \text{n.s}) \) and enjoy the eating experience to a greater extent \( (M_{\text{male}} = 4.36, M_{\text{female}} = 4.70, \text{n.s}) \) if the meal was served on aesthetically pleasing tableware. While both males and females showed their appreciation of the beauty of the more aesthetically pleasing tableware, females reported significantly higher interest and care about the appearance of the tableware \( (M_{\text{male}} = 4.94, M_{\text{female}} = 5.47, t(163) = -2.52, p = .01) \).

**Discussion**
Based on the pre-test, I chose the platinum plate as the most aesthetically pleasing tableware and the plain white plate as the least aesthetically pleasing tableware. The plain white plate is similar to the standardized white plate commonly used in casual restaurants and at home for everyday use. The platinum plate represents a highly aesthetic, premium tableware option for use in special occasions. As a result, these two plates reflect what consumers might use in real-life eating situations and were thus, used in all remaining experiments.

**Study 1: Tableware Aesthetics and Gender Differences**

The objective of Study 1 is to test the influence of tableware aesthetics on food consumption. Specifically, this study aims to provide evidence for H1, which hypothesized an opposing effect of tableware aesthetics on food consumption across males and females.

**Experimental design and respondents**

A 2 (plate type: more versus less aesthetically pleasing) x 2 (gender: male versus female) between-subjects design was employed. Plate type was a manipulating variable while gender was a measured variable. A sample of 73 students (55% females, $M_{age} = 19.38$) participated in the study in exchange for course credit.

**Method and procedure**

Upon arrival, participants were asked to take part in a food taste test. Prior to entering the laboratory room, all participants were asked to indicate if they were willing to consume food and if they were allergic to any type of food. Each participant was seated in a private cubicle with no visual access to other participants. Food was pre-served on each plate, and participants were invited to eat as much as they wanted.
The survey was distributed after a few minutes to ensure that participants had time to try out the food. The quantity of food was pre-set before the experiment. The quantity consumed (in grams) was measured by the difference between the initial amount and the amount that remained.

Potato chips were chosen for our study, as they are often used in food consumption studies (Do Vale, Pieters, and Zeelenberg 2008; Van Kleef, Shimizu, and Wansink 2013). Potato chips are also one of the most frequently tempting food products (Weingarten and Elston 1990) and are considered to be one of the most favorite comfort foods by both males and females (Wansink, Cheney, and Chan 2003).

To evaluate their perceptions of the food provided, I asked participants to indicate their level of agreement on a seven-point scale for seven statements: “Potato chips” “make me feel good”, “taste great”, “will lift me up when I am down”, “are pleasurable”, “are comforting”, “are enjoyable” and “are healthy” (adopted from Garg, Wansink, and Inman 2007). A reliability test for perception of the nature of the food (healthy item was reverse coded) was acceptable ($\alpha = .79$). These items were averaged to form the index of perceived hedonicity of the food.

Participants reported their overall experience by indicating the extent of their agreement with a set of four statements on a seven-point scale (1 = “strongly disagree,” and 7 = “strongly agree”), including “I found my experience to be enjoyable,” “It was a pleasant experience overall,” and “I enjoyed tasting this snack” ($\alpha = .90$). These item scores were averaged to form the index of overall enjoyment. The plates were rated based on a six-item semantic differential scale, as in the pre-test. A reliability test for the perceived aesthetics of the plate was acceptable ($\alpha = .89$). These items were also averaged to form a composite index of tableware aesthetics.
hunger, attempts to control their consumption, and diet plan. Demographic information was also collected.

Results

Manipulation checks. Both male and female participants rated potato chips as highly hedonic, and there was no gender difference in the perceived hedonicity of potato chips ($M_{\text{male}} = 4.79$, $M_{\text{female}} = 4.92, t(72) = 0.65, p > .1$). Manipulation checks confirmed that the platinum design plate was perceived as more aesthetically pleasing than the plain plate ($M_{\text{platinum}} = 4.32$, $M_{\text{plain}} = 2.24, t(72) = 9.94, p < .0001$). In Study 1, I found a marginal gender x plate type interaction effect ($p=.08$). There was no gender difference in the perceived aesthetics of the plain plate ($M_{\text{male}} = 2.18$, $M_{\text{female}} = 2.30, t(72) = .41, p > .1$); but a marginal difference between the perceived aesthetics of the aesthetic plate, with males rating the plate as more aesthetically pleasing than females did ($M_{\text{male}} = 4.69$, $M_{\text{female}} = 4.08, t(72) = -.2.04, p < .05$). Thus, I have controlled for perceived aesthetics of the tableware in this and subsequent studies. However, this control variable is not found to be significant in any other studies.

Consumption. To test our main hypothesis, I ran a two-way ANOVA with consumption quantity as the dependent variable. I also consistently included the extent to which participants control their consumption during the session as a statistical control in this and all subsequent studies. Participants who control their consumption will tend to eat less. Prior research has also examined consumers’ practice of self-control to avoid hedonic temptation, including eating tasty but unhealthy food (e.g., Baumeister 2002; Trope and Fishbach 2000). The values of the focal dependent variable (consumption quantity, in grams) in this study and all subsequent studies are presented in Table 1.
No main effect of gender or plate type was found but a significant interaction of gender and plate type on consumption emerged \((F(1,67) = 8.79, p < .01)\). Specifically, the aesthetically pleasing plate increased food consumption among males \((M_{aesthetic} = 33.42, M_{plain} = 24.30, t(67) = 2.08, p < .05)\) but decreased it among females \((M_{aesthetic} = 20.54, M_{plain} = 28.58, t(67) = -2.17, p < .05)\). Comparing across gender, males ate significantly more off the aesthetic plate than females did \((M_{male} = 33.42, M_{female} = 20.54, t(67) = -3.15, p < .01)\), but the difference was not significant when a plain plate was used \((M_{male} = 24.30, M_{female} = 28.58, t(67) = 1.08, p > 0.1)\). The extent to which participants control their consumption during the session was included as a covariate \((F(1,67) = 21.08, p < .001)\).

![Figure 3: Essay 1 Study 1](image-url)
**Discussion**

Study 1 provides initial evidence of the contrasting effect of tableware aesthetics on consumption between males and females and supports Hypothesis 1. While aesthetically pleasing tableware increases consumption of food among males, it reduces the quantity consumed by females. When participants used less aesthetically pleasing tableware, there was no statistically significant difference in consumption between genders ($M_{\text{male}} = 24.30$, $M_{\text{female}} = 28.58$, $t(67) = 1.08$, $p > 0.1$). This result is consistent with prior research (Garg, Wansink, and Inman 2007), which found no gender effect in consumption of hedonic food among non-restrained eaters. In Study 2, I investigate the underlying mechanism for the findings.

**Study 2: Examining the serial mediation effects**

Having revealed that tableware aesthetics are associated with different patterns of food consumption across gender, the second study aims to explore the underlying mechanism for this difference. Specifically, this study tests whether there are unique pathways across gender, such that tableware aesthetics increases hedonic food consumption among males via increased food salience and perceived taste, while reduces consumption among females via the serial mediating effect of food salience and consumption monitoring.

**Experimental design and respondents**

A student sample of one hundred and seventy-two participants (52% females, $M_{\text{age}} = 19.05$) were recruited for a lab experiment in exchange for course credit. A 2 (plate type: more versus less aesthetically pleasing) x 2 (gender: male versus female)
between-subjects design was employed, similar to Study 1. Plate type was a manipulating variable while gender was a measured variable.

Method and Procedure

As in Study 1, I measured actual consumption of food and asked participants to answer questions related to their eating experience. Additional statements which assessed food salience included “The presentation made the food look attractive,” “The snacks kept attracting my attention,” “The snacks were convenient to eat,” and “It was difficult to resist eating them” (adapted from Wansink, Painter, and Lee 2006) ($\alpha = .71$). To measure consumption monitoring, participants reported their degree of agreement with the following four statements: “I carefully paid attention to how much I ate,” “I carefully monitored how much food I ate,” “I kept track of how many pieces of snack were left” “I lost track of how many pieces of snack I ate,” and “I kept eating, one piece after another, because eating one more piece was nothing” (adopted from Wansink, Painter, and North 2005). These items were then averaged (with the last two items reversed) to form a composite measure of consumption monitoring ($\alpha = .82$). Participants also evaluated the taste of the food by indicating their degree of agreement with the statement “These snacks taste great”.

Results

Manipulation checks. Manipulation checks confirmed that the platinum design plate was perceived as more aesthetically pleasing than the plain plate ($M_{\text{platinum}} = 3.93, M_{\text{plain}} = 2.95, t(168) = 7.07, p < .0001$). There was no gender difference in the perceived aesthetics of the plain plate ($M_{\text{male}} = 2.89, M_{\text{female}} = 3.00, t(168) = -0.54, p > .1$); and the aesthetic plate ($M_{\text{male}} = 4.05, M_{\text{female}} = 3.81, t(168) = 1.29, p > .1$).
Food consumption. I ran a two-way ANOVA analysis with consumption quantity as the dependent variable. As expected, there was a significant interaction between plate type and gender \((F(1,167) = 20.77, p < .001)\). Also, as expected, aesthetically pleasing tableware increased food consumption among males \((M_{\text{aesthetic}} = 31.23, M_{\text{plain}} = 26.00, t(167) = 2.38, p = .01)\) and decreased intake among females \((M_{\text{aesthetic}} = 19.49, M_{\text{plain}} = 27.94, t(167) = -4.12, p < .001)\). Similar to Study 1, the plate effect also worked across gender; males ate significantly more than females using the aesthetic plate \((M_{\text{male}} = 31.23, M_{\text{female}} = 19.49, t(167) = 5.80, p < .001)\), but the difference was not significant when the plain plate was used \((p = .39)\).

![Figure 4: Essay 1 Study 2](image)

Food salience. Tableware aesthetics increased the salience of the food for both males and females \((F(1,168) = 16.61, p < .001)\). Participants using aesthetically pleasing tableware reported a significantly higher score on food salience (among females, \(M_{\text{aesthetic}} = 4.74, M_{\text{plain}} = 4.12, t(168) = 3.32, p < .001\); among males, \(M_{\text{aesthetic}} = 5.07, M_{\text{plain}} = 4.58, t(168) = 2.47, p = .01\)). While aesthetically pleasing tableware increases food salience for both males and females, it was not statistically different.
between males and females using this plate ($M_{\text{male}} = 5.07, M_{\text{female}} = 4.74, t(168) = 1.77, p > .05$), indicating that food salience only is not responsible for differential consumption across gender.

**Serial mediation analysis.** In order to test the serial mediating effect of food salience and perceived taste for male participants and the serial mediating effect of food salience and consumption monitoring among females, I run PROCESS Model 6 with 5,000 bootstrap resamples (Hayes 2013) for male and female participants, independently.

For females, the results confirmed the role of the serial mediators ($\beta = -1.5045, SE = .7424$, and 95% CI excluded zero $= [-3.4898$ to $-.4359]$), suggesting the indirect effect of tableware aesthetics via food salience and consumption monitoring. However, the effect is not significant for males ($\beta = -.2840, SE = .2898$, and 95% CI included zero $= [-1.1245, .1216]$).

For males, the results indicated that the indirect effect of tableware aesthetic via food salience and perceived taste is significant ($\beta = -.6536, SE= .4846$, and 95% CI excluded zero $= [-1.1145, -2.1568]$). In contrast, this mediation pathway is not significant for females ($\beta = -.5467, SE = .4869$, and 95% CI included zero $= [-1.9465, .1487]$).

That is, tableware aesthetics lead to food salience, which increases perceived taste and hence actual consumption among male consumers, but activates monitoring, which then decreases consumption among female consumers.

**Discussion**
Study 2 reconfirms our hypothesis on the opposing effect of tableware aesthetics on food consumption between males and females, and demonstrates the underlying mechanism for the differences, despite the fact that the aesthetically pleasing tableware enhances food salience for both gender. For males, aesthetically pleasing tableware increases food salience, which then leads to greater taste evaluation and results in higher consumption. In contrast, the salience of hedonic food triggers monitoring effort among females, resulting in lower consumption.

The next step in our research is to examine key boundary conditions in our model. A common strategy for bolstering evidence about a proposed mediating process is to examine a variable that correlates with the mediator (Winterich and Haws 2011). Given our assertion that the monitoring effort triggered by tableware aesthetics in females (but not males) might be driven by different consumption goals (of healthy goal versus indulgent goal being implicitly primed), this research examines the impact of goal priming on the relationship between goals and hedonic consumption in the subsequent study.

**Study 3: Understanding the Impact of Consumption Goals**

Study 3 aims to investigate the influence of tableware aesthetics on food consumption when there is an active hedonic or healthy goal. Study 3 extends the findings of Studies 1 and 2 in two respects. First, I replicate the main outcomes of previous studies and provide further support for H1 and H2. Second, as I compare the differences in consumption patterns across different goal conditions, I offer a better understanding of whether consumption goals can interfere or align with the influence of tableware aesthetics on consumption.
Experimental design and respondents

A sample of two hundred and sixty-three participants (54.4% females, $M_{\text{age}} = 19.42$) took part in the study in exchange for course credit. The study employed a 2 (plate type: more versus less aesthetically pleasing) x 3 (goal: hedonic, neutral, healthy) x 2 (gender: male versus female) between-subjects design. Plate type and goal were manipulating variables while gender was a measured variable. Participants were randomly assigned to one of the six conditions.

Method and Procedure

Upon arrival, participants were told that there were two studies in the session, supposedly unrelated and pooled out of convenience. The first one was to understand undergraduate students’ activities and behaviour, and the second one was a food taste test.

For our goal-priming task, participants in the hedonic goal condition were primed by writing about some of their indulgent activities (Fishbach and Labroo 2007). In particular, they listed two to three activities that they found enjoyable and briefly described them. In the neutral goal condition, participants were asked to list and describe two to three activities that they would undertake on a normal day. Similarly, in the healthy goal condition, participants described activities that they undertook to stay healthy and maintain good health. Once they had finished the task, participants were instructed to move to a cubicle to their right and undertake the food taste test, which was run using the same procedure as in previous studies.
Results

**Manipulation checks.** Manipulation checks confirmed that the platinum design plate was perceived as more aesthetically pleasing than the plain plate ($M_{\text{platinum}} = 3.52$, $M_{\text{plain}} = 1.97$, $t(167) = 8.85$, $p < .0001$). There was no gender difference in the perceived aesthetics of the aesthetic plate ($M_{\text{male}} = 3.53$, $M_{\text{female}} = 3.51$, $t(167) = .08$, $p > .1$); and significant difference in perceived aesthetic of the plain plate ($M_{\text{male}} = 1.71$, $M_{\text{female}} = 2.23$, $t(167) = -2.11$, $p < .05$).

**Goal effect.** To investigate the influence of tableware aesthetics and goals on food consumption, I conducted an ANOVA analysis with plate type (more versus less aesthetically pleasing), gender (male versus female), and goal (hedonic, neutral, or healthy) as independent variables and consumption quantity (in grams) as the dependent variable. The results revealed a main effect of gender ($F(1,251) = 21.29$, $p < .0001$), with male participants consuming more food than female participants ($M_{\text{male}} = 26.40$, $M_{\text{female}} = 19.17$, $t(251) = 4.61$, $p < .001$), and a main effect of goal ($F(2,251) = 5.46$, $p < .01$), with participants in the healthy goal condition ($M_{\text{healthy}} = 19.11$) consuming less food than those in the hedonic goal ($M_{\text{hedonic}} = 23.93$, $t(251) = 2.46$, $p = .01$) and control condition ($M_{\text{neutral}} = 25.30$, $t(251) = -3.19$, $p < .01$).

More importantly, there was a significant three-way Gender x Plate type x Goal interaction ($F(2,251) = 4.43$, $p = .01$). Contrast analysis revealed that only in the neutral (no goal) condition, the more aesthetically pleasing plate increased food consumption among male participants ($M_{\text{aesthetic}} = 31.19$, $M_{\text{plain}} = 24.19$, $t(251) = 2.04$, $p < .05$) and reduced food consumption among female participants ($M_{\text{aesthetic}} = 18.5$, $M_{\text{plain}} = 27.32$, $t(251) = -2.27$, $p < .05$).
With aesthetically pleasing tableware, males ate significantly more when primed with either a hedonic goal ($M_{\text{hedonic}} = 31.53, M_{\text{healthy}} = 20.62, t(251) = 2.39, p = .01$) or neutral goal ($M_{\text{neutral}} = 31.19, M_{\text{healthy}} = 20.62, t(251) = -2.51, p = .01$), as compared to a healthy goal. Among males using plain tableware, there was no significant difference across different goals ($p_s > .1$). The pattern of consumption across goal types is also similar among females using aesthetically pleasing tableware (all $p_s > .1$).

The effect of goal on females’ consumption when in different tableware conditions is also expected, supporting H3b. Using plain tableware, females ate significantly less when primed with either a hedonic goal ($M_{\text{hedonic}} = 19.15, M_{\text{neutral}} = 27.32, t(251) = -2.18, p < .05$) or a healthy goal ($M_{\text{healthy}} = 14.10, M_{\text{neutral}} = 27.32, t(251) = -3.37, p < .001$), as compared to the neutral goal condition. On the other hand, the differences between goal conditions among females using aesthetically pleasing tableware are not significant ($M_{\text{hedonic}} = 17.43, M_{\text{neutral}} = 18.50, M_{\text{health}} = 18.52, p_s > .1$). Consumption of hedonic food among females using aesthetic plate remains unchanged, regardless of the goal conditions, and significantly lower than among females using plain plate in the neutral, no goal condition. In addition, comparing males and females using aesthetically pleasing tableware across three goal conditions reveals that females using aesthetically pleasing tableware ate significantly less than males using the same tableware ($M_{\text{males}} = 27.75, M_{\text{female}} = 18.15, t(251) = 4.31, p < .001$).
Monitoring. I next examined the role of monitoring among both male and female participants. Similar to the previous study, no monitoring effect was found among male participants. ANOVA analysis, with monitoring as the dependent variable and plate type and gender as the independent variables, revealed a significant gender effect \( F(1,251) = 5.30, p < .05 \), in which females monitored their consumption to a greater extent compared to males \( (M_{\text{male}} = 3.06, M_{\text{female}} = 3.45, t(251) = -2.30, p < .05) \). Further investigation into the behaviour of females showed different patterns of monitoring effort in different tableware and goal conditions \( F(2,136) = 3.03, p < .05 \). In the neutral (no goal) condition, females monitored their consumption to a greater extent when food was served on the more aesthetically pleasing plate (versus plain plate) \( (M_{\text{aesthetic}} = 3.63, M_{\text{plain}} = 2.72, t(251) = 2.42, p < .01) \), which correlated with lower quantity consumed. Using the less aesthetically pleasing plate,
females monitored more in the hedonic ($M_{hedonic} = 3.48$, $M_{neutral} = 2.72$, $t(251) = 2.1$, $p < .05$) and healthy ($M_{healthy} = 3.64$, $M_{neutral} = 2.72$, $t(251) = 2.45$, $p = .01$) conditions compared to the neutral condition. Among males, there was no difference in the level of monitoring across different goals (all $p_s > .1$).

**Serial mediation analysis.** As H2 predicts, there are unique pathways that aesthetically pleasing tableware influences consumption across gender. Serial mediation analysis for neutral goal condition replicates the findings in Study 2. PROCESS Model 6 with 5,000 bootstrap resamples (Hayes 2013) for male and female participants, independently was run. For females, the results confirmed the role of the serial mediators ($\beta = -1.642$, SE = 1.1973, and 95% CI excluded zero = [-5.0532 to -.0108]), suggesting the indirect effect of tableware aesthetics via food salience and consumption monitoring. For males, the results indicated that the indirect effect of tableware aesthetic via food salience and perceived taste is significant ($\beta = -2.8506$, SE= 1.6367, and 95% CI excluded zero = [-6.2802, -.0392]).

**Discussion**

Study 3 further investigates the role of hedonic and health goals on food consumption across varying levels of tableware aesthetics. When a health (but not hedonic or neutral) goal is primed, males reduce their consumption of the hedonic food when served on the more aesthetically pleasing tableware. The absence of food salience in the plain plate condition predisposes males to reduced levels of consumption regardless of the goal primed. For females, with the plain tableware with lower food salience, both goals lead to decreased consumption compared to the baseline (neutral goal) condition. This is especially interesting in the case of a hedonic goal, as it seems to draw females’ attention to the unhealthy aspects of hedonic food,
which represents a temptation that might hurt their long-term health goals, thus in turn, seems to remind females to monitor their consumption, leading to the avoidance of hedonic food (Trope and Fishbach 2000). With the aesthetically pleasing tableware where monitoring is automatically triggered due to increased food salience, there is no significant difference among the level of food consumer across goal conditions, as expected.

**Study 4: The Moderating Role of Food Type**

Study 4 aims to confirm the results from Study 1 and extend the findings to different food types. Specifically, it examines food type (hedonic versus less hedonic) as a boundary condition to the effect of tableware aesthetics on consumption. In addition to the hedonic food used in previous experiments, I test the consumption patterns between males and females when a less hedonic food is served, and thus test Hypothesis 4.

**Experimental design and respondents**

A 2 (plate type: more versus less aesthetically pleasing) x 2 (food type: hedonic versus less hedonic) x 2 (gender: male versus female) between-subjects design was implemented with potato chips as the hedonic food and low-sodium, low-fat popcorn as the less hedonic food. Plate type and food type were manipulating variables while gender was a measured variable. One hundred and nineteen students (60.5% females, $M_{age} = 22.42$) from a subject pool participated in lieu of monetary compensation.

**Method and procedure**

Similar to Study 1, participants were invited to a taste test for a food product and were encouraged to eat as much as they wanted. They were randomly assigned to
one of the four conditions. The rest of the experiment procedure and measures are consistent with Study 1.

Table 1: Essay 1 Study Summary Statistics

<table>
<thead>
<tr>
<th>Study</th>
<th>Condition</th>
<th>Group</th>
<th>Consumption (in grams)</th>
<th>Aesthetic Plate</th>
<th>Plain Plate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study 1</td>
<td>Hedonic food</td>
<td>Males</td>
<td>33.42</td>
<td>24.30</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(3.23)</td>
<td>(2.80)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Females</td>
<td>20.54</td>
<td>24.30</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(2.55)</td>
<td>(2.53)</td>
<td></td>
</tr>
<tr>
<td>Study 2</td>
<td>Hedonic food</td>
<td>Males</td>
<td>31.23</td>
<td>26.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(1.39)</td>
<td>(1.71)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Females</td>
<td>19.49</td>
<td>27.93</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(1.46)</td>
<td>(1.53)</td>
<td></td>
</tr>
<tr>
<td>Study 3</td>
<td>Hedonic food</td>
<td>Goal = hedonic</td>
<td>Males</td>
<td>31.53</td>
<td>27.63</td>
</tr>
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<td></td>
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<td></td>
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<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>(3.00)</td>
<td>(2.84)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Females</td>
<td>17.43</td>
<td>19.15</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>(2.26)</td>
<td>(2.43)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Goal = healthy</td>
<td>Males</td>
<td>20.62</td>
<td>23.21</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td>(3.44)</td>
<td>(2.84)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Females</td>
<td>18.52</td>
<td>14.10</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>(2.48)</td>
<td>(2.70)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Goal = neutral</td>
<td>Males</td>
<td>31.19</td>
<td>24.19</td>
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<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td>(2.43)</td>
<td>(2.43)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Females</td>
<td>18.50</td>
<td>27.32</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>(2.64)</td>
<td>(2.84)</td>
<td></td>
</tr>
<tr>
<td>Study 4</td>
<td>Hedonic food</td>
<td>Males</td>
<td>29.34</td>
<td>21.55</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(3.51)</td>
<td>(2.91)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Females</td>
<td>18.23</td>
<td>27.04</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(2.23)</td>
<td>(2.49)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Less hedonic food</td>
<td>Males</td>
<td>5.49</td>
<td>7.40</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(3.16)</td>
<td>(2.83)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Females</td>
<td>5.22</td>
<td>5.78</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(2.45)</td>
<td>(2.81)</td>
<td></td>
</tr>
</tbody>
</table>

Note: The values reflect the means of the dependent variable (Consumption quantity, in grams). Standard errors are in parentheses.
Results

Manipulation checks. Manipulation checks confirmed that potato chips were perceived as more hedonic than popcorn \( (F(1,115) = 42.90, \ p < .001, \ M_{\text{chips}} = 5.24, \ M_{\text{popcorn}} = 4.16, \ t(115) = 6.55, \ p < .001) \), and there was no significant difference in perception about these food products across gender \( (p > .1) \). Plates were also perceived as intended \( (F(1,115) = 7.27, \ p < .001) \). Participants rated the platinum (aesthetic) design plate as significantly more aesthetically pleasing than the plain one \( (M_{\text{aesthetic}} = 3.99, \ M_{\text{plain}} = 2.51, \ t(115) = 7.19, \ p < .0001) \). A significant interaction effect of plate type and gender on perceived aesthetic emerged \( (F(1,115) = 9.77, \ p < .01) \), such that females rated the aesthetic plate higher in aesthetic value than males \( (M_{\text{male}} = 3.69, \ M_{\text{female}} = 4.28, \ t(115) = 2.00, \ p = .05) \), while males rated the plain plate higher in aesthetic value compared to females \( (M_{\text{male}} = 2.88, \ M_{\text{female}} = 2.16, \ t(115) = -2.43, \ p < .05) \).

Consumption. As Figure 5 indicates, the results are consistent with our expectations. A three-way ANOVA with consumption quantity as the dependent variable shows a significant interaction between plate type, food type, and gender \( (F(1,110) = 5.04, \ p < .05) \). Regarding hedonic food, a similar pattern of consumption as in Study 1 reconfirmed the robustness of my findings. That is, the aesthetically pleasing plate marginally increased males’ intake \( (M_{\text{aesthetic}} = 29.34, \ M_{\text{plain}} = 21.55, \ t(110) = 1.17, \ p = .08) \) and significantly decreased females’ intake of potato chips \( (M_{\text{aesthetic}} = 18.23, \ M_{\text{plain}} = 27.04, \ t(110) = 2.59, \ p = .01) \). Males consumed more hedonic food than females when using the aesthetically pleasing plate \( (M_{\text{male}} = 29.34, \ M_{\text{female}} = 18.23, \ t(110) = 2.65, \ p < .001) \), but reported no significant difference when using the plain plate \( (p > .1) \). These differences in consumption pattern do not emerge for the less hedonic food; either across or within males and females using the two
plates (all $p > .1$). In other words, the effect of aesthetically pleasing tableware on food consumption across gender is only significant with food that is perceived as unhealthy and hedonic.

**Figure 6: Essay 1 Study 4**

**Discussion**

Study 4 corroborates our premise that tableware aesthetics can influence food consumption in opposite directions, depending on different moderators. Evidently, when hedonic food is served, males eat more, while females eat less from aesthetically pleasing tableware (versus plain tableware). This effect resulted from the attention-drawing ability of aesthetically pleasing tableware, which makes the food more salient and attractive to eat for men, but at the same time reminds women of their diet and healthy-eating goal. As less aesthetically pleasing tableware does not have a similar
impact on how consumers perceive food, men and women behave similarly when hedonic food is served on plain white plates.

The impact of tableware diminishes when the food served is less hedonic. That is, the attention-drawing ability of aesthetics is no longer relevant when the food is not perceived as tasty to men and not as unhealthy to women. In this case, there is neither a tableware effect nor a gender effect, indicating similar behaviour of men and women in a situation when eating moderately hedonic food is involved.

**DISCUSSION**

In this research, I examine whether and how tableware aesthetics can influence food consumption and what factors moderate and mediate this relationship. Four studies provide consistent evidence of gender differences in food decision making, showing that males consume more hedonic food and that females reduce their intake when using aesthetically pleasing tableware. However, this difference is no longer significant when food is served on plain tableware. Tableware with an aesthetically pleasing design is more attractive and therefore attracts greater attention to the food served on it. In turn, this attention translates into higher consumption among males, while reminding females of their concerns with healthy dieting, triggering monitoring effort, and reducing their consumption (Study 2). This monitoring effect is not activated when attention is reduced—for instance, when food is served on a plain plate. However, when either a hedonic or healthy goal is made salient, monitoring increases among females, even with plain plates, leading to lower consumption of hedonic food (Study 3). A healthy goal also helps males reduce their consumption, easing the negative impact of tableware aesthetics. The opposing effect of tableware aesthetics on food consumption between males and females is nevertheless only
evident when food is perceived to be hedonic. The difference is no longer significant statistically in the case of less hedonic food, which is perceived to be less attractive and less tasty to men, but also less harmful to women (Study 4).

The two plates were chosen for this research from six different plates available in the market (Pre-test). In the main studies, I also measured the perceived aesthetic value of the plates, so that it can take into consideration any individual difference that might exist in perceived aesthetic value. Overall, the pretest evaluations were supported across all studies (n= 627) which illustrate that while aesthetics can be subjective, there is significant agreement on this dimension in a given population. It should also be noted that while the plain plate was used to accentuate the difference between high versus low aesthetically pleasing tableware, the findings should apply to any design which is perceived as low on aesthetics by the user.

While prior research has sometimes shown that people with high and low BMI exhibit different effects on food consumption and that an individual’s BMI can moderate how he/she perceives him/herself in relation to the body types of others (Smeesters and Mandel, 2006), other research has found no effect of BMI. Specifically, recent research shows that individual differences, such as restrained eating, body dissatisfaction, or self-esteem moderate the effect of environmental factors on food consumption, but BMI does not (McFerran et al. 2010). Nevertheless, BMI can be a potential control variable in future research. It might be useful for food consumption research to test contexts where the consumption mechanism is or is not, driven by physiological variables like BMI.
While the results in this research are consistent with the proposed hypotheses and across all studies, there was only one food product examined. Potato chips were selected for two main reasons: one, they have been widely used in prior research as an example of hedonic food (Do Vale, Pieters, and Zeelenberg 2008; Van Kleef, Shimizu, and Wansink 2013) and second, they are easy to use in actual eating context compared to other foods such as ice cream (which will melt) or French fries (which will go cold and soggy). However, this is a fruitful area for future research. Examining of other hedonic foods such as butter cakes, pizzas, or danish will increase the generalisability of this research’s findings.

Contributions and Implications

This research’s findings contribute to the growing literature on product aesthetics and its important impact on consumer behaviour. Highly aesthetic product designs attract the attention of customers (Selame and Koukos 2002) and offer a point of differentiation among competitors (Garber 1995). While prior research has investigated the influence of different properties of tableware design such as size, weight, and colour on consumers’ food decision making, the present research is the first to examine the impact of tableware aesthetics on consumption. In this research, I have identified the role of tableware aesthetics as a contextual factor that can influence consumption behaviour in different directions. On one hand, tableware aesthetics direct the attention of males toward eating. On the other hand, such attention becomes a reminder to take control of how much to eat among female consumers. Our results are consistent with past research showing that women are more concerned with dieting and healthy eating than men (Rozin, Bauer, and Catanese 2003) and often feel
pressured to maintain their body image, leading them toward cautious eating habits (Chaiken and Pliner 1987).

Another important finding of our research is the identification of the phenomenon of overconsumption among males (females) when hedonic food is served in aesthetically pleasing (less aesthetically pleasing). It is noted, however, that while many factors differentially influence the consumption of hedonic food, gender has not garnered enough attention thus far, in the literature. In the domain of consumption, ample research has investigated restraint tendencies but primarily focused on females (Bublitz, Peracchio, and Block 2010; Lowe and Timko 2004). Our research has found key moderators that influence both males and females’ consumption of hedonic food, thus, extending the knowledge of gender effect in consumption.

These findings are useful for health professionals seeking to design healthy eating educational campaigns, as differences between males and females matter. While aesthetically pleasing tableware helps females control their desire to eat unhealthy food, it backfires among males. By reinforcing different goals, we can help nudge the consumption process in the preferable direction. In particular, a healthy goal helps males reduce the negative impact of overconsumption due to using aesthetically pleasing tableware. As a result, campaigns targeting males should consist of cues that remind them of healthy activities, a healthy lifestyle, and healthy goals. It is especially important to relate such campaigns with occasions when aesthetically designed tableware is used, such as at a special dinner or a social gathering.

For females, the negative impact of plain tableware should also be taken into account. First, plain tableware is more often used by households and in casual dining places. Second, even though women often care more about dieting, the obesity rates
have continued to rise among women (Sifferlin 2016). Thus, health campaigns targeting women should consider using goal priming as a cue for monitoring. As both hedonic and health goal equally and effectively trigger monitoring, the priming of either goal should be useful. Whether it is the cue of a healthy lifestyle or a reminder of what it takes to indulge oneself, especially when it comes to eating, using such cues can help activate monitoring and thus reduce the consumption of hedonic, tasty, but unhealthy food among females.

This research is also useful for consumers who want to take a more active approach in managing their food consumption and diet. Snack foods are often purchased and consumed to satisfy hunger during the day. However, many tasty snacks are actually fatty, salty and not good for health. Given that tableware aesthetics can influence hedonic food intake, using aesthetically pleasing tableware to serve tasty but relatively unhealthy foods can enhance the attention needed to monitor consumption among female consumers. For such hedonic snack food, females might benefit from using designer, aesthetically pleasing tableware, while males should consider using plain tableware. Nevertheless, an important factor that all consumers must remember is never to distract themselves during eating. Distractions such as watching movies, reading, playing a game or using the computer take away monitoring effort and result in higher consumption.
Häagen-Dazs, a premium American ice cream brand, made headlines in 2017 when it rolled out the biggest re-branding campaign in its 56-year history, replacing its original packaging with a brightly coloured new one. The company also emphasised that its ingredients were all-natural and had no preservatives, in an effort to modernise the brand and stay relevant with Millennial customers (Dua 2017). In another example of package redesign, the pasta brand Leggo’s changed its blue label to a brighter colour in early 2016, in the Australian market. This launch was to accompany Leggo’s new health star rating on its package, an objective indicator of the product’s healthiness (Leggo’s 2016). Are these changes in packaging colours important and are they better able to communicate the desired message to consumers? This chapter seeks to answer these questions.

Shoppers often rely on a product’s package design to make decisions, especially when they have limited or no prior knowledge and little inclination to search for information. With hundreds of grocery items to consider, consumers usually make extremely quick decisions without much deliberation. Based on multiple studies on consumer product purchase behaviour, a recent report by AC Nielsen has confirmed that on average, a consumer spends 13 seconds purchasing a brand in-store and 19 seconds for an online purchase (Beard 2015). In such a time-constrained environment, the package’s visual appearance becomes an important source of information for consumers to make their brand and product choice (Bloch 1995; Crilly, Moultrie, & Clarkson 2004; Fenko, Schifferstein, & Hekkert 2010). Even after the purchase, the packaging design can continue to influence perception and the
consumption experience of consumers (e.g. Deng and Srinivasan 2013; Do Vale, Pieters, and Zeelenberg 2008). In the U.S. alone, packaging is a 143-billion-dollar market, with 64% of consumers trying a new product because of its packaging (Nielsen 2016). Given the theoretical and managerial importance of understanding the different facets of packaging design such as size, shape, colour, and graphics that can impact consumer behaviour, it behooves me to examine it in greater detail.

Colour is an important element of the package design that can attract attention and deliver a message about the product (Bottomley and Doyle 2006). In practice, many companies have been using package colour as a way of communicating certain aspects of that product. For example, blue or green packaging is usually used for healthy food, while red often represents the tastiness of fast food (Huang and Lu 2016). Green is also used with eco-friendly and organic products as green embodies a meaning of being close to nature (Mazar and Zhong 2010).

In the marketing literature, colour has been established as an important variable that can shape perceptions of advertising (Gorn et al. 1997), communicate a desired image (Bottomley and Doyle 2006), and influence brand likeability and purchase intent (Labrecque and Milne 2012), among others. Colours carry meanings that can have an important impact on people’s affect, cognition and behaviour (for review, see Elliot and Maier 2014). For example, Elliot and colleagues (2007) proposed that, as the colour red is associated with danger and failure, and evokes avoidance motivation, seeing red (versus green or control colour) before and during a mathematical task decreases final performance. Research in neuroscience demonstrates that this associative learning ability develops during the early stages of cognitive processing as a key mechanism for survival and quick decision making (Schlack and Albright 2007). Recent research (e.g. Elliot et al. 2007; Elliot and Niesta
2008; Sundar and Noseworthy 2014) has suggested that the formation and activation of colour-meaning associations can be better understood through the conceptual metaphor theory (Lakoff & Johnson 1980).

Drawing on the Conceptual metaphor theory (Lakoff & Johnson 1980), this essay aims to extend the literature on package colour by investigating the influence of dark and bright package colours on consumers’ perception and intention to purchase. The focus is on the lightness (dark versus bright) of achromatic colours, which are commonly seen in practice but almost absent in consumer research. Across six studies, this research demonstrates the link between colour and perceptions of tastiness and healthiness, as well as the effect of package colour on buying intentions. Importantly, it is established that it is the perceived congruency between product type and package colour that mediates this relationship.

Furthermore, this research aims to test the boundary condition of the package colour effect on buying intention and identify the conditions in which the colour effect might amplify or attenuate. When consumers have limited information about the product, such as when they see the product for the first time in the store, package colour is usually an important environmental cue that consumers rely on to make decision. However, when consumers have access to other sources of information, such as marketing information about the product’s benefit provided on the package, experiential information from tasting the food, or other information from association with the brand name, the colour effect might become less prominent. As a result, this research will examine the moderating effect of brand familiarity and health claim on the relationship between package colour and buying intention. In addition, by offering participants an opportunity to taste the food product, this research will extend our understanding of the strength and longevity of the colour effect when there is no
tasting opportunity, immediately after tasting, and after a time delay. Product tasting is an important source of experiential information as it is usually considered more trustworthy by consumers. Overall, this research aims to offer a more holistic picture of how dark and bright package colours can influence perceptions and buying decision.

This essay makes four important contributions. First, it contributes to the package colour literature and decision making. The vast majority of colour research to date has focused on hue, with little attention paid to lightness in achromatic colours (Lakens, Semin, and Foroni 2012, Meier et al. 2004, Sherman & Clore 2009). Specifically, three basic colours of red, blue and green used in package colour were extensively researched (Huang and Lu 2016, Karnal et al. 2016). Lightness with regard to chromatic colours, as well as chroma, has been largely ignored (Elliot and Meier 2014), while the application in practice is enormous. For instance, as illustrated in the earlier examples, Haagen-Dazs and Leggo’s changed their packaging to include brighter colours, presumably in a bid to communicate their product’s health attributes (e.g., natural ingredients) to consumers. However, it is not clear whether these changes communicate product attributes as intended or have the desired effect on consumers’ perceptions and decision making. Research in food consumption is silent on this issue as well. This essay addresses this research gap by examining how dark and bright colours differentially influence consumer decision making.

Second, our research identifies an important effect of package colour on buying intention and the underlying mechanism of this relationship. Specifically, the package colour – buying intention relationship is mediated by the perceived colour-food type congruency, making the congruency between hedonic food in dark packages and healthy food in bright packages more effective in increasing buying intention.
Third, it adds to our understanding of the importance of package colour for new brands, as the effect is strongest when the brand is unfamiliar (versus high familiarity), reiterating our premise that package colour serves as an information cue that consumers use in the absence of other information.

Finally, our research offers practical implications for marketers, especially those involved in the packaged food industry. Package design is extremely influential on consumers’ decisions at the point of purchase and can directly result in sales for the business (Underwood and Klein 2002). Choosing the “right” colour can help in evoking desired product impression, distinguishing the product’s value, and building a strong brand. As a result, the findings of this research can help marketers choose the appropriate package colour for their product and the promise it has made to its customers.

The remainder of this chapter is structured as follows. First, the chapter examines the existing literature in colour and food perception. Next, it will discuss the Conceptual Metaphor theory and develop our hypotheses regarding food products in dark coloured packages being perceived as tastier while those in bright coloured packages are perceived as healthier, leading to an increased level of congruency between package colour and product type, which in turn leads to higher intention to purchase. Figure 7 represents the conceptual model for this research. A series of six studies tests these linkages and establishes the robustness of the findings by testing the effects across different populations (students, non-students), different product categories (ice-cream, potato chips, muesli, breakfast bar), and different settings (online, lab, and field). Finally, implications of this research’s findings as well as directions for future research are discussed.
THEORETICAL BACKGROUND AND HYPOTHESES

Colour and food perception

Past research has consistently associated colour with the perception and evaluation of food products. Food colour influences perceived flavour (Christensen 1985; Garber, Hyatt, & Starr 2000; Stillman 1993), taste evaluation (Hoegg & Alba 2007) and food liking or preference (Christensen 1985; Compeau, Grewal, & Monroe 1998). In some studies, the colour of the plate was found to impact the flavour of food served on it (e.g. Harrar, Piqueras-Fiszman, and Spence 2011; Piqueras-Fiszman and Spence 2015). In particular, it has been reported that salty popcorn tasted sweeter when taken from a blue or red bowl compared to white or green ones, while sweet popcorn tasted saltier when taken from the blue bowl (Harrar, Piqueras-Fiszman, and Spence 2011). At the same time, food appeared to be more intense against the background of a white plate than when served on a black plate, demonstrating the phenomenon of colour contrast (Piqueras-Fiszman et al. 2015).

Colour can activate heuristic inferences which shape consumer perception and judgment of the salient content (Karnal et al. 2016). For instance, warm colours are often tied to hedonic attributes and appropriate for hedonic experiences, while cool colours are perceived to be appropriate for utilitarian products and associated with the perception of healthiness (Walse et al. 1990; Schuldt 2013; Bottomley and Doyle 2006). Red is among the most studied colours in psychology and consumer research, including research in the context of food consumption. Research has shown that red plates and cups reduce food intake (Genschow et al. 2012), which is in line with the interpretation of how red influences context-dependent approach-avoidance behaviour (Meier et al. 2012). The colour red is associated with sweetness (Spence et
al. 2015) and therefore serves as an unhealthiness cue for food evaluation. In contrast to red, blue and green are associated with healthy food. This association is deeply rooted in consumers’ psychological reactions to these colours. Green and blue often symbolise naturalness (Clarke and Costall 2008), and usually elicit low arousal and positive emotions (Kaya and Epps 2004), the latter has been linked to healthier food consumption (Garg, Wansink and Inman 2007).

Recent research in colour has extended to the examination of package colour. It has found an interesting link between colour and the perceived healthiness of food. According to Huang and Lu’s (2016) research, package colours of red and blue moderate the healthiness perception of the food product contained inside. Similarly, other research has shown that food in a red package evokes a perception of high sugar content (Karnal et al. 2016) and is perceived to be sweeter than products packaged in green and blue colours (Huang and Lu 2016).

Colours are often defined using the HSL code, which are Hue, Saturation and Lightness (Karnal et al. 2016). To date, the majority of colour research has focused on hue, with little attention to the lightness of colour such as dark and bright, or black and white (Elliot and Maier 2014). Nevertheless, limited research in colour lightness hints that lightness can have a meaning and communicate certain message to consumers. Research in cross-modal relationship between vision and olfactory reveals that there is a relationship between colour lightness and odour intensity (Kemp and Gilbert 1997). Results show that strong odours are more likely to be associated with darker colours, and vice versa. An experiment by Hoegg and Alba (2007) offers an interesting perspective about the different influences lightness on perception. According to their study, people perceived a non-existing difference in taste between a darker cup of orange juice and a brighter one with the same content. This means the
lightness of colour (dark versus bright yellow) might be quite important in determining perception. Similarly, an early research by Wright and Rainwater (1962) shows that colour lightness can connote certain meaningful concepts, such as happiness is associated with lighter colour, forcefulness and the concept of warmth both depend on darker colour, This current research addresses this gap of research in bright and dark colour and examines their effects on product evaluation.

**Conceptual metaphor theory**

A fundamental premise of our argument in this research is the ability of colour to carry the symbolic meanings which trigger associations with tastiness and healthiness. Conceptual metaphor theory (CMT) offers an explanation for this connection, as it argues that by transferring, or ‘mapping’ knowledge about one concept (the ‘source concept’) to another (the ‘target concept’), metaphors allow us to think about and understand different abstract concepts in our lives (Lakoff and Johnson 1980). For example, using the CMT framework, Sundar and Noseworthy (2014) demonstrated that there is a metaphorical association between the concept of power and height. This metaphor underlies consumers’ preference towards powerful brands when the brand logo is featured high rather than low on the packaging, and towards less powerful brands when the brand logo is placed low rather than high on the packaging.

The embodied meaning of colour can influence perception formation and evaluation (Labrecque and Milne 2012; Labrecque et al. 2013). For example, red is known as a colour of sexual signalling (Guerguen 2012), and men often perceive a woman in red to be more sexually receptive, which in turn facilitates their perception of her attractiveness and sexual desirability (Pazda et al. 2012; Elliot and Meier 2014).
In a social context, red can be associated with the perception of attractiveness. Past research shows that while males rate women wearing red clothing as more attractive and sexually desirable (Elliot and Niesta 2008), they are also more likely to approach a woman wearing red lipstick at a bar (Gueguen 2012), and tend to sit closer to a woman in red (Nieta Kayser, Elliot, and Feltman 2010). Regarding the colour green, the term “green” is strongly associated with the image of nature and the abstract concept of environmental friendliness. Green is often used with eco-friendly products and practices (Mazar and Zhong 2010). As a result, exposure to a logo featuring an eco-friendly colour (such as green) can even bias consumers’ ethical judgments about a company. Eco-friendly colours can make an ethically ambiguous practice seem more ethical, while a logo featuring a non-eco-friendly colour to the same practice might be believed to be less ethical (Sundar and Kellaris 2017).

This research continues to extend our understanding regarding such symbolic meaning of colours by focusing on another aspect of colour, that is, the lightness of achromatic colours. Specially, this research examines the abstract meanings that dark and bright colours embody, and how using them in food packages can lead to heuristic inferences about the attributes of the food product inside.

**The embodied meaning of dark and bright**

Dark and bright are often associated with negative and positive elements respectively. Sherman and Clore (2009) argue that dark colours such as black are associated with more negative meaning for several reasons. It is the colour of night, uncertainty, danger and impurity. The concept of immorality is also automatically linked with blackness, and that immoral words activate “black” while moral words activate “white”. Specifically, the response time in a Stroop task was faster when
words in black (white) indicated an immoral (moral) rather than moral (immoral) meaning (Sherman and Clore 2009). The word itself (i.e. bright) is used in the English language to refer to positive attributes such as a bright mind, bright face or bright smile.

Several companies seem to be intuitively using the “bright is good” metaphor in new product packaging, especially when they want to introduce a healthier alternative to their current product. For example, Coca-Cola has employed both a verbal cue (light) and visual cue (brighter colour) for its Coca-Cola Light product. The low-calorie and sugar-free formula is packed in a light silver can (Coca-Cola Company 2016) instead of its traditional red packaging. Similarly, tobacco companies such as Marlboro offered its Light version in a brighter colour. While plain packaging of tobacco is perceived to be less cool, less attractive, less friendly and older, such lighter colours create an impression of a reduced health risk (Connolly and Alpert 2014). Even when under the new federal tobacco law, U.S. cigarette companies can no longer use words such as “light” or “mild” to imply that some cigarettes are safer than others, the effect of bright colours is still powerful. Many studies, including ones by the industry disclosed in tobacco lawsuits, have shown that consumers believe the terms and colours of the package connote a safer product (Wilson 2010), although this is not necessarily true.

Consistent with the metaphor that “dark is bad”, darker objects evoke more negative and thus less positive judgments than brighter objects (Meier, Robinson, & Clore 2004; Meier, Fetterman and Robinson 2015). In their research, Meier and colleagues illustrated that when abstract concepts such as bad or good are partially structured via metaphors, people will be able to encode faster if the concepts are metaphorically matched. It has been found that participants are faster to categorise
words which are shown in a black or white font colour with a negative or positive meaning respectively. This result implies a metaphoric linkage of black with bad and white with good. In other studies, a similar metaphorical link has been found. Children were inclined to assume that black boxes contained negative objects while white boxes contained positive objects (Stabler and Johnson 1972). Sport players were perceived as more aggressive and malevolent, and behaved more violently when wearing black uniforms than when wearing other colours (Frank and Gilovick 1988).

Departing from the dark – bad, bright – good metaphor, this research argues that brightness dimension can be deployed to embody different abstract concepts such as the perceived healthiness of food. The associative connection between colour and perception has recently been examined using a computer-based Implicit Association Test (Mai, Symmank, and Seeberg-Elverfeldt 2016), which shows that people pair a lighter version of a colour and healthiness faster, making light coloured packaging a health cue. Based on this, I argue that dark is associated with unhealthiness. In addition, due to consumers’ implicit belief that unhealthy is tasty (Raghunathan et al. 2006), food in dark package, which is perceived as less healthy, will also be rated as tastier. As a result, it is hypothesised that food in bright package colour will be perceived as healthier but less tasty than those in dark package, and food in dark package colour will be perceived as tastier but less healthy. As a result, it is hypothesised that a dark colour is more likely to imply tasty but unhealthy attributes, while a bright colour is more likely to associate with attributes that imply benefits to your health.

Based on the above discussion, it is suggested that the embodied meaning of colours can significantly account for consumer inferences about the food’s perception. Specifically, it is argued that dark and bright package colours will influence
consumers’ perception of tastiness and healthiness where food in dark packaging is perceived to be tastier while food in bright packaging is perceived to be healthier. That is,

**H1:** Food products are rated tastier in dark (versus bright) colour package, but healthier in bright (versus dark) colour package

Although consumers often hold an implicit belief that “unhealthy equals tasty” (Raghunathan et al. 2006), they may not always simultaneously evaluate a food product on both aspects of tastiness and healthiness. Instead, consumers would rather look for tastiness when buying hedonic food and healthiness when buying less hedonic, healthier food. Thus, although the relationship between package colour and perception of tastiness and healthiness might not vary with the nature of the food product (hedonic versus healthy), the congruency between package colour and food type might impact buying intentions.

That is, it is expected that a package with dark colour will benefit a hedonic food product, whereas a bright colour package will benefit a healthy brand to a greater extent. As a result, I propose that food type will moderate the relationship between package colour and buying intention.

**H2:** Food type and package colour will interact such that hedonic food in a dark package and healthy food in a bright package will elicit higher buying intentions.

Given the interaction effect of food type and package colour on buying intention, this research next elucidates the underlying process behind this relationship. Past research has examined the notion of congruency between two subjects that have connotative meanings and the link with buying behaviour (e.g., Drolet and Aaker 2002, Roth and Romeo 1992). Roth and Romeo’s study of country of origin effect
(1992) shows that willingness to buy an imported product will be higher when the country image matches the benefits desired from product category. Research has also looked specifically into the idea of congruency between colour and product. Bottomley and Doyle (2006) have demonstrated that it is more appropriate to use functional colours (such as gray, green, blue) in logo design for functional products (such as car tyres, power tools), and sensory-social colours (such as red, yellow, pink, purple) for sensory-social products (such as ice cream, perfume). Their arguments were based on prior research on the meaning of colours and their connotations. For example, blue, association with sincerity and trustworthiness appear relatively more salient to the fulfilment of functional rather than sensory-social needs, while associating red with an exciting and cheerful appeal is more relevant to the fulfilment of sensory-social needs.

Past research shows that congruency can enhance perceived brand and product value (Erdem & Swait 1998, 2004). For example, congruency between colour types and product types (function colour – blue and functional products such as car tires; sensory-social colour – red and sensory-social products such as perfume) positively affect consumer responses such as perceived appropriateness and brand image (Bottomley and Doyle 2006). In another study, it shows that congruency between product shape and font design types (typeface) positively affected perceptions of brand credibility, brand aesthetics, brand value and price expectation (van Rompay and Pruyn 2011). For a product of hedonic nature, consumers evaluate the product as more premium when the colour and product framing are congruent (red colour and hedonic framing such as tasting delicious; green colour and utilitarian framing such as healthy) (Lyons and Wien 2017). That is, research suggests that congruence, as opposed to incongruence, induces higher levels of perceived brand or product value.
reflected in, among other aspects, a higher expected price (Erdem and Swait 1998, 2004).

Evaluations are easier when object valence metaphorically matches rather than mismatches colour (Meier, Robinson, & Clore 2004; Meier, Fetterman and Robinson 2015). Consumers find it more sensible to pair a food package in a colour that is congruous with the product type. In contrast, the incongruity between product category and packaging colour will result in a negative effect on product attractiveness (Garber, Burke and Jones 2000). As the outcome decision results from the metaphorical association between dark - tastiness, and bright – healthiness, it is proposed that the congruency of colour and food type will positively increase product preference and buying intentions. That is,

**H3:** Perceived congruency will mediate the interaction effect of packaging colour (dark versus bright) and food type (hedonic versus healthy) on buying intention.
The moderating role of health claim

The substantial number of marketer-provided health claims such as ‘oven baked,’ ‘natural,’ and ‘low fat,’ appearing on packaged food labels highlights the importance of understanding how consumers comprehend and interpret such information, and importantly, how these health claims influence consumer decision making. Health claim refers to any claim or label suggesting that the food is healthier than conventional versions (Belei et al. 2012). Despite the growth in such health claims for various food products available in the market, limited research has focused
on whether and how this information is assimilated by the consumer in their decision making.

Marketing claims of health benefits can influence and even bias consumers’ expectation and perception. For examples, crackers described as containing mostly “good fat” were perceived to be tastier than those containing mostly “bad fat”, and a smoothie was expected to taste better when described as “generally considered healthy”, especially among consumers who customers’ expected unhealthy food to be generally tastier (Raghunathan, Naylor and Hoyer 2006). Healthy claims featuring hedonic attributes such as “low fat” accommodates the pleasure dimension of the food, resulting in lower goal conflict and increased consumption of the food (Belei et al. 2012). In a study that examines the effect of nutrition claims on food consumption, Wansink and Chandon (2006) show that low fat claims lead to increased consumption of snacks due to guilt reduction and ease of justification.

In the presence of a health claim, consumers’ evaluation of a food product is more favourable compared to the situation when no claim is made. For example, Kozup, Creyer and Burton (2003) found that when a packaged food product (a microwaveable, frozen lasagna dinner) is claimed to be a heart-healthy selection, consumers expressed more positive attitudes towards the product and indicated higher purchase intention. Similarly, Andrews, Netemeyer, and Burton (1998) showed that consumers believe the health claim as it is stated. Health claims are often generalised by consumers, as they perceive food products advertised as “no cholesterol” as significantly lower in fat, and food products advertised as “healthy” as significantly healthier than foods simply advertised as “delicious” (Andrews, Netemeyer, and Burton 1998). Taken together, these findings suggest that consumers are sensitive to any information provided and willing to use this information to make judgments, in
the direction that favours that information. As a result, it is predicted that the presence of a health claim will increase the perception of healthiness and buying intention of food products. That is,

**H4a:** A food product presented with a health claim will be perceived as healthier than the one without it, regardless of the package colour.

**H4b:** A food product presented with a health claim will elicit higher buying intention than the one without it, regardless of the package colour.

**Brand familiarity as the moderator**

While past research agrees that consumers may respond differently for unfamiliar new brands versus familiar brands, there is a conflict in literature on the direction of that difference. The majority of research emphasises the advantage of familiar brands in marketing. At the point of purchase, it is familiarity that guides consumers’ attention. Well-known brands find it easier to capture the attention of consumers (Alba and Hutchinson 1987), and consumers often demonstrate a greater willingness to engage in processing the information offered by the familiar versus unfamiliar brands (MacInnis, Moorman, and Jaworski 1991).

Consumers appear to better remember new product information for familiar brands. In contrast, it is more difficult for them to remember product information from marketing efforts such as advertising for new brands, especially in heavily advertised categories (Kent and Allen 1994). The familiarity of brands also plays an important role in consumers’ perception of the products. Brand imagery and mnemonic tools that are evoked when consumers encounter a familiar brand, can serve as stimulus input (Leigh 1992). Consumers rely on the familiarity of the brand to process information, whether it is known knowledge based on their learning and previous
experience, or something new. This is, however, not the case for unfamiliar brands, where consumers tend to rely on the product itself (Leigh 1992) and other contextual cues such as packaging colour, which might or might not have objective information.

As a result, it is proposed that when brand familiarity is high, consumers will rely on their existing experience with and knowledge of the brand to make the decision. High brand familiarity gives consumers information about the product which might be considered more objective by them such as the taste of the product and its quality. In such cases, contextual cues such as package colour should have limited influence on consumer decision making. In contrast, when brand familiarity is low, package colour becomes a source of information that consumers can easily access, and it can thus influence their perceptions and buying intention. Formally:

**H5:** Brand familiarity and package colour will have interactive effect on buying intentions such that the colour effect is attenuated when the brand has high familiarity.

**OVERVIEW OF STUDIES**

In a series of six studies, my research tests the five hypotheses. In all studies, I adopt the colour manipulation methodology used by Meier, Robinson and Clore (2004). Specifically, grey scale is used as the chromatic dimension, such that bright is manifested as the colour white (0% grey scale) and dark is manifested in the colour black (100% grey scale).

In Study 1, I run a field experiment to show the initial evidence of the colour effect. Study 1 tests the main effect of package colour (dark versus bright) on perception of tastiness and healthiness, and buying intentions of hedonic food. Study 2 tests the effect of package colour on perception and buying decision and further
examines the mediating role of perceived congruency between colour and food type on the relationship between package colour and buying intention. Study 3 offers a test of how a sensory experience such as tasting the food might disrupt the effect of package colour and whether such change sustains over time. Food tasting is a common practice in business, which helps companies to attract customers’ trial of new product and increase conversion. As a result, food tasting was included in the experimental design to afford participants an opportunity to try the product which is similar to trials offered in FMCG markets. Trials are positively associated with increased preferences for the product (Lee, Frederick, and Ariely 2006), and therefore, are expected to attenuate the effect of package colour that occur prior to the experience.

In Studies 4 and 5, I examine boundary conditions that might attenuate the influence of package colour at the point of purchase. Study 4 tests the effect of the presence of a health claim on the food package and evaluates whether it enhances or reduces the attractiveness of the product to consumers. In the fifth and final study, I test the effect of brand familiarity, and evaluate whether the impression of package colour holds when the brand is familiar to consumers. Our experiments are designed to provide a roadmap that will help researchers and marketers predict how dark and bright colours can be used to communicate an intended message to consumers.

**Study 1: A field experiment to examine package colour effects**

I conducted a field experiment as an initial test of our hypothesis that food in a dark package will be perceived as tastier than food in a bright package and will lead to higher buying intentions.
Experimental design and respondents

A one-factor, two-level (package colour: dark versus bright) between-subjects design was employed. Ninety-seven adults (59.8% female, age range = 18-45) took part in our study. As all participants were informed that tasting is required in this study, those who declined to taste could not proceed with the survey.

Method and procedure

A large poster of a potato chip package without an identifiable brand logo or name was displayed next to a supermarket in the retail area of a large Australian public university campus (see appendix). People who saw the poster as they walked by, were invited by the researcher to participate in a short survey in exchange for a $5 gift card. If they agreed, they were then invited to taste a supposedly new food product and provide their opinion on it. The experiment was conducted near the supermarket as I wanted to observe the effect of package colour when participants were likely to be in the mood for shopping. Potato chips were chosen for this experiment as they are considered one of the most frequently tempting food products and the most favourite comfort food by both male and female consumers (Wansink, Cheney and Chan 2003).

The survey consisted of two parts: before tasting, and after tasting. Participants first answered three questions about their perception of taste, enjoyment and purchase likelihood after exposure to the image of the potato chips poster. Once they completed this part of the survey, respondents were then invited to taste the potato chips and offer their opinion again. The potato chip used in this tasting experiment is a national brand. However, this information was not disclosed to respondents.

Participants’ opinion about the food product was measured both before and after tasting because it is important to capture the difference in perception and decision
making in the presence of a sensory, experiential experience such as tasting. Tasting is a valuable source of information for consumers. In addition, food tasting is a common promotion strategy used by food marketers. Understanding how tasting changes perception and buying intention can be interesting and useful for practitioners.

In order to measure buying intention, participants indicated the likelihood that they would purchase the product if it were available in the market on a 7-point scale from 1 (extremely unlikely) to 7 (extremely likely). They indicated their evaluation of the product’s tastiness on a 7-point scale from 1 (not at all tasty) to 7 (very tasty). I also measured how much participants thought they would enjoy eating the food on a similar 7-point scale from 1 (not at all) to 7 (very much). This set of questions was presented before actual food tasting, and repeated after the tasting experience. Participants also indicated their frequency to buy potato chips, and whether they were on a diet to lose weight. Finally, basic demographic information such as gender and age range was collected.

Results

Pre-tasting taste perception. One-way ANOVA found a significant main effect of package colours on taste perception (F(1,95) = 5.31, p < .05). Participants rated the potato chips in dark colour packaging as tastier than those in bright packaging (M_{dark} = 4.88, M_{bright} = 4.16, t(95)=2.30, p < .05). This result provides support for H1.

Post-tasting taste perception. However, the taste test changes participants’ perception of taste in two aspects. First, the difference in perceived tastiness between two package colour conditions is no longer significant (F(1,95) = 1.84, p < .1). Second, taste evaluation increases for both package colour conditions after tasting. Paired
samples t-tests indicated that these changes are significant for both potato chips in the dark colour package (before tasting $M_{\text{dark}} = 4.88$, after tasting $M_{\text{dark}} = 5.60$, $t(95) = -2.53, p<.05$) and potato chips in the bright colour package (before tasting $M_{\text{bright}} = 4.16$, after tasting $M_{\text{bright}} = 5.22$, $t(95) = -3.42, p<.05$).

As I ran the field study across a couple of days, I re-ran the analysis with dates being the covariate. The results remain unchanged when I controlled for the variation between different dates.

![Figure 8. Essay 2 Study 1](image_url)
**Pre-tasting buying intention.** A one-way ANOVA with package colour as independent variable and buying intention as dependent variable found a marginal main effect of package colour on buying intention \( F(1,95) = 2.84, \ p = .09 \). Participants indicated that they will be more likely to purchase the potato chips in the dark package compared to the bright package \( (M_{\text{dark}} = 4.15, M_{\text{bright}} = 3.67, t(95) = 1.69, p < .1) \). This finding provides initial support for Hypothesis 2.

**Post tasting buying intention.** After tasting, the buying decision was no longer influenced by package colour \( F(1,95) = .90, p < .1, M_{\text{dark}} = 4.7, M_{\text{bright}} = 4.4, \ ns \). Tasting also increased the likelihood to purchase in general, from an average of 3.91 before tasting, to 4.56 after tasting. Paired samples t-tests indicated that this difference is significant \( (p < .05) \).

**Discussion**

The field experiment provides an ecologically and externally valid test of H1-2. It leads to two interesting insights into how consumers respond to new food products based on their impression of the package colour. First, it shows that package colour can have an immediate impact on perceptions and buying intention. Consistent with our hypothesis, I found that hedonic food in dark (versus bright) packaging is perceived as tastier than that in bright packaging. Consumers also indicated a greater likelihood to purchase hedonic food in a dark (versus bright) package.

The second insight from the field experiment is about the longevity of the package colour impression. Although the influence of package colour is clear, it can be interfered with by actual tasting. The taste test attenuated the difference in taste perceptions and buying intention across packages. This suggests that when the brand is not known or unfamiliar, consumers rely on contextual factors such as package
colour as a cue to form judgment, including perception of tastiness and buying intention. However, once participants gain more experience with the product, the influence of package colour becomes less relevant.

Study 1 offers initial support for our hypotheses on the role of dark and bright package colours on consumer perceptions and decision making. Study 1 does so in an externally valid set-up. This study allows me to examine consumers’ perceptions and buying intentions in a naturalistic setting and provides a foundation for examining our hypotheses in the labs, in more internally valid setting.

The findings are also consistent with the outcomes of Mai, Symmank, and Seeberg-Elverfeldt’s (2016) paper, which also found an association of lighter colours with healthiness. However, while Mai et al. (2016) focused on the lightness of different hue versus neutral (rather than dark) colour, my research examines differences across dark and bright colours rather than lightness across a specific colour say red or brown. It looks at achromatic colours, which have lightness but no hue or saturation and their effect on outcomes such as taste perceptions and willingness to buy. In addition, my research focuses primarily on different moderators, which are managerial relevant (such as taste testing, introducing a new health claim, and the role of brand) while Mai et al (2016) focused more on the main relationship between colour lightness and perception. These moderators will be examined in subsequent studies.
Study 2: The mediating role of congruency on buying intention

In Study 1, the effect of package colour on perception and buying intention was examined. However, it did not examine the underlying mechanism of the package colour-buying intention relationship. Study 2 aims to address this issue and test Hypothesis 3. Specifically, Study 2 examines the package colour effect with both hedonic and healthy food, with a larger, more diverse subject pool and most importantly, tests the mediating role of perceived congruency between package colour and food type.

Experimental design and respondents

A 2 (package colour: dark versus bright) x 2 (food type: hedonic - potato chips, versus healthy - muesli) between-subjects design was implemented in the study. Two hundred and forty-three respondents were recruited from Amazon Mechanical Turk (53% female, \(M_{\text{age}} = 35.96\)).

Method and procedure

In this study, participants were asked to evaluate a new product that might be available in the market in the near future. Each participant was assigned to one of the four conditions. They each saw a picture of the food package with no brand name on the computer screen and answered a series of questions to indicate their evaluation of the product.

First, participants reported their perceptions regarding the product’s tastiness on a 7-point scale from 1 (not at all tasty) to 7 (very tasty) and healthiness on a 7-point scale from 1 (not at all healthy) to 7 (very healthy). In order to evaluate participants’ buying intention, I asked participants to report the extent of their
agreement on whether they would buy the product if it were available on the market, using a 7-point scale from 1 (strongly disagree) to 7 (strongly agree). In addition, perceived congruency was measured using two items adapted from Hummelen (2012), “The product and package colour come together” and “The package colour is appropriate for this product” (r = .87). These items were aggregated to form perceived congruency score for each respondent.

In order to control for individual preferences for specific foods, participants were asked to indicate their overall perception of healthiness, tastiness and buying frequency across seven different types of snacks, including the product categories examined in this study (muesli and ice cream). Participants also reported whether they were on a diet to lose weight at that moment and provided demographic information such as age, gender, and ethnicity.

**Results**

*Taste and healthiness perception.* A two-way ANOVAs with perception of tastiness and healthiness as dependent variables and food type and package colour as independent variables resulted in the main effect of food type on perception. Specifically, potato chips were perceived as tastier (F(1,239)=25.02, p < .001, M\textsubscript{chips} = 4.82, M\textsubscript{muesli} = 3.91, t(239)=5.00, p < .001) and less healthy (F(1,239)= 12.09, p < .001, M\textsubscript{chips} = 3.28, M\textsubscript{muesli} = 5.84, t(239)= -12.66, p < .001) than muesli. As a result, the experimental design is acceptable with potato chips as the hedonic food and muesli as the healthy, less hedonic food.

Importantly, the significant main effect of package colour on perceived tastiness (F(1,239)=12.09, p < .001) and perceived healthiness (F(1,239)=7.78, p < .01) reaffirms the findings of Study 1 and provides consistent support for H1. Both hedonic
food and healthy food were perceived tastier in the dark colour package (versus bright colour) \((M_{\text{hedonic-dark}} = 5.14, M_{\text{hedonic-bright}} = 4.51, p < .05; M_{\text{healthy-dark}} = 4.23, M_{\text{healthy-bright}} = 3.59, p < .05)\), and perceived as healthier in the bright colour package (versus dark) \((M_{\text{hedonic-dark}} = 3.03, M_{\text{hedonic-bright}} = 3.52, p = .08; M_{\text{healthy-dark}} = 5.52, M_{\text{healthy-bright}} = 6.16, p < .05)\).

**Buying intention.** I also found a significant interaction effect of package colour and food type on buying intention \((F(1,238) = 7.60, p < .001)\), providing support for H2. Consumers indicated their higher intention to purchase hedonic food in the dark package and healthy food in the bright package \((M_{\text{hedonic-dark}} = 4.22, M_{\text{hedonic-bright}} = 3.77, p = .05; M_{\text{healthy-dark}} = 4.19, M_{\text{healthy-bright}} = 4.66, p = .05)\).

**Perceived congruency as a mediation.** A two-way ANOVA with package colour (dark versus bright) and food type (hedonic versus healthy) as independent variables and perceived congruency as the dependent variable was run. As expected, a significant interaction effect emerged \((F(1,239) = 13.36, p < .001)\), indicating that hedonic food in dark packaging was perceived as more congruent than those in bright packaging \((M_{\text{hedonic-dark}} = 5.33, M_{\text{hedonic-bright}} = 4.47, p < .05)\), and healthy food in bright packaging was perceived as more congruent than those in dark packaging \((M_{\text{healthy-dark}} = 5.31, M_{\text{healthy-bright}} = 6.00, p < .05)\).

Hypothesis 3 proposed that the perceived congruency, or match between package colour and food type (hedonic-dark and healthy-bright) mediates the package colours on buying intention for both types of food. Hence, consistent with this conceptualisation, this study tested the mediation effect using PROCESS Model 8 with 5,000 bootstrap resamples (Hayes 2013). The results show that the indirect effect of dark versus bright package colour is significant in both hedonic food \((\beta = -.2487, SE = .1257, 95\% \text{ CI} = [-.5371, -.0365], \text{zero excluded})\) and healthy food conditions.
(\(\beta=.3215\), \(SE=.1039\), 95% CI = [.1397, .5508], zero excluded), but in different directions. Negative beta indicates that dark colour increases congruency for hedonic food, leading to increased buying intention, while positive beta means that brightness of colour (bright colour) increases congruency for healthy food, leading to increased buying intention. Therefore, these results provide strong support for Hypothesis 3.
Figure 9: Essay 2 Study 2

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<tr>
<th></th>
<th>Hedonic food</th>
<th>Healthy food</th>
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</thead>
<tbody>
<tr>
<td><strong>Perceived Tastiness</strong></td>
<td>5.14</td>
<td>4.51</td>
</tr>
<tr>
<td>Dark</td>
<td>4.23</td>
<td>3.59</td>
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<td>Bright</td>
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<th>Hedonic food</th>
<th>Healthy food</th>
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<tr>
<td><strong>Perceived Healthiness</strong></td>
<td>3.03</td>
<td>3.52</td>
</tr>
<tr>
<td>Dark</td>
<td>5.52</td>
<td>6.16</td>
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<th>Hedonic food</th>
<th>Healthy food</th>
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<tr>
<td><strong>Buying Intention</strong></td>
<td>4.22</td>
<td>3.77</td>
</tr>
<tr>
<td>Dark</td>
<td>4.19</td>
<td>4.66</td>
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<td>Bright</td>
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Discussion

Study 2 replicates and extends the results of Study 1 by showing that food in dark package colour is perceived to be tastier while food in bright package colour is perceived as healthier (H1). The colour effect emerges regardless of the nature of the food and across product categories, whether healthy (muesli) or hedonic (potato chips). More importantly, I replicated the findings with buying intentions where purchase intention is higher when hedonic food is presented in the dark colour package and healthy food in the bright colour package (H2).

Study 2 further tests the mediating role of perceived congruency (H3). The metaphorical match between colour and food type (dark is tasty and bright is healthy) translated into greater colour-food type congruency, and results in higher buying intention for the matching pair. This finding is consistent with prior research examining congruency and consumer response (e.g. Bottomley and Doyle 2006; Lyons and Wien 2018) that found a positive relationship between colour-food type congruency and buying intention.

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2 In order to enhance the generalisation of the finding, another study was run in the lab with student subject, using ice-cream as a hedonic food and muesli as a healthy food. The experimental design and procedure were similar to Study 2. The findings of Study 2 are replicated in this lab experiment. Specifically, a main effect of package colour on perceived tastiness emerged ($F(1,154)=10.15, p<.01$). Both hedonic food and healthy food were perceived as tastier in the dark colour package (versus bright colour) ($M_{\text{hedonic-dark}} = 6.00$, $M_{\text{hedonic-bright}} = 5.16$, $p<.05$; $M_{\text{healthy-dark}} = 4.69$, $M_{\text{healthy-bright}} = 4.09$, $p<.05$). In addition, a significant two-way interaction effect between package colour and food type on buying intention emerged ($F(1, 153) = 10.96, p < .01$), such that participants were more likely to purchase hedonic food in dark (versus bright) packaging ($M_{\text{hedonic-dark}} = 4.72$, $M_{\text{hedonic-bright}} = 4.22$, $p = .08$) and healthy food in bright (versus dark) packaging ($M_{\text{healthy-dark}} = 4.04$, $M_{\text{healthy-bright}} = 4.81$, $p < .01$). Comparing the likelihood of buying food in similar package colours, I found that participants are more likely to purchase the hedonic (versus healthy) food when the package is dark ($M_{\text{hedonic-dark}} = 4.72$, $M_{\text{healthy-dark}} = 4.04$, $p < .05$) and more likely to purchase the healthy (versus hedonic) food when the package is bright ($M_{\text{hedonic-bright}} = 4.22$, $M_{\text{healthy-bright}} = 4.81$, $p < .05$).
Study 3: Package colour and tasting experience

This study wanted to extend our understanding of package colour effects in the context of actual product tasting. Tasting will provide participants an opportunity to gather more objective information about the product, and hence I hypothesise that it can attenuate the colour effect. To test this hypothesis, I implemented a three-phase design: before tasting, immediately after tasting, and post-tasting after a period of time.

Experimental design and respondents

A 2 (package colour: dark versus bright) x 2 (food type: hedonic - potato chips versus healthy - muesli) between-subjects design was employed. One hundred and seventy-two participants (67% female, $M_{\text{age}} = 21.87$, range = 18-35) from a business laboratory subject pool participated in this study for monetary compensation.

After three months, an email was sent to these participants to invite them to complete the follow-up study for financial compensation. In the follow-up study, I received one hundred and forty-nine responses (66% female).

Method and procedure

The first phase of Study 3 was designed similarly to Study 2, but in a laboratory setting. In phase one, participants were randomly assigned to one of the four conditions and evaluated the product in terms of tastiness, healthiness, and likelihood to buy. These measures were the same as those used in Study 2.

After indicating how much they would like to taste the food, participants were invited to move to a cubicle on their right-hand side, where a sample of the food was placed. This was the second phase of Study 3. Participants were offered to taste the
food and eat as much as they wanted. Once they were finished with tasting, participants answered another questionnaire, which collected their perception and intention to buy post-tasting.

For the final phase of this study, a follow-up study after a delay of three months was conducted with these participants. I emailed and invited all participants who had completed phases 1 and 2 to complete a short survey about the food product they had tasted and evaluated. The survey was run online, and all participants once again saw the food product and re-evaluated it. I matched people to their earlier condition of food type.

Results

Pre-tasting. Similar to Study 2, I observed a similar pattern of behaviour prior to tasting. That is, both hedonic and healthy foods were perceived as tastier in dark colour packaging, and healthier in bright (supports H1).

I found a main effect of package colour on perceived tastiness (F(1,168)=13.11, p<.01). Both hedonic food and healthy food were perceived as tastier in the dark colour (versus bright colour package) (M_{hedonic-dark} = 5.02, M_{hedonic-bright} = 4.02, t(168)=3.25, p < .05; M_{healthy-dark} = 4.4, M_{healthy-bright} = 3.78, t(168) =1.91, p = .05).

Examining healthiness perception, I also found a significant main colour effect (F(1,168)=13.76, p<.05). Both food products were perceived to be healthier in the bright package colour (versus dark) (M_{hedonic-dark} = 2.54, M_{hedonic-bright} = 3.58, p < .01; M_{healthy-dark} = 5.35, M_{healthy-bright} = 5.76, p > 0.1, but in the same direction with the previous study. I question whether this effect was due to the fact that the study is conducted in the lab).
Figure 10: Essay 2 Study 3 Before tasting

Perceived Tastiness

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<tbody>
<tr>
<td>Hedonic</td>
<td>5.02</td>
<td>4.02</td>
</tr>
<tr>
<td>Healthy</td>
<td>4.4</td>
<td>3.78</td>
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Perceived Healthiness

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<tbody>
<tr>
<td>Hedonic</td>
<td>2.54</td>
<td>3.58</td>
</tr>
<tr>
<td>Healthy</td>
<td>5.35</td>
<td>5.76</td>
</tr>
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</table>

Buying Intention

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<tr>
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</thead>
<tbody>
<tr>
<td>Hedonic</td>
<td>4.02</td>
<td>3.62</td>
</tr>
<tr>
<td>Healthy</td>
<td>4.36</td>
<td>4.85</td>
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</tbody>
</table>
Participants were also more willing to purchase hedonic food in dark colour package and healthy food in bright colour package (F(1,167) = 7.34, p < .01, supports H2). Consistent with Study 2, I established similar evidence to support H3. I found a significant interaction effect of food type and colour on congruency (F(1,167) = 17.96, p < .01). Consumers reported higher levels of perceived congruency for hedonic food in dark colour packaging compared to bright (M_{hedonic-dark} = 4.34, M_{hedonic-bright} = 3.42, p < .01) and higher level of perceived congruency for healthy food in the bright package colour compared to dark (M_{healthy-dark} = 4.64, M_{healthy-bright} = 5.60, p < .01). Mediation analysis using PROCESS Model 8 indicated full mediating function of perceived congruency (for Hedonic food: β = -.3437, SE = .1424, 95% CI = [-.6736, -.1070], zero excluded; and for healthy food: β = .3566, SE = .1143, 95% CI = [.1526, .6066], zero excluded). That is, the product type-colour match leads to higher intention to buy, and this perceived congruency between product type and colour mediates the relationship between package colour and buying intention.

Post-tasting. Tasting influences the effect of package colour on perception and buying intention in two significant ways. I have observed this effect in the field study, and now replicated the phenomenon in the laboratory setting. First, the colour effect on perception diminished. I only observed the main food effect on perception, which remains consistent as this evaluation results from the true nature of the food product. Hedonic food is perceived as tastier than healthy food (F(1,168) = 10.22, p < .001), but the differences between package colours are not statistically different (M_{hedonic-dark} = 6.52, M_{hedonic-bright} = 6.55, p = .93, ns; M_{healthy-dark} = 5.48, M_{healthy-bright} = 5.63, p = .73, ns). Similarly, healthy food is perceived as healthier than hedonic food (F(1,168) = 287.36, p < .001), but the differences between package colours are not
statistically different ($M_{\text{hedonic-dark}} = 2.73$, $M_{\text{hedonic bright}} = 3.37$, $p > .05$, ns; $M_{\text{healthy-dark}} = 5.98$, $M_{\text{healthy-bright}} = 5.93$, $p > .05$, ns). Second, the interaction effect of package colour and food type on buying intention is no longer significant ($p < .05$). I found a marginal food effect ($F(1,167)=3.22$, $p < .07$), with the healthy food in dark colour receiving slightly higher interest for purchase than other items.

**Figure 11: Essay 2 Study 3 Post tasting**

![Bar chart showing perceived tastiness and healthiness for hedonic and healthy food in dark and bright colors](chart.png)
**Post-delay.** I conducted similar analysis for the data collected after three months of the lab experiment. Analysis showed a significant main effect of package colour on perceived tastiness ($F(1,145)=14.64, p<.001$), implying that participants’ perceptions of taste and colour were restored after the time delay, presumably after the effect of tasting has faded. Replicating our earlier findings, participants rated both foods as tastier in the dark (versus bright) package colour ($M_{\text{hedonic-dark}} = 4.58$, $M_{\text{hedonic-bright}} = 4.00$, $p < .05$; $M_{\text{healthy-dark}} = 4.32$, $M_{\text{healthy-bright}} = 3.42$, $p < .05$). However, the colour effects on perception of healthiness was not significant ($p > .1$, ns).

A two-way ANOVA shows a significant interaction effect of package colour and food type on buying intention ($F(1,144)=7.71, p<.001$). Similar to the original condition where tasting is absent, participants reported a higher intention to buy the hedonic food in the dark (versus bright) package ($M_{\text{hedonic-dark}} = 4.44$, $M_{\text{hedonic-bright}} = 3.85$, $p <.05$ and healthy food in the bright (versus dark) package ($M_{\text{healthy-dark}} = 4.35$, $M_{\text{healthy-bright}} = 4.89$, $p <.05$).
Figure 12: Essay 2 Study 3 Post delay

- **Perceived Tastiness**
  - Hedonic food: 4.58 (Dark) and 4 (Bright)
  - Healthy food: 4.32 (Dark) and 3.42 (Bright)

- **Perceived Healthiness**
  - Hedonic food: 2.97 (Dark) and 3.14 (Bright)
  - Healthy food: 5.84 (Dark) and 5.67 (Bright)

- **Buying Intention**
  - Hedonic food: 4.44 (Dark) and 3.85 (Bright)
  - Healthy food: 4.38 (Dark) and 4.89 (Bright)
**Moderated mediation analysis.** To test the proposed mediating variable, first, a two-way ANOVA was conducted to examine the differences in perceived congruency among package colour and food type conditions (F(1,145) = 10.67, p < .01). I found that perceived congruency is higher for hedonic food in dark than in bright colour packaging (M_{hedonic-dark} = 4.33, M_{hedonic-bright} = 3.71, t(145)=2.17, p < .05), and higher for healthy food in bright than in dark package colour (M_{healthy-dark} = 4.88, M_{healthy-bright} = 5.62, t(145)=-2.44, p < .05).

Hypothesis 3 proposes that perceived congruency will mediate the influence of package colour and food type on buying intention. Consistent with this prediction and previous studies in this research, I therefore ran a mediation analysis using PROCESS macro Model 8. As predicted, the results demonstrated that the indirect effect is significant in both hedonic food (B = -.6022, SE = .3234, and 95% CI excluded zero: -1.3616, -.0823) and healthy food condition (B = .7183, SE = .3007, and 95% CI excluded zero: .2287, 1.4407). These results provide consistent support for Hypothesis 3.

**Discussion**

Study 3 replicates findings from prior studies where food is perceived as tastier in dark packaging and healthier in bright packaging. When the package colour and food type match (hedonic food in dark package and healthy food in bright package), participants perceived higher congruency, leading to greater purchase intentions. However, this effect attenuated after an opportunity to taste the product is prioritised to participants.

Nevertheless, after a time delay (three months), the impact of package colours on perception is largely restored. While taste perception responds to the colour effect, health perception disappears. I may investigate this effect in future research. It might
be that over time, sensory experience (actual tasting) and further knowledge about the food still remains in the consumers’ memory, which can remind them of the actual healthiness of the product in their next encounter with the product. While taste is an affective/sensory perception, it is easier to be influenced by colour. In contrast, as healthiness is a cognitive perception, it might not be influenced by colour in the long run. Thus, perception will be less influenced by external elements such as package colour.

**Study 4: Introducing new product with health claim**

As shown in Studies 1 and 3, experiential information gained from tasting the food attenuates the effect of package colour on perception and intention to buy. Similarly, marketing information found on the packaging might influence the effect of package colour on decision making. In this study, health claim will be tested as a boundary condition. The main objective of Study 4 is to examine whether brighter or darker package colour will be more effective when a hedonic food is sold with a health claim.

**Experimental design and respondents**

The experiment employed a 2 (colour: dark versus bright) x 2 (healthy claim: yes versus no) between subject design. 336 students (64.6% female, $M_{age} = 22.12$, range = 18-35) from a large public university participated in this study for course credit.

**Method and procedure**

In the health claim condition, an additional tag line “The new oven-baked potato chips made with all-natural ingredients” was printed on the potato chips
package. Upon seeing the picture of the food product, participants provided their evaluation in the questionnaire. The content of the questionnaire is similar to the one used in previous studies.

**Results**

**Healthiness perception.** A two-way ANOVA on health perception as a dependent variable showed a main effect of health claim \( (F(1, 332) = 46.27, p < .001) \). Participants perceive potato chips with the health claim (oven baked and all-natural ingredients) to be healthier than those without such a claim \( (M_{health-claim} = 4.04, M_{no-claim} = 2.99, t=-6.80, p < .001) \). As a result, our manipulation was acceptable.

**Tastiness perception.** As expected, I found the main effect of package colour \( (F(1, 332)=13.84, p < .001) \) on taste perception. Participants rated potato chips in the dark package as tastier \( (M_{dark} = 4.21, M_{bright} = 3.70, t=3.72, p < .001) \). Interestingly, I also found the main effect of a health claim on perceived tastiness \( (F(1, 332) = 14.44, p < .001) \). The potato chips accompanied with a health claim were rated as tastier than those without the tag line \( (M_{health-claim} = 4.21, M_{no-claim} = 3.69, t=-3.80, p < .001) \). Among the four conditions, participants also rated the health claim potato chips in dark package colour to be the tastiest \( (M_{dark-health claim} = 4.43, all \ p_s < .05) \). It is perceived to be tastier than the potato chips with health claim in the bright package \( (M_{dark-health claim} = 4.43, M_{bright-health claim} = 4.00, t(332) = 2.22, p < .05) \). While health claim does not intervene with the effect of package colour on taste perception, it amplifies the colour effect, making the potato chips in dark package with health claim to be more attractive for consumers. There was no significant interaction effect of health claim and package colour on perceived tastiness \( (F(1, 332) = .38, p > .1) \).
**Perceived healthiness.** Similarly, I found the main effect of package colour (F(1, 332) = 12.03, p < .001) on perceived healthiness, in which food in bright package was perceived as healthier (M_{dark} = 3.25, M_{bright} = 3.79, t = -3.47, p < .001). Among the four conditions, the potato chips in bright package with a health claim were rated healthier (M_{bright-health claim} = 4.38, all all p < .05). I am also interested in further examining the evaluation of the health claim potato chips in dark package colour as it was rated tastiest among four conditions. Apparently, the evaluation of healthiness for this product is only lower than the highest one (M_{dark-health claim} = 3.71, M_{bright-health claim} = 4.38, p < .05), while being higher than the other two conditions.

**Buying intention.** A two-way ANOVA on buying intention revealed a significant main effect of health claim and package colour. While the main effect of package colour was expected (F(1,332)=10.14, p < .001) as it replicated the findings of previous studies, the main effect of health claim (F(1,332)=12.72, p < .001) was the key finding of this study. Participants were more likely to purchase hedonic food product with the health tag line on the package (M_{health-claim} = 4.01, M_{no-claim} = 3.43, t = -3.57, p < .001). Among four conditions, people were most likely to purchase potato chips in dark package colour that was claimed healthy (M=4.28, p < .05). It receives greater interest to buy than the potato chips in bright package colour with health claim (M_{dark-health claim} = 4.28, M_{bright-health claim} = 3.74, t(332) = 2.29, p < .05) and than the potato chips in dark package colour without health claim (M_{dark-health claim} = 4.28, M_{dark-no claim} = 3.67, t(332) = -2.58, p < .05). Similar to the effect of health claim on perceived tastiness, the health claim enhances the attractiveness of the potato chips in dark package. Health claim does not repress the effect of colour, but rather boosts its effect.
**Mediation analysis.** A two-way ANOVA was run to examine the differences in perceived congruency among different conditions of package colours and health claims. Hedonic food in a dark package was perceived as more congruent than hedonic food in a bright package, regardless of the health claim (F(1,332)=10.04, \( p < .01 \); \( M_{\text{dark}} = 3.98, M_{\text{bright}} = 3.17, t=-3.47, p < .01 \)). The results indicate that perceived congruency was influenced by the original hedonic nature of the food, not the health claim that the food can make. Mediation analysis using PROCESS Model 4 with package colour as independent variable, buying intention as dependent variable and perceived congruency as the proposed mediator resulted in significant indirect effect (B = -.2412, SE = .0836, and 95% CI excluded zero: = -.4174, -.0864).
Figure 13: Essay 2 Study 4

### Perceived Tastiness
- **No claim**
  - Dark: 3.99
  - Bright: 3.39
- **Health claim**
  - Dark: 4.43
  - Bright: 4

### Perceived Healthiness
- **No claim**
  - Dark: 2.79
  - Bright: 3.19
- **Health claim**
  - Dark: 3.71
  - Bright: 4.38

### Buying Intention
- **No claim**
  - Dark: 3.67
  - Bright: 3.19
- **Health claim**
  - Dark: 4.28
  - Bright: 3.74
Discussion

The results support the benefit of adding a health claim on food package. The added healthy claim tag line did not only increase rating of healthiness, but it also increased the perception of tastiness. Most importantly, the health claim enhanced the attractiveness of potato chips in the dark package, which was already perceived as tastier and received higher buying intention. With the health claim, potato chips in the dark package bypassed the other three conditions in both taste perception and likelihood to buy, while being very competitive on the rating of healthiness.

This finding is consistent with previous research that examines the effect of marketing health claim on hedonic food. Health claims featuring a hedonic food attribute (such as low fat) induce a significant increase in consumption compared to a control condition by activating a health goal to a much lower extent (Belei et al. 2012). In contrast, claims highlighting a functional attribute (such as extra antioxidants) result in a significant lower consumption.

In this study, as the health claim used in the tag line featuring hedonic attributes (all-natural, oven-baked), it results in greater evaluation of the food product in general. Not only do consumers perceive the food with a health claim to taste better and be healthier, they are more likely to choose the most indulgent food option available. As the hedonic food in dark package with health claim is perceived the most attractive choice, this experiment shows consumers’ tendency to choose a healthy indulgence, hoping to have the best of both taste and health.

From the marketing perspective, adding a health claim might benefit the product, especially when healthy eating is one of the biggest trends worldwide at the moment. One common question that businesses raise when adding health claims on package labels is whether it helps boost sales. According to a review of purchasing
data, these claims are strongest when added to products already considered healthy (Nielsen 2015). For less-healthy and indulgent food, the effectiveness of health claims depends on consumers’ perception of the product. Specifically, from 2012 to 2014, potato chips with whole-grain labelling’s sales decreased 11%, while potato chips with low or reduced sodium increased 18%. This sales data is consistent with Belei et al.’s (2012) theory of different effects of health claims featuring hedonic versus utilitarian attribute and therefore aligns with the findings in study 4.

**Study 5: Brand familiarity as the moderator**

When it comes to new products in the market, consumers encounter both new brands and new packaging or new lines of products offered by existing brands. In this research, I have so far examined the effect of package colour in the absence of brand familiarity effects. However, as Study 3 shows that with experience (such as tasting) with the brand, the colour effects are attenuated. Thus, Study 5 explores the moderating role of brand familiarity on the relationship between package colour and perception and buying intention.

**Experimental design and respondents**

The experiment employed one-factor, three-levels (colour: dark, bright, original colour) between-subject design. Brand familiarity is a measured moderator. 229 students (66.81% female, $M_{age} = 20.65$, range = 18-30) from a large public university participated in this study for course credit.
**Method and procedure**

Participants saw one of the three packages of Smith’s potato chips. Smith’s is a well-known brand in the market. It is also the market leader in its category in the Australian market and can be easily found in big supermarket chains and different stores across the country.

**Measures.** I adopt the approach of measuring brand familiarity as a continuous variable, which reflects a consumer’s level of experience with a product (Alba and Hutchinson 1987; Ken and Allen 1994). Each participant completed a 3-item brand familiarity scale (adopted from Kent and Allen 1994): “Regarding the Smith’s potato chips shown in the study today, are you: unfamiliar/ familiar, inexperienced/ experienced, not knowledgeable/ knowledgeable”; a 7-point semantic differential scale ($\alpha = .93$). These three items were averaged to form a composite score for brand familiarity.

**Results**

**Manipulation checks.** Participants reported a high level of brand familiarity with the (median = 5.33, standard deviation = 1.77), suggesting that our choice of brand to induce familiarity is acceptable.

**Tastiness and Healthiness perception.** There was no significant effect of package colour on perceived tastiness and perceived healthiness for Smiths potato chips. The colour effect that was consistently shown in previous experiments for unknown brands is not visible when the brand is well known.

**Perceived congruency.** I found a significant effect of package colour on perceived congruency ($F(2,258)=18.71$, $p<.001$), with Smith’s potato chips in its original package rated as most congruent ($M_{\text{original}} = 5.10$, all $p_s <.01$), while there was
no significant difference in perceived congruency between dark and bright package colour ($M_{\text{dark}} = 3.97$, $M_{\text{bright}} = 3.94$, $p<.1$) when the brand is familiar.

**Buying intention.** I ran a two-way ANOVA with package colour as the independent variable, brand familiarity as the measured moderator, and buying intention as the dependent variable. I found a significant main effect of colour ($F(2,223)=3.68$, $p<.05$) and main effect of brand familiarity ($F(1, 223) = 20.05$, $p<.001$) on buying intention. Importantly, a colour x brand familiarity interaction effect emerged ($F(2, 223)=3.45$, $p<.05$), indicating the moderating role of brand familiarity on the relationship between package colour and intention to buy a well-known brand of hedonic food.

Mid-point analysis showed that, for consumers who are less familiar with the brand, intention to buy the potato chips in a dark package are significantly higher than in the original package ($M_{\text{dark}} = 4.14$, $M_{\text{original}} = 2.67$, $p<.05$), and significantly higher than the bright package ($M_{\text{dark}} = 4.14$, $M_{\text{bright}} = 3.05$, $p<.05$). This is consistent with prior studies in this research, which show that when consumers have limited information or purchase a product without a brand name, they tend to choose the chips in darker colour. Dark even outperforms the original blue for the low familiarity group. However, among consumers who are more familiar with the brand, intention to buy the chips in the original package is similar to that in the dark package ($M_{\text{original}} = 4.43$, $M_{\text{dark}} = 4.38$, $p>.1$), but marginally higher than the bright package ($M_{\text{original}} = 4.43$, $M_{\text{bright}} =3.90$, $p=.05$). The difference in intention to buy between dark and bright package colours for high familiarity group of customers is not significant ($M_{\text{dark}} = 4.38$, $M_{\text{bright}} =3.90$, $p=.1$), indicating no difference between dark and bright for high familiarity brand. Thus, H5 is supported, where the dark versus bright colour effect is attenuated when brand is more familiar, but not when it is low in familiarity.
In study 5, I examined the effect of package colour on perception and buying intention, but with a well-known brand to account for brand familiarity. The effect of dark and bright package colour was compared, along with the original colour of the product package. When the brand is more familiar, the colour does not have a significant effect on perception. This finding is consistent with brand research, which
shows that consumers rely on the familiarity of the brand and past knowledge to process information, which then influences their perceptions (Leigh 1992).

This essay measured the degree of brand familiarity and examined its moderating effect. The studies found that buying intention varies due to the interaction effect of package colour and brand familiarity. While the original package colour was preferred by participants who were familiar with the brand, those who were less familiar were more willing to try other colour options such as dark or bright. As predicted, package colour effect is more powerful for people who are less familiar with the brand than for those who are more familiar with it. This finding is consistent with the literature and with prior experiments in this research, which show that the less experience consumers have with the product, the more influential contextual factors such as package colour are, on their buying decision.

DISCUSSION

In this essay, this research proposed an unexplored influence of embodied meaning of bright and dark colours used in package design. Based on the conceptual metaphor theory, this essay suggested a link between dark colours and the abstract concept of tastiness, and between bright colours and the concept of healthiness. As a result, I hypothesised and showed that when a food type and package colour’s metaphorical meaning is matched, consumers perceive a higher level of congruency, and hence, more favourable attitude toward the product.

Across six studies, this essay systematically examined the effect of dark and bright package colours on food perception and buying intention. I also explored different conditions in which the colour effect might amplify or attenuate. Data was collected across different sample populations (students versus non-students), and
using different settings (including online panel, laboratory and field experiment). The essay found consistent evidence to support our main premise regarding the powerful effect of dark and bright colours on consumers’ perception and decision making. Study 1 showed that hedonic food products in dark package colours were rated tastier and were more likely to be purchased than those in bright package colours. Nevertheless, the effect diminished after consumers had the opportunity to taste the product.

Study 2 formally tested our hypotheses. Study 2 demonstrated that food in dark packages were rated tastier, while food in bright packages were rated healthier, providing evidence to support H1. I also found the moderating effect of food type on buying intention, with consumers indicating higher intention to purchase hedonic food in dark packages and healthy food in bright packages, supporting H2. Furthermore, Study 2 established the mediating effect of colour-food type congruency, supporting H3.

Studies 3-5 further investigated the moderating effect of actual product tasting, health claim, and brand familiarity. Study 3 suggested an immediate but short-lasting interference of tasting on colour effect. Although actual tasting weakened the influence of package colour, this effect faded away after a time delay, leading to a resurgence of the colour effect. In study 4, I explored the effect of health claim on food package. Overall, I found that it boosted the overall attractiveness of hedonic food in dark package, thus amplifying product appeal. Finally, study 5 examined the colour effect for well-known brands with high brand familiarity, and found that brand familiarity moderates the influence of package colour, attenuating its effect for consumers who have high familiarity of the brand.
While the current research focuses on achromatic colours (dark and bright), which have lightness but no hue or saturation, future research might extend to chromatic colours (such as red, blue, yellow). Recent research has shown interest in examining specific colour in different degrees of lightness. For example, Mai et al. (2016) show that consumers associate light-coloured packages with healthiness and perceive cream cheese in pale green packaging to be healthier than tasty. Furthermore, examination of chromatic colours can be extended to the understanding of how colour saturation influences our perception and decision making, an arena that cannot be examined with achromatic colours. By manipulating the saturation of the whole package with multiple colours, Mead and Richerson (2018) show that consumers perceive food items as healthier if they are displayed in packaging with lower colour saturation. Future research can further investigate the influence of lightness and saturation of specific hues, as well as their interaction with the associated meaning that each colour carries. Altogether, my current research and these suggestions for future studies contribute to research in colour, which identify how colour can bias consumers’ perceptions of food attributes (Huang and Lu, 2016, Levy et al., 2012, Mai et al., 2016).

In the current study, the focus is on snack food products, which are mostly considered low-involvement, habitual purchases. As a result, the power of the brand might trump other information such as colour. Nevertheless, this effect might manifest differently for high-involvement products. This would thus be a fruitful avenue for future research.
Contributions and Implications

This essay’s findings contribute to the growing literature on package colour and its influence on perception and decision making. Colour is an important element of package design and is usually the first element that consumers notice and recognise when shopping in the grocery store. Past research has illustrated how colours carry meanings that can have important effects on consumers’ perception and behaviour (for review, see Elliot and Maier 2014). However, the majority of colour research to date has focused on hue (in particular, the three basic colours of red, blue, and green) with little attention paid to the differences across dark and bright colours (Meier, Robinson, and Clore 2004). This essay has addressed this research gap.

Additionally, this essay examined the underlying mechanism of the relationship between package colour and buying intention. In this research, I not only paired two elements that match metaphorically (i.e., colour and food type) but also, measured and established that it is the perceived congruency between these factors that mediate the package colour and buying intention relationship.

Our research also offers practical implications for fast moving consumer goods companies, especially in the context of marketing new products. I respond to Garber and Hyatt’s (2003) call for guidelines to assist marketing managers with the colour selection decision. For many new products in a crowded and competitive market, gaining attention might be difficult enough, not to mention convincing consumers to buy. This research suggests that the colour of the package can be an important way to attract attention and communicate product attributes at the point of purchase. Based on the findings of our research, businesses can identify what package colour would best suit their strategy, and how other elements of the package and the marketing, in general, can enhance the power of colour in favour of their brand.
In this research, I also show that package colour effect is powerful, especially until consumers have an opportunity to experience the product. However, it gives the product an opportunity to garner consumer interest in the first instance, which can be critical in the fast-moving consumer goods industry. Further, when this initial interest is complemented with expected product quality, the synergistic effect of the two can be powerful.

When introducing a healthier alternative to a hedonic food, businesses might benefit by adding a health claim and using dark package colours. Consumers view the option as the combined best of both worlds, treating themselves with a “healthy indulgence”. Even though consumers tend to rely on Nutrition Facts information when it is provided rather than the claim (Levy 1995; Garretson and Burton 2000), the influence of health claims is still powerful. A health claim presented on the front is typically encountered before the Nutrition Facts table, which is usually presented on the back of the package. In addition, front-of-package claims help generate awareness and interest in a product. This scenario is similar in online shopping, where supermarkets often present only one picture of the product. Even if two or more pictures are presented, online shoppers usually rely on the first picture only. For products sold in vending machines, consumers can only see the front of the package when making purchase choices.

Companies with well-established brands will need to consider whether dark or bright colours might benefit their existing product offerings, and to what extent. For an established brand, changing the package colour might harm the brand. However, changing the colour to dark or bright might offer a fresh look for declining brands and help the brand communicate its product attributes more clearly to consumers. In addition, by introducing a line extension with new colours (dark or bright), the brand
might benefit from both the colour effect and the brand familiarity effect, making it more attractive to consumers.

Finally, the findings of this research can apply across markets and cultures. Madden et al. (2000) suggested that dark and bright is a culturally invariant colour, and as a result, might have international implications for businesses. In this research, data was collected from different countries, and a diverse group of participants. As the main effect of colour replicated across, this research suggests that these effects are applicable across populations and cultures.

In the current research, I focused on three main dependent variables, namely tastiness perception, healthiness perception and intention to buy. Due to this objective, I only explored one dimension of colour meaning in food perception context. However, this is the limitation of our research that should be addressed in the future. Not only that colours carry meanings, they have different dimensions of meanings, depending on the context, and the product that they pair with. For example, the congruency between colour and product can also influence the premium evaluations (Lyons and Wien 2007). Further research should examine the colour effect with other products, and measure different outcome variables.

Finally, the colour effect can be extended to the online shopping context, where consumers are increasingly spending their time and money. Online grocery shoppers rely on the images of the product to make their decision, and suitable package colours can help new brands gain leverage in the marketplace. The current research suggests that product images, even on the computer screen, can produce the package colour effect, but this aspect needs further examination.

Table 2: Essay 2 Study Summary Statistics
### STUDY 1

<table>
<thead>
<tr>
<th></th>
<th>Perceived Tastiness</th>
<th>Buying Intention</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dark</td>
<td>Bright</td>
</tr>
<tr>
<td><strong>Hedonic food</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before tasting</td>
<td>4.88</td>
<td>4.16</td>
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<tr>
<td></td>
<td>(0.22)</td>
<td>(0.22)</td>
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<tr>
<td>After tasting</td>
<td>5.60</td>
<td>5.22</td>
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<td></td>
<td>(0.20)</td>
<td>(0.20)</td>
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</tbody>
</table>

### STUDY 2

<table>
<thead>
<tr>
<th></th>
<th>Perceived Tastiness</th>
<th>Perceived Healthiness</th>
<th>Buying Intention</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dark</td>
<td>Bright</td>
<td>Dark</td>
</tr>
<tr>
<td><strong>Hedonic food</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before tasting</td>
<td>5.14</td>
<td>4.51</td>
<td>3.03</td>
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<tr>
<td></td>
<td>(0.18)</td>
<td>(0.18)</td>
<td>(0.20)</td>
</tr>
<tr>
<td>Healthy food</td>
<td>4.23</td>
<td>3.59</td>
<td>5.52</td>
</tr>
<tr>
<td></td>
<td>(0.18)</td>
<td>(0.19)</td>
<td>(0.20)</td>
</tr>
</tbody>
</table>

### STUDY 3

<table>
<thead>
<tr>
<th></th>
<th>Perceived Tastiness</th>
<th>Perceived Healthiness</th>
<th>Buying Intention</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dark</td>
<td>Bright</td>
<td>Dark</td>
</tr>
<tr>
<td><strong>Hedonic food</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before tasting</td>
<td>5.02</td>
<td>4.02</td>
<td>2.54</td>
</tr>
<tr>
<td></td>
<td>(0.21)</td>
<td>(0.22)</td>
<td>(0.18)</td>
</tr>
<tr>
<td>After tasting</td>
<td>6.52</td>
<td>6.55</td>
<td>2.73</td>
</tr>
<tr>
<td></td>
<td>(0.29)</td>
<td>(0.31)</td>
<td>(0.16)</td>
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<tr>
<td>Post delay (3 months)</td>
<td>4.58</td>
<td>4.00</td>
<td>2.97</td>
</tr>
<tr>
<td></td>
<td>(0.19)</td>
<td>(0.18)</td>
<td>(0.22)</td>
</tr>
<tr>
<td><strong>Healthy food</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Before tasting</td>
<td>4.40</td>
<td>3.78</td>
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<td>(0.23)</td>
<td>(0.25)</td>
<td>(0.20)</td>
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<tr>
<td>After tasting</td>
<td>5.48</td>
<td>5.63</td>
<td>5.98</td>
</tr>
<tr>
<td></td>
<td>(0.32)</td>
<td>(0.31)</td>
<td>(0.18)</td>
</tr>
<tr>
<td>Post delay (3 months)</td>
<td>4.32</td>
<td>3.42</td>
<td>5.84</td>
</tr>
<tr>
<td></td>
<td>(0.19)</td>
<td>(0.20)</td>
<td>(0.22)</td>
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</table>

### STUDY 4

<table>
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<th>Perceived Tastiness</th>
<th>Perceived Healthiness</th>
<th>Buying Intention</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dark</td>
<td>Bright</td>
<td>Dark</td>
</tr>
<tr>
<td><strong>Hedonic food</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No claim</td>
<td>3.99</td>
<td>3.39</td>
<td>2.79</td>
</tr>
<tr>
<td></td>
<td>(0.13)</td>
<td>(0.13)</td>
<td>(0.15)</td>
</tr>
<tr>
<td>Health claim</td>
<td>4.43</td>
<td>4.00</td>
<td>3.71</td>
</tr>
<tr>
<td></td>
<td>(0.15)</td>
<td>(0.13)</td>
<td>(0.17)</td>
</tr>
</tbody>
</table>

### STUDY 5

<table>
<thead>
<tr>
<th></th>
<th>Perceived Tastiness</th>
<th>Buying Intention</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dark</td>
<td>Bright</td>
</tr>
<tr>
<td><strong>Hedonic food</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low brand familiarity</td>
<td>4.12</td>
<td>4.03</td>
</tr>
<tr>
<td></td>
<td>(0.25)</td>
<td>(0.24)</td>
</tr>
<tr>
<td>High brand familiarity</td>
<td>4.78</td>
<td>4.48</td>
</tr>
<tr>
<td></td>
<td>(0.19)</td>
<td>(0.18)</td>
</tr>
</tbody>
</table>
Note: In all studies, the values reflect the mean of the dependent variable. Standard errors are in parentheses.
CHAPTER 5: CONCLUSION

Food and eating are a crucial part of our lives. On one hand, food provides nutrition, gives strength, and brings joy. On the other hand, overconsumption of food, especially tasty but unhealthy food, is linked to obesity and other health risks. The culture of eating and our relationship with food, including what we eat, how we eat and what drives our food decisions, are constantly being shaped and changed by a variety of factors.

This thesis examines two contextual factors in the food consumption domain and how they influence our perception, buying intention, and amount consumed, across two essays with a combined ten studies, including a field experiment and several lab experiments. It illustrates how our perception of food and behaviour can be significantly influenced by just small changes in the consumption context, providing theoretical and managerial insights.

The first essay examines the relationship between tableware aesthetics and food consumption. Four studies provide consistent evidence of gender differences in food decision making, showing that males consume more hedonic food and females consume less hedonic food when using aesthetically pleasing (versus plain) tableware. Tableware with an aesthetic design is more attractive and thus transfer the attention to the food, making it more salient. The salience of hedonic food evokes increases taste evaluation among males, hence increases consumption among males, but triggers monitoring in females, reducing their consumption. This monitoring effect is not activated when food salience is low—for instance, when food is served in an aesthetically plain plate. However, when either a hedonic food or healthy goal is made active, monitoring increases among females, even with plain plates, leading to lower
consumption of the hedonic food. A healthy goal also helps males reduce their consumption, attenuating the impact of tableware aesthetics on them. The opposing effect of tableware aesthetics on food consumption between males and females is only evident when food is perceived to be hedonic. The effect is not significant in the case of less hedonic food, which is perceived to be less attractive and less tasty to males, but also less harmful to female consumers.

The second essay investigates the influence of dark versus bright package colours on perception and buying intention of the food product, as well as its key moderators and mediator. For both hedonic and healthy food, dark packaging leads to increased perception of taste and bright packaging to increased perception of health. The perceived congruency between package colour and food type (dark package – hedonic food and bright package – healthy food) mediates the effect of package colour on buying intention, with consumers more likely to buy hedonic food in dark packages and healthy food in bright packages colours. However, when given an opportunity to taste the product, the colour effect is attenuated, but the effect of package colour on perception and buying intention is restored after a time delay. Examining the effect with a national, highly familiar brand and with a health claim suggests that the package colour effect is moderated by these factors; attenuated by brand familiarity and amplified by a health claim.

In summary, across two essays with a combination of studies in different settings (online panels, lab and field experiment), using different subject populations (students, non-students), and examining different outcome variables (perceptions, buying intention, and amount consumed), this thesis broadens our understanding of the role of contextual cues in food consumption. In addition to showing how contextual elements such as tableware aesthetics and package colour increase or
decrease consumption and buying decision of food, the thesis emphasises the underlying mechanism driving these relationships. Furthermore, it examines a variety of boundary conditions which moderate the effect of these contextual factors on food preference and consumption; attenuating or amplifying it. Given the unquestionable and significant effect of contextual factors on food consumption, the findings of this thesis provide important implications for academics and various stakeholders potentially associated with consumers’ decision-making process, including businesses, health professionals, and consumers themselves.

**Theoretical implications**

This thesis makes four important theoretical implications. First, it contributes to the consumption literature by examining how contextual factors such as tableware aesthetics and package colour influence perceptions and decision making. As both tableware and product packaging are closely and directly associated with food and its consumption experience, their influence on food decision is extensive, from pre-purchase to post-consumption stages. Whether it is at home or in a restaurant, choosing the appropriate tableware is an important part of the food experience. Nevertheless, past research has mainly focused on specific physical elements of tableware such as its size, colour contrast, and weight (Mishra, Mishra, and Masters 2012; Piqueras-Fiszman et al. 2011; Wansink and Van Ittersum 2005) rather than evaluating it holistically. By addressing the aesthetic aspect of the tableware and how it influences actual amount consumed, this research contributes to a more holistic understanding of how this factor impacts food consumption.

Further, this thesis addresses the lack of research in package colour as a contextual factor that influences perceptions and food decision. Consumers often rely
on the product package to make a judgment about the product they see and want to buy. Research in package design has examined a variety factors such as package shape (Raghubir and Krishna 1999), package transparency (Deng and Srinivasan 2013) and number of product image on packaging (Madzharov and Block 2010). This thesis extends this stream of research by emphasising the role of package colour. A key difference between package colour and other elements in package design is the ability of colour to carry meanings. By understanding the metaphorical meaning of dark and bright, we are able to associate these package colours with perception of tastiness and healthiness, and ultimately, buying intention.

Next, this thesis identifies the underlying mechanism of the relationship between the two examined contextual factors and food consumption. Specifically, it is shown that monitoring mediates the influence of tableware aesthetics on food consumption among females, leading to opposite patterns in consumption across males and females. In addition, perceived congruency between package colour and food type was established as the mediator in the package colour – buying intention relationship. That is, consumers perceive dark and hedonic food, as well as bright and healthy food as more congruent, resulting in more favourable intent to buy. While existing literature has established that contextual factors significantly influence food consumption, a more thorough understanding of the underlying driving forces is key to developing strategies to help consumers better manage their consumption. This thesis makes significant progress in that direction.

Third, this thesis identifies food type as the common moderator for the tableware aesthetics - actual consumption and package colour – buying intention relationships. Not all past research in food consumption distinguishes the difference between food types. Nevertheless, it might be the first criteria that comes to mind
when consumers shop for food. That is, whether they want a tasty or healthy food option in a particular shopping event. In this thesis, it is shown that while food consumption and buying intentions are susceptible to changes in package colour (dark versus bright) and tableware aesthetics (aesthetically pleasing versus plain), they also depend on the type of the food - whether it is hedonic or not. The findings suggest that food type can either attenuate the effect (in Essay 1) or direct behaviour the opposite way (in Essay 2). When food is hedonic, its taste attribute becomes an important element of consideration. As found in this thesis, consumers are more likely to buy hedonic food in a package that implies higher perception of tastiness, which is dark instead of bright (package colour). In contrast, when food is healthy, consumers are more likely to buy it in a bright package as it implies higher perception of healthiness.

In the context of consumption using aesthetically pleasing tableware, the difference in consumption pattern between males and females is only evident when food is hedonic, as it might represent the pleasure associated with the consumption to males, but a threat to the short- and long-term health goals to female consumers. When food is less hedonic, it does present these distinctive motivations to males and females, resulting in similar patterns of consumption.

Finally, this thesis tests the robustness of the findings by examining the contextual effects across different populations (students, non-students), in different settings (online panels, lab and field experiment), and with actual food. Additionally, whether it is consumption of food with measurement of the actual amount consumed, a food taste test in the field with real shoppers tasting the food near a supermarket, or a taste test across a period of time, this thesis emphasises the importance of implementing realistic set-ups in consumer research in order to increase the ecological
and external validities, as well as amplifying the managerial implications of the findings.

**Implications for Businesses and Health Professionals**

In addition to the theoretical contributions, the implications of this thesis are valuable for businesses in the food industry such as restaurants and food manufacturers.

Restaurants are increasingly replacing standardised white plates and bowls with designer, aesthetically pleasing tableware. Beautiful tableware can offer multiple benefits such as a point of difference for restaurants, enhancing the overall impression of the meal, and complementing the overall enjoyment of the experience. In addition, the opposite effect of tableware aesthetics on consumption of hedonic food on males and females might serve in the restaurant’s favour. For example, if hedonic food is served, male consumers typically will eat more and hence may feel more value in having a larger, tasty meal. In contrast, female consumers who are more concerned with healthy eating (Rozin, Bauer, and Catanese 2003) might eat less. Their action can result in overall satisfaction as females can be obligated to societal food consumption expectations of having smaller bites and eating a smaller amount (Chaiken and Pliner 1987; Rolls, Fedoroff, and Guthrie 1991), while still enjoying the meal due to their slower consumption and breaks between bites (Nelson and Meyvis 2008).

For food manufacturers, understanding the colour effect can enable them to strategically match package colours to products and enhance their attractiveness, while effectively communicating the products’ value to customers. For example, the recent introduction of the health star label on food packaging in Australia has
encouraged many firms to create new lines of healthier products (Willis 2017). Depending on the current positioning of the brand and its image, choosing an appropriate colour will help enhance the value of the product to customers. For example, while some instant food products are generally considered tasty, they are mass-produced processed foods. The company should consider using bright colours for the healthier version of the product in order to better communicate to customers the health benefits that the product offers.

The findings are also useful for advertisers and health professionals in designing healthy-eating educational campaigns. While aesthetically pleasing tableware helps females reduce their consumption of hedonic food (usually tasty but unhealthy), it backfires among males. A health goal attenuates this tableware effect in males, nudging their consumption toward lower consumption, and moves in the preferable direction. Health campaigns, especially those targeting males should consist of cues that make the health goal salient to them. This approach will benefit female consumers as well, as their consumption of hedonic food will also be moderated in the presence of an active health goal, especially if plain tableware is in use.

Making healthy food more attractive is possibly another important goal of health-related campaigns in order to promote long-lasting changes in consumption and lifestyles. Healthy food is usually perceived as less tasty and makes you feel hungrier (Raghunathan et al. 2006, Finkelstein and Fishbach 2010). Featuring healthy food in dark packaging increases its perceived tastiness. While the effect on purchasing behaviour might not be immediate, influencing perceptions will be a big step forward. Young consumers, who might not yet be health-conscious, make many of their food decisions based on taste. Perceiving a healthy food packaged in dark
colour as tastier, such consumers will be more willing to try the food and over time, become regular consumers.

**Implications for Consumers**

Obesity is one of the most serious health problems that consumers in both developed and developing countries are increasingly facing (Ng et al. 2014), and many consumers are trying to avoid unhealthy food and purchase healthier options instead (Nielsen 2016). This thesis has several insights that consumers might consider utilising to aid them in making healthier food choices.

In browsing for food in the supermarket, consumers who are on a diet or have an active health goal should be aware of hedonic foods in bright packages. The colour of the package might bias their perception, making them believe that it is healthier. Thus, it is important for consumers to understand that packaging and other contextual factors influence their decision making, and try to rely on more objective information such as nutrition labels or a health star rating. Another way for consumers to avoid making impulsive decisions and buying hedonic food is to ignore any offers to taste the product in the retail setting. Tasting the food not only undermines package colour effect that consumers experience but also, and more importantly, increases the rating of product tastiness and intentions to buy it.

Overall, the findings support the premise that, by being more aware of how contextual factors influence their perceptions and decision making, consumers can take greater control of the process influencing their food consumption.
Directions for future research

In this research, I examined food types based on a perception of hedonicity versus healthiness. I have shown that the effect of tableware aesthetics is diminished when less hedonic food is used. However, food typology can be more complicated. Previous research in food consumption has categorised foods in terms of appearance (attractive versus not attractive) (Deng and Srinivasan 2013) or hedonicity (hedonic or less hedonic) (Garg, Wansink, and Inman 2007). Some foods are perceived to be both tasty and healthy; hence, future research might specifically investigate different types of food that vary on a continuum of hedonicity and healthiness.

As more consumers nowadays eat directly from the package, the influence of packaging might extend beyond perception and buying intention, such as influencing the amount consumed. Another example of such usage are take-away containers, which first function as a package, and are then used as a serving tool. In such cases, the food package and the disposable tableware become more essential in the entire food decision making process; from perceptions, to buying, to actual consumption. Future research may be interested in understanding how both package colour and the aesthetics of disposable tableware might influence perceptions and food choice.

Given that the two contextual factors examined in this thesis are both design driven, further research is crucial in gaining a richer understanding of how other elements of design such as food presentation, art decoration, and artistic images used on packaging, might impact the consumer decision making process.

Last but not least, the context of this research can be extended to the online shopping environment, where consumers are increasingly spending their time and money. Online grocery shoppers rely on the images of the product to make their decision, and suitable package colours can help new brands gain leverage. The current
research has presented some evidence to suggest that product images in the online context can influence buying decisions, for both unknown and well-known brands, but more research is needed to establish these effects.

This thesis has taken an important step in exploring the effects of tableware aesthetics and package colour on food consumption, with implications that are valuable for researchers, consumers, and practitioners. Strong empirical evidence across multiple studies and in different settings supports the premise that contextual factors can significantly influence perceptions and decision making, sometimes beyond the awareness of the consumers. By paying more attention to such contextual elements, consumers can take better control of their choice and consumption, allowing them to make food decisions that are in their best interest. For marketers, whether it is about choosing the appropriate tableware to serve diners or finding the right package colour that generates higher sales, implementing relevant changes in the contextual environment can benefit them in the long run.
APPENDIX

Appendix 1: Tableware (Essay 1, Pre-test and Studies 1-4)
Appendix 2: Tableware - (Essay 1, Pre-test)
Appendix 3: Product images - Hedonic food (Essay 2, Studies 1, 2, 3)

Product images – Healthy food (Essay 2, Studies 2 and 3)
Appendix 4: Product images – Hedonic food (Essay 2)

*Copyright materials*
Appendix 5: Product images – Hedonic food with health claim (Essay 2, Study 4)
Appendix 6: Product images – Brand familiarity (Essay 2, Study 5)

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Appendix 7: Field study set up (Essay 2, Study 1)
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