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Consumer Processual State of Confusion

Effects of colour similarity and brand familiarity

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A thesis submitted in fulfilment of the requirements for the degree of
Doctor of Philosophy in Marketing, the University of Auckland, 2018.
Trademark litigations alleging identity infringements by global brands have attracted significant media attention, highlighting the need for empirical investigation into the concept of consumer confusion around brand identity. Given the importance of colour to brand and packaging decisions, and the significant revenue spent by global competitors on branding and brand protection, it is surprising that the impact of colour on consumer confusion is not yet fully understood. Colour is often the most visually salient aspect of a product, and thus packaging colours are an invaluable cue for consumers in their product and brand identification processes—particularly with respect to product choice decisions in the fast-moving consumer goods (FMCG) category.

This research investigated the effect of consumer confusion in the context of FMCG packaging colours. The objectives of this research were to: (1) explore the nature of consumer confusion in the context of brand choice, (2) understand the cognitive and emotional effects of confusion on consumers, (3) assess the effects of varying degrees of discriminability in packaging colour on consumer confusion, and (4) establish the role of brand familiarity in the relationship between colour and consumer confusion. Nine research hypotheses were proposed and tested to achieve these four objectives.

A new definition of confusion is proposed in this research. Confusion is defined as a cognitive state, characterised by a discomforting uncertainty triggered by the perceived mismatch or contradiction between a stimulus and pre-existing schema. This definition overcomes the limitation of extant research that conceptualises consumer confusion only as an outcome, i.e. an incorrect attribution. This research theorises that a consumer processual state of confusion (CP-SoC) arises when multiple brands in the same product category use similar packaging colours, but that the outcomes of CP-SoC are moderated by brand familiarity. Three experimental studies were conducted to investigate the influence of brand
familiarity on the relationship between packaging colour similarity and consumer confusion within the FMCG context.

The first study explored the effect of the three main colour attributes (hue, saturation, and lightness) of secondary colours (purple, orange, and green) on choice response time. Different degrees of discriminability in terms of hue, saturation, and lightness were found across the colours. The second study involved the development of the CP-SoC scale. This scale, measuring perceptions of confusion, correlated well with an accepted behavioural measure of confusion (response time). This demonstrates convergent validity and indicated that the new scale was an appropriate proxy for confusion.

The final study investigated the influence of colour similarity and brand familiarity on confusion (operationalised using the CP-SoC scale) in a 3 (colour: identical, similar, different) × 2 (brand: familiar, unfamiliar) × 2 (product category: milk chocolate, energy drinks) full factorial repeated-measures design. An interaction effect was found for similar (but not identical or different) colours across familiar and unfamiliar brands and the two product categories. In the milk chocolate category, similarly-coloured packages of a familiar brand produced higher levels of confusion than an unfamiliar brand. However, in the energy drink category, there was a reversal of this effect.

These findings indicate that: (1) as expected, similar colours are inherently more confusing than different colours in a brand identification task, and (2) brand familiarity differentially moderates the effect of colour similarity on confusion across product categories. Specifically, the effect of colour similarity on consumer confusion is more pronounced in an FMCG category that is relatively ‘newer’ (energy drinks) than a more established FMCG category that has been in the market for more than a century (milk chocolate). This suggests that the effects of stimulus similarity on consumer confusion are more complex than previously thought and warrant continued in-depth investigation.
Dedication

I dedicate this thesis to my mother, 김미향.
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Chapter 1. Introduction

Imitation, often regarded as a form of flattery, seems to be a natural response to the overly-saturated market (Kapferer, 1995; Mitchell & Papavassiliou, 1999), as brands compete with one another for greater market share. Whether the imitation is intentional or accidental, the consequences are far-reaching—not just for the imitated, but also for the imitator, and even for the innocently-confused consumer—and are not just limited to profits. In an environment such as this, it is to no surprise that companies are safeguarding themselves by protecting their visual branding marks.

This chapter provides an overview of the research. Firstly, the research context is introduced, and a justification of the research is given. Secondly, the overall research purpose and specific research objectives are outlined. This is followed by a brief introduction to the overall research design and potential contributions of the research are proposed. Lastly, the scope of the research is briefly explained. This chapter concludes with a description of the overall structure of the thesis.

1.1. Context and justification

There are currently over 2.8 million live trademark registrations in the US alone (Trademark Electronic Search System, January, 2018). Trademark litigations frequently appear in the media, especially if they involve major global brands (e.g. Cadbury, May 9, 2014; Fioretti, December 16, 2016; Humphries, December 29, 2017; Rubik’s, August 29, 2017). For all kinds of products and services, trademarks are increasingly being used as legal tools for companies to guard their brand’s visual equity—protecting value derived from the visual form of a brand (Lightfoot & Gerstman, 1998). The definition of a trademark covers a broad range of signs, including the distinctive features of a branded product and its packaging (Trade Marks Act 2002). Of these signs, the most visually salient is often colour (Ansorge
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& Heumann, 2003; Bottomley & Doyle, 2006; Bramão, Faísca, Petersson, & Reis, 2010; Fernandez & Rosen, 2000).

While legislation can offer strong legal protection for trademarks, actual enforcement requires significant evidence. In order for a mark to be considered as infringing upon a trademark in court, the establishment of confusion is imperative—this is where the difficulty in attaining the protection lies. The ‘likelihood of confusion’ (see Bartow, 2004) has been presented in various forms of empirical and theoretical evidence in courts of law, but ultimately it depends upon the judge’s subjective evaluation of the evidence—as stated by K. M. Elliot (1990), “a few courageous judges have admitted that when deciding the ‘likelihood of confusion’ in cases brought before them, they used mainly a subjective ‘hunch’” (p. 6). In addition, colour trademarks are still a contentious topic in the legal sector due to the highly subjective nature of colour evaluation and the fact that colour alone has no intrinsic value (Bednall, Gendall, Hoek, & Downes, 2012; Gorman, 2012; Metzgar-Schall, 2015; Piscionere, 2013; Winckel, 2013). This has made obtaining colour trademarks more difficult than verbal or design marks, and if obtained, they are more difficult to protect.

The reason that the likelihood of confusion is not easy to establish, in court and in research, is because consumer confusion can manifest in several different ways (e.g. mistakenly purchasing one brand’s product when the intention was to purchase another, or misattributing an advertisement of one brand to another) and can be caused by many different factors (e.g. similarity in packaging features, similarity in brand image, or individual characteristics that make certain consumers more prone to confusion than other consumers). Importantly, confusion has been found to have real, physical, and sometimes detrimental consequences on the unaware consumer (Cooper, 1992; Leek, Szmigin, & Baker, 2015; Moon, Costello, & Koo, 2017) but has proven to be difficult to conceptualise beyond the legal definition. A generally-accepted definition and conceptualisation in this context has yet to be found.

With the increase in lookalike packaging (Burt & Davis, 1999; Noori & Esmaeili, 2016; Satomura, Wedel, & Pieters, 2014; Wilke & Zaichkowsky, 1999),
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particularly in the fast-moving consumer goods (FMCG) sector, there is an urgent need for investigation into the effects of imitation and copycat branding strategies on consumer confusion (Balabanis & Craven, 1997; Braguinsky, Gabdrakhmanov, & Ohyama, 2007; van Horen & Pieters, 2012b). Accelerated technological advancement has facilitated the ability to execute imitation and copycat brand strategies by providing access to brand and packaging information on a global scale (Hall, 2016). A simple Google search on the Internet can give any ill-intentioned individual detailed images of most brands in most product categories in existence—and what they do with this information is outside the control of the brand owners. Furthermore, significant advancements in printing, graphics, and computing technologies have resulted in the ability to easily develop a brand colour scheme and visual brand image, and then reify these in the form of packages on a mass scale (Labrecque, Patrick, & Milne, 2013). In such an environment, a focus on confusion research is imperative.

In addition, while colour and its effects on consumers has been conscientiously researched over the years (e.g. Babin, Hardesty, & Suter, 2003; Fernandez & Rosen, 2000; Hagtvedt & Brasel, 2017; Sparkman Jr & Austin, 1980), the influence of colour on confusion has received little to no attention in terms of academic marketing research. This is a significant gap in the literature, as it means that empirical research and theory has yet to ‘catch up’ to the proliferation of colour trademarks and the increasing frequency of litigations. Very little theoretical insight, or guidance for practitioners, exists in the form of systematic, scientific investigation of the relationship between colour, confusion, and brands. Hence, research focussed on this area is crucial. Bringing together the existing knowledge from research in marketing and focussing it on this relationship will greatly benefit all stakeholders—in research, and in the market. This research contributes to filling this gap by not only focussing on the effects of colour on consumer confusion, but also exploring the influence of brand familiarity in this relationship.

The main reason that brands seek protection of their visual equity in the form of a trademark is because these marks—on which companies spend significant proportions of their revenue creating and developing—are the primary visual signals to consumers in the shopping process both offline (Baker, Hutchinson,
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Moore, & Nedungadi, 1986; Hoyer & Brown, 1990) and online (Park & Stoel, 2005). Using the mark as a signal, marketing efforts create familiarity of a brand across the market, whether it is through advertising or product placement (Gorn, Chattopadhyay, Yi, & Dahl, 1997; Hirschman, 1986). Over time, these marks and the brand become closely associated and in turn, the mark alone can signal to consumers much more than just the brand (Bettman, 1979; Keller, 1993; Krishnan, 1996). Perceptions of quality and the expectations of product performance are just a couple of examples of what the mark can signal and imply to the consumer. In sum, it can be argued that the mark becomes the brand in the eyes of the consumer. Then, a mark (such as colour) and the consumer’s familiarity with the brand are inextricably linked—both can influence consumer confusion, in ways that are still unknown.

Thus, this research brings together confusion, brand, and colour (see Figure 1) in order to explore the relationships between these areas and to contribute to marketing knowledge as a whole in a research niche that has increasingly important implications.

![Research position diagram](image)

**Figure 1. Research position**

### 1.2. Research objectives and proposed contributions

The overall purpose of this research is to shed light on confusion and explore the effects of colour similarity and brand familiarity on confusion in the consumer context. More specifically, the four main objectives of this research are as follows:
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1. To explore the nature of consumer confusion in the context of brand choice.
2. To understand the cognitive and emotional effects of confusion on consumers.
3. To assess the effects of varying degrees of discriminability in packaging colour on consumer confusion.
4. To establish the role of brand familiarity in the relationship between colour and consumer confusion.

Specific research hypotheses are proposed in section 3.5, Chapter 3.

By providing a systematic empirical account of the effects stated above, insights into the degree of colour similarity that is more (or less) likely to confuse consumers will be gained. These insights will provide guidance to many stakeholders—future researchers in branding, legal practitioners, marketing practitioners, consumer protection agencies, and so forth. In doing so, this research has the potential to be used as supporting evidence for trademark litigations, the potential to guide branding decisions for companies, and the potential to enhance consumers’ knowledge of persuasion to protect their power and well-being.

This research—through the empirical examination of the effects of colour and brand familiarity on consumer confusion—will also make valuable contributions to several areas of research in marketing: branding and brand equity, advertising, packaging, consumer behaviour, product management, and trademark protection, to name a few. Furthermore, the findings of this research have implications, not just in terms of theory, but also in practice: brand management, trademark registration, protection and litigation, and public policies around consumer protection.

1.3. Research design

A philosophical stance of scientific perspectivism (Giere, 2006b) was taken, and a tripartite design was employed to achieve the research objectives. A series of three linked experiments were conducted. In all experiments, standard research protocols were followed, including appropriate sampling techniques, manipulation
checks, assessment of reliability, judgments of validity, and accepted statistical analyses.

The first experiment was a preliminary study that focussed on colour and consumer perception. The HSL (hue, saturation, and lightness) model of colour attributes was used to quantify the variations in colour similarity. Specialised research in colour vision and perception emphasises the importance of giving consideration to all three colour attributes (Camgöz, Yener, & Güvenç, 2002)—something that prior colour studies in research in marketing have often omitted. Through this experiment, the magnitudes at which the experimental manipulations needed to achieve were established. This was necessary in order to ensure the successful observation of an effect in the third and final study. Therefore, this preliminary study was crucial, not only for the operationalisation of the main study of the proposed research, but also for ensuring quality standards of colour research in marketing.

A scale to measure consumer confusion was developed, tested, and refined in the second experiment. Using an adapted combination of existing and newly-developed items, a scale consisting of 12 attitudinal items was developed, categorised by four subscales: perceived confusion, perceived discomfort, decision task difficulty, and decision confidence. Convergent validity of the scale was verified and was used to empirically measure the degree of consumer confusion in the third experiment.

The third experiment (the main study) examined the effect of packaging colour similarity and brand familiarity on consumer confusion. Publicly available online images of existing brands of chocolate and energy drinks were collected. Different levels of brand familiarity were manipulated by contrasting local brands, highly familiar to the participants, with similar global brands which are generally unknown to participants. The colour of the packaged products in the images was altered across varying degrees of hue, saturation, and lightness using computer software. This study specifically focussed on the United States market and data was collected using an online panel of United States residents. Empirical data in the
form of confusion scores (obtained using the consumer confusion scale developed in the second study) was collected and analysed.

A detailed explanation of the full experimental research design is provided in Chapter 5.

1.4. Research scope

An experimental design methodology was employed and thus clear boundaries on what constitutes this research and what does not must be set in advance. Firstly, in conceptualising confusion, a focus on the marketing context and trademarks context was given precedence over others (e.g. cognitive science) to align with the objectives of this research. Although confusion can overlap into the counterfeiting context, this is beyond the scope of this research as the motivations and goals behind counterfeiting are semantically distinct from regular market activities. Hence, specific consideration of counterfeiting is omitted.

Secondly, colour was quantified using the HSL (hue, saturation, and lightness) model (Giere, 2006a; Levkowitz & Herman, 1993; Wong, 2010). This model was chosen over others due to the intuitive alignment of the model with typical colour perception and naming. Hue refers to wavelength and is the classification of colour. It is what is commonly known and referred to as ‘colour’—for example, red, blue, purple. Saturation is the intensity or the vividness of a colour. A pure hue is when a colour is at its most saturated (i.e. contains no white). And lastly, lightness is the relative dark-to-light or white-to-black property of a colour (A. J. Elliot & Maier, 2014; Wong, 2010). This system aligns with the basic terms in everyday language used to describe and explain colours (e.g. a bright red, a faded red, a dark red); thus, it was chosen over other non-intuitive models.

Thirdly, the affective aspect of colour and other qualitative colour effects (e.g. colour and brand personality, colour and emotion) are also beyond the scope of this research and thus omitted. Instead, this research focusses specifically on the effect of colour on confusion and colour discriminability, therefore the more qualitative aspect of colour is not relevant.
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Lastly, in the confusion process, there are several factors that can be examined. Environmental (e.g. Garaus, Wagner, & Kummer, 2015) and situational factors (e.g. Pappas, 2017), and individual characteristics (e.g. Walsh, Hennig-Thurau, & Mitchell, 2007) have been found to influence confusion. This research focusses on stimulus characteristics in the form of packaging colours, thus other factors are beyond its scope. In addition, the consequences of confusion are not directly addressed in this research. This is because in doing so, the scope of the research would become too broad for efficient project management. Instead, using the findings of this research, future research is called for that addresses the consequences of confusion on the consumer.

While this research can provide the foundation for future studies and be theoretically extrapolated across other contexts beyond its specific scope, the generalisability of the findings of this research are limited to similar contexts in which this research was conducted.

1.5. Thesis structure

This chapter has provided a brief overview of the context, justification, objectives, contribution, scope, and design of the research. The following chapters will discuss in detail the theoretical background, conceptualisation, experimentation, and analyses of this research. The final chapter will bring these threads together in a discussion of the wider contributions and implications and suggest future research opportunities that will move the field forward.

Chapter 2 is a literature review that provides the theoretical grounding of this research and sets the position in which this current research is situated. Chapter 3 presents the conceptual development of the confusion concept. Chapter 4 and Chapter 5 explain the research philosophy and methodology employed and present the empirical findings. Chapter 6 presents a detailed theoretical discussion of the findings including contributions, implications, limitations, and the conclusions of this research are presented in this final chapter. Finally, research stimuli, experimental scenarios, questionnaire scripts, and statistical output are presented in Appendices.
Chapter 2. Literature Review

This chapter provides a review of the extant literature surrounding consumer confusion and the fast-moving consumer goods (FMCG) context. The purpose of this chapter is to set the theoretical scene of this research and to provide an overview of the current knowledge in these areas. This literature review was used as a basis to guide the formulation of this research project as a whole.

This chapter begins with a review of the origins of confusion and theoretical explanations of the confusion phenomenon. Following this, the antecedents of confusion (with specific focus on packaging and colour) are discussed and a brief overview of the consequences of confusion is provided. The concept of brands and branding is then discussed, followed by an overview of the FMCG context and the role of the brand within this context. A discussion on trademark protection and marketing ethics then concludes this chapter.

2.1. Consumer confusion

To date, consumer confusion has been studied in numerous ways from various perspectives including law (e.g. Hall, 2016), marketing (e.g. Shiu, 2017), psychology (e.g. Basso, Bouillé, Le Goff, Robert-Demontrond, & Oullier, 2016), and ethics (e.g. Chen & Chang, 2013). This relevance in diverse fields has led to multiple interpretations, definitions, and methodological approaches to consumer confusion. This suggests that the area of study has been fruitful but has lacked a general consensus on the conceptual development aspect of confusion.

On the other hand, in a sense of silent agreement, the disparate conceptualisations of confusion all point to suggesting that consumer confusion in the marketing context is the notion of some kind of uncertainty or misattribution with specific antecedents and consequences. This is perhaps due to the ways that
the term ‘confusion’ is understood in everyday use. Other than this, there are few areas of agreement about the concept of confusion.

One of the most recent and integrative reviews of confusion in the marketing context is by Kasabov (2015), who proposes an integrative framework under the term “confusion marketing.” He suggests that confusion can be defined as “subjective consumer experiences of mental discomfort and behavioural uncertainty engendered by misjudgements, information processing errors and inaccurate beliefs relating to products or services, affecting consumers’ overall evaluation of products and services” (Kasabov, 2015, p. 1779). While this definition ostensibly synthesises most of the various definitions and approaches to confusion, the focus is limited to subjectivity, and omits the direct influence of other external factors that are driving confusion. As will be explained in Chapter 3, a more parsimonious yet inclusive approach is warranted.

2.1.1. Origins of consumer confusion

Consumer confusion has its origins in the legal literature surrounding trademarks (e.g. Brown Jr, 1948). Around the 1940’s, the law began to recognise the symbolism of certain marks in the consumer context. At its inception, trademark legislation functioned on the basis of the ‘likelihood of confusion of source or origin’ (Lunsford Jr, 1951). That is, it was legally recognised that: symbols used by companies signalled to consumers the origin of a product or service; consumers relied on such symbols to make purchases; it was possible for consumers to become confused when another company used the same mark; and a consumer could potentially believe two products with similar symbols were made by the same company (Allen, 1991a, 1991b). This legislation opened up a new opportunity for companies to proactively protect themselves against competitors by trademarking their symbols, leading to a proliferation of trademarks and trademark litigations. Concurrently, academic research on consumer confusion also proliferated.

One of the first academic empirical studies on confusion in the marketing context was by Weitz (1960), who investigated confusion in trade names (also referred to as company names by the author). Weitz (1960) provided two potential
methods of ascertaining the likelihood of confusion between two similar trade names—one method based on recognition, and the other based on identification. However, there was no explicit definition of confusion provided by the authors. Through their operationalisation, it could be assumed that Weitz (1960) considered confusion to be the equivalent of an incorrect recognition or recall, and misidentification. This could be attributed to the fact that legislation provided only basic guidelines about the instances in which the likelihood of confusion can occur, but no clear definition of what ‘likelihood of confusion’ meant.

Upon recognising this significant limitation in the legislation, Miaoulis and D’Amato (1978) appear to be the first to provide an explicit definition of confusion based on psychological theory. They stated, “we take the position here that ‘confusion’ is in effect stimulus generalization” (Miaoulis & D’Amato, 1978, p. 50). Based on psychological learning theories, stimulus generalisation is a behavioural response (Guttman & Kalish, 1956). It refers to situations in which one stimulus (e.g. brand X) becomes associated with a particular behaviour (e.g. purchase) over many learning occasions, but then another stimulus (e.g. brand Z) that is similar to the first stimulus (e.g. brand X) elicits the same learnt behaviour (e.g. purchase). Hence, stimulus generalisation is the generalisation of a certain learnt behaviour across similar stimuli (Guttman & Kalish, 1956; Miaoulis & D’Amato, 1978). Miaoulis and D’Amato (1978) suggested that measuring the rate of stimulus generalisation was evidence of consumer confusion.

### 2.1.2. Cognitive associations and confusion

Cognitive associations are the mental links between pieces of information about a given object or idea (Sigelman & Rider, 2009). These associations are learnt over time through repetition. Associative interference refers to an interference in the elicitation of a certain association, resulting in a different association being made. Associative interference can occur for several reasons, including the similarity of a certain novel stimulus with the original stimulus in the learning process (Humphreys, Tangen, Cornwell, Quinn, & Murray, 2010).
Many years after Miaoulis and D’Amato (1978), in the field of social psychology, Leippe, Greenwald, and Baumgardner (1982) examined confusion in the context of advertising messages about brands. Although the authors did not directly address consumer confusion, they built on the stimulus generalisation argument to propose that a context-confusion effect occurs due to associative interference, based on cognitive theory. The context-confusion effect is “a delayed indirect persuasion effect through interference” (Leippe et al., 1982, p. 645), and refers to situations in which one brand’s advertising messages produce an affective evaluation (e.g. positive or negative) for another similar brand. Leippe et al. (1982) highlighted that this effect was more pronounced when there was low involvement, as opposed to high involvement, as individuals were then more likely to make simple associations between the evaluation and the object due to a lack of elaborate processing (R. E. Petty, Cacioppo, & Schumann, 1983; Zaichkowsky, 1986).

Several studies suggested that cognitive associations are the basis for confusion, with some focussing on stimulus similarity. For instance, Loken, Ross, and Hinkle (1986) found that physical brand similarity led to consumers perceiving a common origin (i.e. made by the same company) between two brands, empirically demonstrating that similarity can cause associative interference between two brands’ origins. In addition, Foxman, Muehling, and Berger (1990) found that consumers made incorrect attributions across products that employed an imitation packaging strategy of a leading brand, derived from stimulus similarity causing an associative interference effect. Kapferer (1995), Rafiq and Collins (1996), Burt and Davis (1999), Rutherford, Perkins, and Spangenberg (2000), and Balabanis and Craven (1997), and more recently, Falkowski, Olszewska, and Ulatowska (2015)—each using different approaches and measures—all found empirical evidence of confusion between lookalike brands (i.e. overall stimulus similarity) using the same trade dress strategies. In terms of the similarity of specific features or details of the stimulus, Howard, Kerin, and Gengler (2000) found that brand name similarity can cause confusion, while Law (2002) and Kent and Allen (1994) found that even two brand claims can be confused with one another.
2.1.3. Schema theory and confusion

Cognitive associations are organised within mental structures known as schemas (Bettman, 1986). A schema is made up of a network of these associations. An individual has a schema specific to a category of information or an idea, and all schemas in an individual’s memory are also interconnected. The associations in a particular schema vary in strength. The stronger the association, the faster and more easily it is elicited. Association strength depends on multiple factors such as repetition (Bettman, 1979; Campbell & Keller, 2003) or emotional relevance (Elliott, 1994; MacInnis & Jaworski, 1989). In other words, repeated associations between two ideas will strengthen the link between the two, so that if a stimulus triggers this association, it is activated more quickly and easily; or if a particular association has a high emotional relevance or importance to an individual, the association is stronger and, therefore, accessed faster.

Schema theory originated from the cognitive, developmental, and educational psychology disciplines and was initially theorised by Jean Piaget (Sigelman & Rider, 2009). The theory is frequently used as a frame in research in marketing (e.g. Aggarwal & McGill, 2007; Baxter, Ilicic, & Kulczynski, 2018; Holbrook & Hirschman, 1982; Sujan, 1985). This is because schema theory provides an explanation for how consumers’ knowledge is stored, augmented, and retrieved in memory, and can explain how potential errors in these processes can lead to various behavioural and attitudinal outcomes.

There are two main processes in which an existing schema can be altered: assimilation and accommodation (Sigelman & Rider, 2009). Assimilation occurs when a new concept becomes integrated into an existing schema. For example, when a brand releases a new product that is similar to its existing products, it will become associated within the existing schema of the brand through exposure to advertising and promotion, and other modes of communication (e.g. word of mouth). This association can then become stronger through repetition of the communication, and through repeated experiences of the new but similar product.
On the other hand, accommodation occurs when an existing schema is substantially modified to interpret the new concept (Bettman, 1979; Sigelman & Rider, 2009). For example, if a new product is released by an existing brand that significantly deviates from its existing product line in some way (e.g. visually or functionally), the existing brand schema must be substantially altered to incorporate this new, very different product. When an entirely new type of product is released, one that cannot be assimilated or accommodated in some way into existing schemas, a new schema for this new product type is created that consists of a new set of associations.

Assimilations and accommodations that occur between two brands and their products can explain the basis of consumer confusion. A consumer can become confused when they mistakenly assimilate or accommodate one brand’s product concept into the schema of another brand (e.g. believing the two products are of the same origin, or the same quality, and so forth). When these unintended and even undesired assimilations and accommodations occur, or a brand’s owner believes there is risk of this occurring, a case for counteraction can be created in the form of litigation.

2.2. Antecedents of consumer confusion

Prior research documents several antecedents of consumer confusion. Three general categories of antecedents exist: (1) stimulus characteristics, (2) individual characteristics, and (3) situational characteristics (Balabanis & Craven, 1997; Foxman, Berger, & Cote, 1992; Foxman et al., 1990). Stimulus similarity, such as packaging or brand similarity (Kocyigit & Ringle, 2011; Kronrod & Lowrey, 2016), or even more broadly, store atmosphere (Kopp & Langenderfer, 2014), fall within this category. Stimulus characteristics can be broadly defined as an environmental feature that is external to the individual. Individual characteristics are idiosyncratic; factors such as levels of involvement (Zaichkowsky, 1986), mood (Gardner, 1985), knowledge and expertise (Alba & Hutchinson, 1987), and cognitive processing style (Foxman et al., 1990) fall within this category. Situational characteristics are those specific to the situation and are usually fleeting, for instance, information

2.2.1. Packaging

The packaging of a product is a stimulus characteristic that can cause consumer confusion. Packaging is a significant aspect of branding (Underwood, 2003). It communicates to consumers both through visual appearance and tactile experience (Holbrook & Hirschman, 1982; Underwood, Klein, & Burke, 2001). The packaging of everyday consumables, however, is often taken for granted and goes unnoticed because of its ubiquity (Hine, 1995); only 3% of products do not require packaging, suggesting that the remaining 97% do (Falkowski et al., 2015).

As such, the impact of a package on a consumer occurs at a subconscious, or even unconscious level (Balabanis & Craven, 1997; Hine, 1995). Packaging is only truly noticed and observed when it does not function as it is expected to (Hine, 1995; Kocyigit & Ringle, 2011). Examples of this are when the product inside is broken due to flimsy packaging, or when the performance of a product falls short of meeting the expectations and assumptions created through the package and its elements. Packaging can also be noticed and fall into awareness when consumers’ expectations fail to align with preconceived assumptions, such as when a mistaken purchase is made due to the uncanny similarity of packages between two competing brands.

Packages are not only functional (e.g. for safety reasons). They are powerful in their influence on consumer behaviour and psychology. Packages have the power to change the way certain products are used (Agariya, Johari, Sharma, Chandraul, & Singh, 2012; Ordabayeva & Chandon, 2013; Pettit & Liu, 2011; Westerman et al., 2012). For instance, smaller sized packages make consumers use less of the product at one time and larger sizes make consumers use more (Wansink, 1996). In addition, packaging can influence emotions through the use of different typefaces that evoke different feelings, and different colours can influence mood (Childers & Jass, 2002; Kauppinen-Räisänen & Luomala, 2010). Brands use this knowledge to assist not only in their efforts to increase sales, but also in building their personalities—a feature of a brand that has been found to increase attraction and
loyalty (Maehle, Chunyan, & Supphellen, 2009; Maehle, Otnes, & Supphellen, 2011; Maehle & Supphellen, 2011; Pappu, Quester, & Cooksey, 2005).

Over time, packaging can become synonymous with a brand, and with the main brand colour, which is typically used on the package (Mishra, 2016; Phillips, McQuarrie, & Griffin, 2014). This effect can be seen in the Coca Cola brand, with its use of the colour red in combination with an iconic glass bottle. With repeated exposures to this packaging-brand-colour combination, consumers commit to memory these brand elements, and associate and attribute them to the brand (Bierley, McSweeney, & Vannieuwkerk, 1985; Holden & Vanhuele, 1999; Stuart, Shimp, & Engle, 1987). This knowledge is then used to quickly search for brands in the marketplace; that is, the package becomes the heuristic that consumers use to shortcut their processes (Bettman & Zins, 1977; Chung & Szymanski, 1997; Hoyer & Brown, 1990; Kent & Allen, 1994).

Due to the mood, feelings, and emotions that colour evokes in people (Adams & Osgood, 1973; A. J. Elliot & Maier, 2007, 2014; Valdez & Mehrabian, 1994), package colour is often used to visually convey to consumers certain brand personality traits and meanings (e.g. outgoing, dynamic, and so on) (Baxter et al., 2018; Labrecque & Milne, 2012; Lieven, Grohmann, Herrmann, Landwehr, & van Tilburg, 2015). In addition, packaging usually carries the brand name and logo, and will often echo the brand colours or bear a distinctive colour associated with the brand (Bottomley & Doyle, 2006; Hoek & Gendall, 2010; Klink, 2003).

In particular, colour as a visual cue is perceived and processed more rapidly than other types of cues (Bramão, Inácio, Faisca, Reis, & Petersson, 2011; A. J. Elliot & Maier, 2014; Giere, 2006a; Palmer, Schloss, & Sammartino, 2013). Marketers are aware of this, and actively use colour to signal their place on the shelf to loyal consumers (P. F. Bone & France, 2001; Creusen & Schoormans, 2005; Grossman & Wisenblit, 1999; Herm & Möller, 2014; Kareklas, Brunel, & Coulter, 2014; Percy, 1974; Satyendra, 2006). Highly successful brands pride themselves on their packaging and colour schemes because their use of that colour results in high levels of awareness developed across various groups of consumers (Creusen & Schoormans, 2005; Kapferer, 1995).
However, the downside to being a well-known and well-recognised brand is that it invites other players in the industry, both old and new, to imitate its successful packaging strategy (d’Astous & Gargouri, 2001; Kasabov, 2015; Morrin & Jacoby, 2000; van Horen & Pieters, 2012a; Wilke & Zaichkowsky, 1999). Additionally, consumers become tied to certain brands through what is called an ‘evoked set’ (Baker et al., 1986). This is directly related to how familiar and loyal a consumer is to a set of brands in a product category. The more familiar a consumer is with a brand, the more likely they are to remember physical attributes of the packaging used for the brand’s products (Herm & Möller, 2014; Pechmann & Ratneshwar, 1991; Szymanowski & Gijsbrechts, 2012). This suggests that more familiar and loyal consumers will be less likely to be confused between the original brand and an imitating brand, both with similar packages. However, a few studies have shown that being familiar with a brand may actually hinder recall of the brand’s attributes, such as packaging features (e.g. Mehta, Hoegg, & Chakravarti, 2011; Stocchi, Wright, & Driesener, 2016).

2.2.2. Colour

Colour is the most visual of cues available to consumers and is instinctively and automatically processed (Giere, 2006a; Palmer et al., 2013), therefore brands that use a specific colour to portray their identity are generally associated with that colour (Bottomley & Doyle, 2006). However, the role of colour in the physical attributes of a brand, beyond the name and mark (i.e. packaging colour), is still not fully understood.

In general, it is recognised that colour has three attributes: (1) hue, (2) saturation, and (3) lightness (A. J. Elliot & Maier, 2014; Levkowitz & Herman, 1993; Whitfield & Wiltshire, 1990; Wong, 2010). Hue is the attribute used to classify or categorise a colour, for example, red, blue, or yellow (Wong, 2010). Research that refers to ‘colour’ is often referring specifically to hue only. Saturation is the vividness or the intensity of a colour (A. J. Elliot & Maier, 2014; Levkowitz & Herman, 1993; Wong, 2010). Lightness (sometimes referred to as brightness or value, although these are not directly interchangeable terms) is the white-to-black property of a colour, or the lightness-darkness of a colour (A. J. Elliot & Maier,
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2014; Wong, 2010). More accurately, ‘colour’ is a subjective perception of an amalgamation of these three attributes and its interaction with the object surface (Bramão et al., 2010; Bramão et al., 2011; Therriault, Yaxley, & Zwaan, 2009). Hence, research in marketing employing colour as a variable must take considerable care and precision when it comes to controlling the effects of colour in experimentation.

It is only recently that a few researchers in marketing have explicitly controlled for and provided the specific values of the three colour attributes used in experimentation processes (e.g. Baxter et al., 2018). The majority of the prior research in marketing on colour has focussed only on hue, often not controlling for and omitting the influence of the other two attributes. As such, the colour literature in marketing is limited in providing guidance for future researchers wishing to employ colour variables in their experiments. There is a need to integrate literature from other areas such as colour application, graphics, print applications, psychology, and biology, to develop a deeper understanding of the role of colour in the brand context. In addition, research in marketing requires empirical investigation of how the other, less-studied colour attributes (i.e. saturation and lightness) influence consumers and their perceptions. However, this is not to say that colour knowledge in marketing as a whole is limited. In fact, a large body of research that has provided some insightful findings, is attributable to this area in marketing.

For instance, studies have shown that colour can influence consumers’ intentions of purchase (Babin et al., 2003; Bellizzi & Hite, 1992; Crowley, 1993), enhance advertisement recall (Fernandez & Rosen, 2000), influence perceived flavour of food items (Garber Jr, Hyatt, & Starr Jr, 2000), influence perceived package size and volume (Hagetvedt & Brasel, 2017), and even influence the way a brand is perceived (Hess & Melnyk, 2016). Evidently, the impact of colour on consumers is vast and significant in terms of perception, evaluation, and affect.

In the general areas of colour graphics, colour application research, and consumer psychology, the findings show that all three attributes of colour have a significant impact on general colour preferences (Camgöz et al., 2002). In the experiments conducted by Camgöz et al. (2002), participants preferred maximum
lightness and saturation levels for any colour. However, as marketing research on colour tends to be contextualised, conclusions may be different from general research on colour preferences due to the presence of other variables (e.g. the type of coloured object or the category of coloured object). In other words, introducing a context such as fast-moving consumer goods (FMCG) into colour research in marketing may provide deeper insight into how people are influenced by colour beyond mere general preference.

2.3. Consequences of confusion

A wide range of consequences resulting from consumer confusion impact—often negatively—not only the brand that has been imitated in some way, but also the consumer (Kasabov, 2015). Brands have long been recognised as having a particular identity or personality. Each brand has a particular symbolic meaning to consumers in society (Underwood, 2003). Moreover, brands of tangible products use the packaging of their product as the main symbolic vehicle of communication with the consumer (Elliott, 1994; Kniazeva & Belk, 2007; Pantin-Sohier, 2009; Underwood, 2003). Often, brands that imitate an existing market-leading brand will steal their identity or personality. These brands that intentionally imitate market-leading brands usually gain a profit or a general benefit by leveraging their competitor’s brand image (van Horen & Pieters, 2012a, 2013). The consequences for the brand that has been imitated or copied include: brand personality dilution (Choy & Kim, 2013), a decreased market value (Sandner & Block, 2011), and reduced brand equity as well as the potential devaluing of whole product categories (Wilke & Zaichkowsky, 1999).

For consumers, the consequences of confusion include decision postponement and inertia (Shiu, 2017), decreased consumer trust and purchase intention (Kasabov, 2015; Pappas, 2017), dissatisfaction with the product and the brand (Moon et al., 2017), decreased consumers’ psychological wellbeing (Garaus & Wagner, 2016), and general unhappiness (Tang, Hsieh, & Chiu, 2017). Some studies have even demonstrated dire consequences of consumer confusion, including ones that potentially pose very real health risks (e.g. Golodner, 1993).
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One study found that confusion occurred for lookalike (that also sound alike phonetically) brand names in pharmaceutical products, such as medication (Filik, Purdy, Gale, & Gerrett, 2006; Joshi et al., 2007) that led to errors in purchasing and ingesting medication. Another study found that shapes and labels of food-imitating products can cause confusion over the functional use of a product (Basso et al., 2016).

There was even a case of confused consumers ingesting dishwashing liquid believing it to be lemon juice because of the similar packaging of the dishwashing liquid brand to a well-known juice brand (Foxman et al., 1990). Although such deleterious effects of confusion on consumers are now explicitly controlled through regulations and consumer protection agencies, this particular example highlights the potential physical harm that confusion can bring to the consumer.

2.4. Brands and branding

The American Marketing Association (AMA) defines *brand* as a “name, term, design, symbol, or any other feature that identifies one seller's good or service as distinct from those of other sellers” (AMA Dictionary, 2017). This definition is from the practitioners’ perspective. Extending this definition to include the consumers’ perspective, under the heading *brand and branding*, the AMA considers a brand to be:

A customer experience represented by a collection of images and ideas; often, it refers to a symbol such as a name, logo, slogan, and design scheme … a brand often includes an explicit logo, fonts, color schemes, symbols, sound which may be developed to represent implicit values, ideas, and even personality (AMA Dictionary, 2017).

Despite regarding these definitions as being generally accepted by the majority of researchers, there is still argument regarding scope and applicability in the interconnected and complex market of today (Brodie & de Chernatony, 2009; Brodie, Whittome, & Brush, 2009; Conejo & Wooliscroft, 2015). For example, Brodie and de Chernatony (2009) argue that conventional theories fail to
incorporate the broad nature of brands as they function in various different contexts. Burmann, Jost-Benz, and Riley (2009) argue for a balanced perspective of brand equity by incorporating both employees’ and customers’ perceptions of the brand, while de Chernatony and Dall'Olmo Riley (1998a) emphasise that the brand concept is multidimensional, consisting of functional and emotional values of both the firm and its customers.

Following on from these criticisms, however, some have argued that a trend of the complete dematerialisation of the brand concept has resulted from the incorporation of semiotics into branding literature (Manning, 2010), yet physical (i.e. tangible) elements of the brand are equally important; they are the physical manifestations that influence consumers in the most direct way. This consideration is a misunderstanding of the modern perspective of the brand concept; a semiotic perspective of the brand refers not only to the metaphysical, it also allows for the tangible elements to be integrated with the intangible ones, working as a total complex system in the market (Brodie, 2009; Brodie & de Chernatony, 2009). As such, the brand should be defined as a “semiotic entity” (Thellefsen, Sørensen, Danesi, & Andersen, 2007, p. 59) that has its own “semiotic marketing system” (Conejo & Wooliscroft, 2015, p. 1) in which all elements—tangible and intangible—are signs that serve as short-hands for consumers in the marketplace (de Chernatony & Dall'Olmo Riley, 1998a).

Addressing this contested definition within the debate of the brand concept, de Chernatony and Dall'Olmo Riley (1998b) proposed the “double vortex model” (p. 1085). This model is dynamic and allows for certain brand elements to be more salient than others, given the context and perspective that is taken. The model recognises that certain aspects of a brand become more important depending on whether a firm-perspective or customer-perspective is taken. It also demonstrates the complexity of the brand in the marketplace. Furthermore, it recognises the wider boundary of brands (cf. the traditional conceptualisation) by including both tangible and intangible elements (de Chernatony & Dall'Olmo Riley, 1998a, 1998b). See Figure 2 for an adapted version of the model.
The core message that these criticisms of the traditional perspective of the brand and its function is that the current brand definition does not resemble the way a brand actually functions in the real world. The influence of a brand is wider-reaching and deeper than traditionally thought. Furthermore, conventional models that attempt to explain the impact of brands only give rise to flat, linear, and unrealistic representations. Instead, what these academics are strongly proposing is that various perspectives must be taken into account when conceptualising the brand concept, and that the influence of brands extends beyond the just firm and the customer-firm relationship (Ponsonby-McCabe & Boyle, 2006).

2.4.1. Brands as complex symbols and sign-systems in society

Consumers’ use of brands in their everyday lives reveals how brands function for consumers (Phillips et al., 2014). Specifically, consumers use brands to construct their self-concept (Schembri, Merrilees, & Kristiansen, 2010) and to engage in brand identification to maximise efficiency in purchase decisions (Kuenzel & Vaux Halliday, 2008). To construct their self-concept, consumers consume brands in three main ways: symbolically (conveying meaning in ways that are conventionally understood), iconically (conveying meaning via resemblance),
and indexically (conveying meaning via factual associations) (Elliott & Wattanasuwan, 1998; Grayson, 1998; Schembri et al., 2010). Qualitative research on brand consumption extends the notion of the brand as a complex sign system that enables consumers to create and understand meaning (Phillips et al., 2014; Ponsonby-McCabe & Boyle, 2006; Schembri et al., 2010).

From a managerial perspective, the purpose of a brand is to demarcate the boundary between one firm’s identity and another’s (de Lencastre & Côrte-Real, 2010). In other words, it is to let consumers know which offerings in the marketplace belong to which firm and where they come from (Pappu et al., 2005; Pappu, Quester, & Cooksey, 2006). Brands are not only important signals that the firm sends to consumers, they also act as identity tools for the employees of a firm (Burmann et al., 2009; de Chernatony & Dall'Olmo Riley, 1998b). Brands are vehicles of meaning and identity (Maggio-Muller & Evans, 2008; Ogilvie & Mizerski, 2011).

Manning (2010) highlights that “recent marketing discourses tend to treat the essence of brand as a set of associations held in the minds of consumers” (p. 36). Prior research has also suggested that the current definition could be augmented by considering the brand as a complex sign system (a semiotic perspective) that represents identity for consumers in the marketplace (Brodie, 2009; Brodie & de Chernatony, 2009). These views are comprehensive in that they enable the consideration of the two most important marketing functions of the brand: the brand as an identifier (Phillips et al., 2014), and the brand as a network of associative representations (Kay, 2006).

In line with this perspective is schema theory, as discussed in section 2.1.3, which is grounded in cognitive psychology (DiMaggio, 1997). Schemas are organised mental categories of knowledge and information that ultimately drive behaviour (DiMaggio, 1997; Meyers-Levy & Tybout, 1989). Like the semiotic sign system (Manning, 2010), schemas are interconnected and associated with one another. In the marketing context, one schema in the mind of a consumer may be a brand that they routinely purchase (Chung & Szymanski, 1997; DiMaggio, 1997; R. E. Petty et al., 1983). This brand will have its own mental network consisting of
various nodes of sign-related information that the consumer draws upon when making purchase decisions.

Traditionally, aspects such as branded product packaging were regarded as purely functional. Conceptualising the brand as a complex sign system enables the recognition of other traditionally non-brand elements, such as packaging colour, in the overall definition of the brand. To illustrate this idea, consider the Coca Cola Company. The physical attributes of this company’s flagship product are a significant part of Coca Cola’s brand sign system, signalling to its consumers the brand and its meaning. This includes, but is not restricted to, the contoured shape of the bottle. Hence, these other non-traditional brand elements also serve a significant role in the brand sign system, influencing consumer experience. From this perspective, a brand can be described as a “semiotic entity” (Thellefsen et al., 2007, p. 59) that has its own “semiotic marketing system” (Conejo & Wooliscroft, 2015, p. 1) in which all elements are signs that serve as short-hands for consumers in the marketplace (de Chernatony & Dall'Olmo Riley, 1998a, 1998b).

2.4.2. Brand identity and equity

A brand’s visual identity is so strongly connected with the brand that consumers are able to detect even subtle changes (Phillips et al., 2014). As Newman (2001) argues, “establishing and sustaining brand identity probably accounts for half of marketing expenditure and it is money well spent for, in many well-known cases, the value of the brand exceeds or equals the other asset values of the company” (p. 410), highlighting the importance of identity to the brand owners as it builds intangible but invaluable equity in consumers’ minds.

Brand equity describes the value placed on brands by consumers (Erdem & Swait, 1998; Pappu et al., 2005). Although elusive in terms of exact dollar figures, brand equity has been found to inform and explain purchase and usage behaviours and overall customer satisfaction (Burmann et al., 2009; Pappu & Quester, 2006), hence it is considered as an important intangible asset for companies (Burmann et al., 2009). As consumers are the ones to ascribe this value to brands, models of
consumer-based brand equity are more appropriate (Pappu et al., 2005)—both commercially and academically—than solely firm-based perspectives.

Models of consumer-based brand equity emerged as a research topic in 1990s (Krishnan, 1996), but it was only towards the 2000s that the concept of visual equity emerged in marketing research (Bottomley & Doyle, 2006; Lightfoot & Gerstman, 1998). Visual equity subdivides the brand equity concept by referring to the value placed on the visual form of the brand by consumers (Bottomley & Doyle, 2006; Lightfoot & Gerstman, 1998). Deconstructing the broader concept of brand equity into different sources or forms of brand equity allows for the recognition of the role of brands as more than just a unique mark used as a company-identifier in the competitive marketplace.

Visual aspects of a brand, such as the key colour or set of colours of a product (whether this is part of its logo, or the packaging) are a significant—and perhaps one of the most salient—parts of what is encoded in the mental network associated with the relevant brand schema. However, much of the research on brands and schema theory in the consumer context has focussed specifically on brand names or brand marks (e.g. Klink, 2003; van Grinsven & Das, 2014), brand advertising (e.g. Zhang, Kardes, & Cronley, 2002), and brand extensions (e.g. Boush et al., 1987). As such, little is known about how packaging colour influences and informs the consumer in their brand identification and purchase processes. By considering the concept of the brand both semiotically and as an element of a cognitive schema, colour as a non-verbal brand element and packaging as part of a brand’s expression can be included.

2.5. Fast-moving consumer goods

The fast-moving consumer goods (FMCG) context highlights the importance of the role of signs (i.e. short-hands) in the routine purchase environment (Bettman & Zins, 1977; Hoyer & Brown, 1990; Wobker, Eberhardt, & Kenning, 2015). The role of signs in communication through packaging is particularly critical in this typically low involvement context. In FMCG purchase processes, consumers tend to rely on peripheral cues and avoid extensive evaluation of the products and its
features (R. E. Petty et al., 1983; Zaichkowsky, 1985, 1986). Hence, cues, signs, and symbols are particularly important in the routine FMCG purchase context due to the nature of information processing involved (Hoyer & Brown, 1990; Petty et al., 1983; van Grinsven & Das, 2014).

2.5.1. Brand recognition and identification

Brands and their physical expressions (i.e. packaging) act as signals to consumers in the marketplace and help consumers reduce the time and effort required during routine purchases (Campbell & Keller, 2003; Hoyer, 1984; Hoyer & Brown, 1990; van Grinsven & Das, 2014). As Hoyer and Brown (1990) found, brand awareness has a significant impact on product identification and choice. In other words, during low involvement routine purchases, consumers actively search for cues that signal a known brand. In this manner, brands and their characterising features (i.e. colour and shape) are critical in purchase choices, feeding into revenues. van Grinsven and Das (2014) emphasise that brands in the fast-moving consumer goods (FMCG) environment need to be recognised easily and quickly: in their words, “creating brand recognition through brand logos is a key element of marketing success” (p. 12).

Brand identification is particularly important in the common, repeat-purchase context (Allison & Uhl, 1964; Herm & Möller, 2014; Kuenzel & Vaux Halliday, 2008). These contexts usually invoke peripheral processing typical of low involvement conditions, thus consumers tend to rely on heuristics (R. E. Petty et al., 1983; Zaichkowsky, 1986). As routine purchases are made with little evaluation and often in time-restricted situations, a consumer will generally scan a shelf with its array of different brands to find the one they are looking for, or one they recognise based on salient visual cues. Colour is a key cue that is used in peripheral processing. There are many examples of this in the marketplace.

For instance, historical brands with distinct, well-known flagship products, such as Coca Cola, rely on accurate brand identification from their customers. The physical attributes of this brand’s flagship product are a significant part of the overall Coca Cola brand. These physical attributes include, but are not restricted to,
the contoured shape of the bottle, the colour of the brand label, and the unique shape of the brand logo. Hence, these physical brand elements play a significant role in Coca Cola’s brand identification process, thus influencing overall consumer experience.

Furthermore, unique local or domestic brands and their ability to be identified in an international context determines the extent to which exporting is successful for a company. Globalisation has resulted in the blurring of the boundaries of industries, of cultures, and of identities (Kuenzel & Vaux Halliday, 2008; Salciuviene, Ghauri, Salomea Streder, & De Mattos, 2010; Thakor, 1996). In this environment, the brand identity, equity, and protection of these valuable assets becomes ever more important in order to maintain competitive positioning.

2.5.2. Brand familiarity and loyalty

Brand familiarity describes the level of information that a consumer has with a particular brand (Campbell & Keller, 2003; Grobert, Cuny, & Fornerino, 2016; Park & Stoel, 2005). It can be driven through both personally learned information (i.e. through direct experience) and vicariously learned information (i.e. through advertising or word of mouth). Prior research has found that brand familiarity interacts with several variables of interest to marketers, often moderating the effect of one variable on another, for instance, the relationship between price and preference (Monroe, 1976), brand extensions and perceptions of fit (Milberg & Sinn, 2008), interference and advertising (Kent & Allen, 1994), and confidence in brand evaluations and purchase intention (Laroche, Kim, & Zhou, 1996).

From the perspective of the rational, careful, and constantly-aware consumer, brand familiarity could potentially decrease the likelihood of consumer confusion (Choy & Kim, 2013; d’Astous & Gargouri, 2001; Herm & Möller, 2014). This is because familiarity with a brand would suggest the presence of stronger associations of salient visual features in consumers’ brand schemas, allowing them to commit to memory and recall these with ease and accuracy. On the other hand, as routine purchases and fast-moving consumer goods are often purchased under low involvement conditions and peripheral processing, it is also likely that brand
familiarity would cause or induce consumer confusion (DeRosia, Lee, & Christensen, 2011; Holden & Vanhuele, 1999; Mehta et al., 2011; Stocchi et al., 2016). This would be due to the shortcircuiting of the overall identification process. For example, a consumer may see a red package and instantly believe it to be a product by Brand X, when in fact it is a product made by Brand Y, which is also in a red package. The result could be that the consumer ends up purchasing Brand Y, instead of Brand X. Evidently, existing knowledge of the influence of brand familiarity on consumer confusion suggests conflicting and opposing effects.

The term brand loyalty is often used to refer to consumers’ repeat purchase behaviours; however, these are distinct concepts (Jacoby & Kyner, 1973). Brand loyalty is said to be the result of repeated and positively-valenced brand consumption experiences (Ponsonby-McCabe & Boyle, 2006). As such, while repeat purchase can be one behavioural manifestation of brand loyalty, it may not necessarily be correct to assume all repeat purchase behaviours are due to brand loyalty. Research has found that in order for consumers to become loyal to a particular brand, appeals beyond promotion and other marketing tactics are required (Matzler, Pichler, Füller, & Mooradian, 2011; Newman, 2001). Instead, the whole consumption experience needs to facilitate the development of positive attitudes, evaluations, and emotions towards a brand in order to foster loyalty from consumers (Elliott & Wattanasuwan, 1998; Ponsonby-McCabe & Boyle, 2006; Schembri et al., 2010; Schmitt, 2012; Underwood, 2003). Understandably, once brands have established strong visual identities and consumers become familiar, and even loyal to the brand, the threat of imitation and consumer confusion is very real.

2.6. Trademark protection and marketing ethics

Branding, brand marketing, and trademarks tend to go hand-in-hand. In fact, in the beginning of the twentieth century, brand marketing was called trademark advertising (Desai, 2012; R. D. Petty, 2011). With such a long history, it appears that companies have been safeguarding their marks from imitation strategies throughout the decades. Imitation and copycat strategies have been frequently employed by competitors and new entrants across virtually all industries but are
particularly prevalent in the fast-moving consumer goods (FMCG) sector (Burt & Davis, 1999; Friedman, 1966; Garaus et al., 2015; Kocyigit & Ringle, 2011; Rafiq & Collins, 1996). Advancements in packaging technology have facilitated the exponential increase in the use of such strategies by various players across almost all industries (R. G. Bone, 2012; Choy & Kim, 2013; Falkowski et al., 2015).

2.6.1. Non-traditional trademarks

The most common way in which product category leaders are copied is through imitating the colour and shape of the industry leader’s packaging attributes as these are the easiest to copy and are the most salient (d’Astous & Gargouri, 2001; Foxman et al., 1992). Ironically, colour marks are one of the most difficult types of trademarks to obtain, along with scent marks, textures, and sounds (Elias, 1992; Winckel, 2013). As Hasan (2016) argues, “no nontraditional trademark has acted as powerfully as an advertising tool, incited as much contention, and inspired as much debate as the color mark” (p. 294).

A classic example of this contention over colour trademarks is the famous and revered Louboutin shoe, its mark being the signature red sole. In 2008, the Louboutin brand obtained successful registration of the red sole trademark in the United States (Gorman, 2012). Over the years, there was litigation against another global fashion brand, Yves Saint Laurent (YSL), where one decision was made in favour of YSL, but then overturned in favour of Louboutin (Vidackovic, 2012-2013). This final decision is now in question again, as a recent decision by the European Union states that colour and shape should not be trademarked (Paton, February 6, 2018).

The justification for this decision was that the colour red and the shoe sole are not separate entities, and therefore, trademarking the colour would also translate to trademarking the shoe sole. As all shoes have soles, the sole (and its shape) cannot be trademarked as it is not a unique feature to Louboutin. This may, perhaps, be the case for any other shoe, but in the case of the famous red-bottom Louboutin, the colour of the sole and the sole itself should be considered as separate entities, as consumers see the red sole as a source-identifying mark, and this has historically
Literature Review

been completely unique to the Louboutin brand (Metzgar-Schall, 2015; Paton, February 6, 2018).

2.6.2. Imitation

One of the reasons behind the use of imitation strategies is that each product category has a set of visual signals (i.e. norms) that any product must use in order for it to be ‘part’ of that category (Foxman et al., 1992; Labrecque & Milne, 2013). For example, yoghurt is expected to be in a white plastic tub, otherwise consumers may not instantly recognise that it is yoghurt. Due to these pre-existing sets of signals that are particular to a product category, new entrants must follow the existing rules to be competitive (Burt & Davis, 1999). The other, more questionable reason is to mimic a category leader to leverage the leader’s brand image built over years and significant expenditure. A major leading brand is always in a vulnerable position to be imitated, because their success provides other players with a ready-to-go marketing mix proven to be successful in the marketplace (d’Astous & Gargouri, 2001; Howard & Kerin, 2011, 2014; Howard et al., 2000).

Given the degree to which imitation and counterfeiting are prevalent globally, consumer confusion needs to be prioritised as a key area of academic research. There has yet to be systematic investigation into the degree of specific similarity elements in brand packaging for consumers to become confused and the degree of similarity necessary for confusion to occur. Therefore, the extent to which a packaging must be dissimilar for it to be considered as not confusing is still unknown. Trademark legislation in New Zealand and elsewhere—designed to protect brands whose trademarks are being infringed—sometimes fails to do so, working instead, in favour of the accused infringers or imitators (The Coca-Cola Company v. Frucor Softdrinks Limited & Pepsico Inc., 2013).

The inadequacy of the current conceptualisation of consumer confusion can be seen in the fact that these cases have been ruled in favour of imitators, disadvantaging legitimate competitors. Existing research still does not provide clear guidelines to insightfully inform legal proceedings. This is attributable to a lack of empirical and theoretical guidance regarding consumer confusion caused by
packaging similarity. In some cases, similarity in packaging is the direct result of a brand’s *intentional* use of imitation strategies and copycat branding to emulate the leading brand in a particular product category (Kapferer, 1995).

2.6.3. Ethics and morality

From an ethical and moral standpoint, research focussing on the nature of consumer confusion is imperative and the findings of such research must continue to inform courts of law across the world that deal with matters of trademarks. In addition, while it is acknowledged that the consequences of confusion are severe for brands and companies, the focus should always be on the consumer. The choice-saturated market environment is inherently conducive to consumer confusion, so much so that even the most rational of consumers are still prone to being deceived or mistaken (Tang et al., 2017). The onus should be on the brand and government to protect the consumer in ways they simply cannot; consumers often cannot change the environment in which they are in.

Some have argued for a reconsideration of marketing practices engendering consumer confusion, suggesting that in some ways they can benefit consumers and thus are not necessarily unethical (Kasabov, 2015; Prendergast, Hing Chuen, & Phau, 2002). Currently, it is difficult to determine the true extent to which consumers are affected by confusion—both positively and negatively—pointing to the need for further investigation into confusion from a consumer perspective and in terms of the consequences.

The primary purpose and function of visual brand identities and trademarks is to reliably signal a product’s lineage—where it comes from, who it is made by, and so on (Alexander, 2009; Choy & Kim, 2013; DeRosia et al., 2011; Howard et al., 2000; Matos, 2010; McKenna, 2009). Consumers depend on the accuracy of these visual cues to make their purchase decisions. Both practitioners and researchers of the marketing field have a social responsibility to uphold ethical practice and maintain morality on behalf of the innocent consumer.
2.7. Summary

This chapter has reviewed the literature on consumer confusion and its antecedents and consequences, brands and branding, the fast-moving consumer goods (FMCG) context, and trademark protection and ethics. When considered as a whole, this literature demonstrates the importance of package colour in consumer perception, evaluation, and decision processes. This review also highlights the current omissions in the literature and the ways in which an improved understanding of package colour can assist marketing researchers, brand managers, the legal profession, and regulators. Subsequent chapters will frame this research in a way that can contribute to a greater understanding of how similarity of packaging colours contributes to consumer confusion.
Chapter 3. Conceptual Development and Hypotheses

This chapter focusses on the central concept of this research: confusion. Through the evaluation of extant confusion research and the etymology of the term “confusion,” a new conceptualisation that overcomes the limitations of existing definitions is proposed. Confusion is conceptualised as both a process and a state (consumer processual state of confusion—CP-SoC). The following sections discuss in detail the development of this concept and conclude with proposed hypotheses that this research investigated.

3.1. Confusion research

Confusion, as connoted by the term, has oft been misconstrued. Research in marketing has tended to conflate the term with misidentification, misattribution, misunderstanding, or misinterpretation of a feature of a brand or product, or a message conveyed through advertising efforts. Though extant research studies have referred to ‘confusion,’ their conceptualisation and operationalisation of the term are outcome-based. That is, they theorise ‘confusion’ but then measure misidentification, misattribution, misunderstanding, or misinterpretation. Many have made the conclusion that confusion has occurred due to an incorrect identification, an inaccurate perception, or an improper understanding of the relationship between two objects or ideas. However, the presence of these outcomes does not unequivocally indicate confusion. There can be confusion without the presence of one or more of these outcomes. Table 1 provides a summary of the literature addressing confusion.
<table>
<thead>
<tr>
<th>Author (Year)</th>
<th>Context</th>
<th>Focus of definition of confusion</th>
<th>Empirical research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leeds (1955)</td>
<td>Trademark infringement</td>
<td>Mental associations</td>
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<td>Weitz (1960)</td>
<td>Trade names</td>
<td>Outcomes (recognition and identification)</td>
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<td>Friedman (1966)</td>
<td>Pricing and packaging</td>
<td>Behavioural outcomes</td>
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<td>Miaoulis and D’Amato (1978)</td>
<td>Trademark infringement</td>
<td>Stimulus generalisation</td>
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<td>Leippe et al. (1982)</td>
<td>Persuasion</td>
<td>Associative interference</td>
<td>Yes</td>
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<tr>
<td>Loken et al. (1986)</td>
<td>Business origin</td>
<td>Misattribution</td>
<td>Yes</td>
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<td>Poiesz and Verhallen (1989)</td>
<td>Advertising</td>
<td>Misattribution</td>
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<td>Foxman et al. (1990)</td>
<td>Package similarity</td>
<td>Misattribution</td>
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<td>Foxman et al. (1992)</td>
<td>Conceptualisation</td>
<td>Inferential processing error</td>
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<td>Kapferer (1995)</td>
<td>Lookalike brands</td>
<td>Behavioural outcomes</td>
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<td>Rafiq and Collins (1996)</td>
<td>Lookalike brands</td>
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<td>Balabanis and Craven (1997)</td>
<td>Lookalike brands</td>
<td>Behavioural outcomes</td>
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<tr>
<td>Mitchell and Papavassiliou (1997)</td>
<td>Watch market</td>
<td>None</td>
<td>Yes</td>
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<td>Huffman and Kahn (1998)</td>
<td>Retail strategies</td>
<td>None</td>
<td>Yes</td>
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<td>Shani and Sandler (1998)</td>
<td>Ambush marketing</td>
<td>Misidentification and mistaken recall</td>
<td>Yes</td>
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<td>Mitchell and Papavassiliou (1999)</td>
<td>Marketing and policy</td>
<td>Various</td>
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<td>Chryssochoidis (2000)</td>
<td>Organic food products</td>
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<td>Howard et al. (2000)</td>
<td>Brand source</td>
<td>Behavioural</td>
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<tr>
<td>Turnbull, Leek, and Ying (2000)</td>
<td>Mobile phone market</td>
<td>Information load</td>
<td>Yes</td>
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<td>Law (2002)</td>
<td>Brand claim repetition</td>
<td>Misattribution</td>
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<td>Mitchell and Kearney (2002)</td>
<td>Legal measures</td>
<td>Various</td>
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<td>Mitchell, Walsh, and Yami (2005)</td>
<td>Conceptualisation</td>
<td>Similarity, overload, ambiguity</td>
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<td>Zhou (2005)</td>
<td>Brand origin</td>
<td>Misidentification</td>
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<tr>
<td>Leek and Chansawatkit (2006)</td>
<td>Thai mobile phone market</td>
<td>Various</td>
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<tr>
<td>Schweizer, Kotouc, and Wagner (2006)</td>
<td>Scale development</td>
<td>Stimuli factors</td>
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Table 1 continued.

<table>
<thead>
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<th>Author (Year)</th>
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<th>Empirical research</th>
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<td>Walsh et al. (2007)</td>
<td>Scale development</td>
<td>Individual factors (proneness)</td>
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<td>Kruger and Vargas (2008)</td>
<td>Percentages</td>
<td>Inferential error</td>
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<td>Kasper, Bloemer, and Driessen (2010)</td>
<td>Coping strategies</td>
<td>Overload and over-choice</td>
<td>Yes</td>
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<td>Shukla, Banerjee, and Adidam (2010)</td>
<td>Financial services</td>
<td>Mental state</td>
<td>Yes</td>
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<tr>
<td>Walsh and Mitchell (2010)</td>
<td>Consequences</td>
<td>Individual factors (proneness)</td>
<td>Yes</td>
</tr>
<tr>
<td>DeRosia et al. (2011)</td>
<td>Antecedents</td>
<td>Misattribution</td>
<td>Yes</td>
</tr>
<tr>
<td>Harbaugh, Maxwell, and Roussillon (2011)</td>
<td>Product labels</td>
<td>Uncertainty</td>
<td>No</td>
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<tr>
<td>Kalaycı and Potters (2011)</td>
<td>Market prices</td>
<td>Inferential error</td>
<td>Yes</td>
</tr>
<tr>
<td>Carrete, Castaño, Felix, Centeno, and González (2012)</td>
<td>Satisfaction and equity</td>
<td>Various</td>
<td>Yes</td>
</tr>
<tr>
<td>Chen and Chang (2013)</td>
<td>Green consumer behaviour</td>
<td>None</td>
<td>Yes</td>
</tr>
<tr>
<td>Balkowski et al. (2015)</td>
<td>Lookalikes and counterfeits</td>
<td>Recognition</td>
<td>Yes</td>
</tr>
<tr>
<td>Garaus and Wagner (2013)</td>
<td>Retail shopping</td>
<td>Affective response</td>
<td>Yes</td>
</tr>
<tr>
<td>Q. Wang and Shukla (2013)</td>
<td>Choice goals</td>
<td>Similarity, overload, ambiguity</td>
<td>Yes</td>
</tr>
<tr>
<td>Tjiptono, Arli, and Bucic (2014)</td>
<td>Smartphones</td>
<td>Individual factors (proneness)</td>
<td>Yes</td>
</tr>
<tr>
<td>Garaus and Wagner (2016)</td>
<td>Retail shopping</td>
<td>Cognition, emotion, conation</td>
<td>Yes</td>
</tr>
<tr>
<td>Kasabov (2015)</td>
<td>Review</td>
<td>Subjective experiences</td>
<td>No</td>
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<tr>
<td>Lu and Gursoy (2015)</td>
<td>Online tourism</td>
<td>Overload, similarity, ambiguity</td>
<td>No</td>
</tr>
<tr>
<td>Spiteri Cornish and Moraes (2015)</td>
<td>Nutrition knowledge</td>
<td>Overload and ambiguity</td>
<td>Yes</td>
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<tr>
<td>Garaus and Wagner (2016)</td>
<td>Retail shopping</td>
<td>Cognition, emotion, conation</td>
<td>Yes</td>
</tr>
<tr>
<td>Lu, Gursoy, and Lu (2016)</td>
<td>Online tourism</td>
<td>Misinterpretation, overload, similarity, ambiguity</td>
<td>Yes</td>
</tr>
</tbody>
</table>
In general, existing research has concentrated on the outcomes of confusion because they are easily measurable and observable, and the consequences of these outcomes are able to be easily translated into percentages of revenue or proportions of sales. In contrast, this research concentrates on the mental state of confusion itself—the sense of uncertainty and mental discomfort that precede and impede processes of identification, attribution, comprehension and interpretation. As will be discussed in further detail in the following sections, a quadripartite formative approach to the state of consumer confusion is taken. Consequently, by considering consumer confusion as both a mental state (as this research proposes) and an outcome (as extant research has proposed), we can gain a clearer insight into the concept and further investigate the ways in which certain factors trigger, exacerbate, or prevent consumer confusion, and develop a deeper knowledge of when certain outcomes of consumer confusion occur (and why).

There is a paradox inherent in the process of confusion. It is possible to have complete misidentification, misattribution, misunderstanding, or misinterpretation without the presence of confusion, in other words, when an individual is certain about the wrong answer, decision, or choice. Or, it is possible for one to experience confusion without misidentifying, misattributing, misunderstanding, or misinterpreting something. In other words, a high level of confusion can be experienced with proper identification, i.e. when an individual is very uncertain about the right answer, decision, or choice.

In the first instance (an individual being certain about the wrong answer), it can be said that the individual is confused but the individual themselves will not feel that way. In the second instance (an individual being uncertain about the right answer), the individual will make the correct decision or choice, thus, behaviourally, they will appear not to be confused; however, the individual will feel confused due to their uncertainty surrounding the decision or choice. This paradox is perhaps one of the reasons why prior research on confusion in the marketing context seems to describe one thing but examine another.
3.2. Etymology of the term “confusion”

In situations where a concept in research has been elusive in its proper conceptualisation, an appropriate approach is to investigate the term’s etymology. According to the Oxford English Dictionary (OED), c. 1290 was the earliest record of the use of the term ‘confusion’ (confusion, n., 2017). It was one of the earliest 5% of entries recorded in the OED. Currently in the English language, the term occurs between 10 and 100 times per million words, along with basic colour adjectives (e.g. red, blue, yellow, green, orange, purple, brown, grey, and pink) (Key to frequency, 2017). Its roots are related to the term ‘confound’ (confound, v., 2017), and is currently used as a noun of action and condition for both the verb ‘confound’ and the verb ‘confuse’ (confuse, v., 2017).

Originally, ‘confusion’ meant overthrowing, ruin, or destruction; it then evolved to mean mental uneasiness, embarrassment, perplexity, or a flattered condition (confusion, n., 2017). From this definition, the term was then used to describe the action of confounding or throwing into disorder. Since the early 17th century, the term has finally settled upon the description of mistaking one for another, or a failure to distinguish between things, usually used in the forms: (1) ‘confusion’ + of + a thing + with + another thing, or (2) ‘confusion’ + between + things (confusion, n., 2017). The verb form ‘confuse’ means to “mix up or mingle so that it becomes impossible or difficult to distinguish the elements,” or “to mix up in the mind, to fail to distinguish, erroneously regard as identical, mistake one for another” (confuse, v., 2017). The full term ‘confusion’ can be broken down into ‘con’ and ‘fusion’, where in Latin, ‘con’ means ‘with’, ‘together’, or ‘jointly’ and ‘fusion’ means “the union or blending together of different things (whether material or immaterial) as if by melting, so as to form one whole; the result or state of being so blended” (fusion, n., 2017). In sum, these definitions all suggest two or more things becoming intermingled, blended, or indistinguishable.

Furthermore, the root ‘confound’ means “to throw into confusion of mind or feelings; so to surprise and confuse (a person) that he loses for a moment his presence of mind, and discernment what to do” (confound, v., 2017). According to the OED, colloquial expressions of the verb ‘confound’ are ‘dumbfound’ or
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‘flabbergast’, which expresses the feeling of bewilderment associated with the term. It also means, almost identically to ‘confusion’: (1) to mix up or mingle so elements become difficult to distinguish or impossible to separate, or (2) to mix up in an idea, erroneously regard or treat as identical, or fail to distinguish (confound, v., 2017).

Considering all the definitions above, four related but unique facets of the meaning of the term ‘confusion’ can be delineated:

1. ‘Confusion’ as a state of mind
2. ‘Confusion’ as a state of affect
3. ‘Confusion’ as a process
4. ‘Confusion’ as a mental outcome

Table 2 summarises the definitions and the four facets are each highlighted.
Table 2. Relevant OED definitions

| “confusion,” n | i. Mental discomfiture [a feeling of unease, awkwardness] |
|               | ii. Mental perturbation or agitation such as prevents the full command of the faculties; embarrassment, perplexity, fluttered condition |
|               | iii. A confused or disordered condition; disorder |
|               | iv. The confounding or mistaking of one for another; failure to distinguish |

| “confuse,” v. | i. To mix up or mingle so that it becomes impossible or difficult to distinguish the elements |
|              | ii. To mix up in the mind, to fail to distinguish, erroneously regard as identical, mistake one for another |

| “confound,” v. | i. To throw into confusion of mind or feelings; so to surprise and confuse (a person) that he loses for the moment his presence of mind, and discernment what to do |
|               | ii. To mix up or mingle so that the elements become difficult to distinguish or impossible to separate |
|               | iii. To mix up in idea, erroneously regard to treat as identical, fail to distinguish |

| Key | State of mind |
|     | State of affect |
|     | Process |
|     | Mental outcome |

(From Oxford English Dictionary, 2017)

3.3. Conceptualisation: Consumer Processual State of Confusion (CP-SoC)

This background of the definitions of the terms suggests that perhaps prior studies on confusion have not been studying the concept in the fullest sense. They have been focussing on confusion only as a mental outcome or the manifestation of confusion—as a state of mind, affect, and process—in terms of behaviours or beliefs. It can be argued that other behaviour- or belief-based terms are more appropriate in describing prior studies on confusion (e.g. misidentification, misattribution, misunderstanding, misinterpretation, and so on) so as not to conflate
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these terms any further. As such, the fourth facet of confusion, (a mental outcome) should be replaced with terms that more accurately describe the outcome, rather than the term “confusion.”

In order to overcome the limitations of prior research and move the field forward, this research takes a more comprehensive stance, conceptualising ‘confusion’ as both a state and a process, namely:

Confusion is a cognitive state characterised by feelings of discomfort and uncertainty (state of affect) triggered by a mismatch or contradiction between something in the external environment and the existing knowledge in the individual, that involves a mental process by which the two things (something in the external environment and existing knowledge) are considered simultaneously.

The precondition of confusion occurs when an environmental input (i.e. a set of stimuli, such as an array of packages on a supermarket shelf) activates an existing cognitive schema. The process by which confusion occurs requires both the stimulus and the schema to be held and considered simultaneously in the mind. During this process, a confused state of mind occurs if a mismatch or contradiction between the schema and the stimulus is detected. The state of confusion is resolved upon a decision or choice being made to categorise the stimulus in a particular way.

Following this conceptualisation then, confusion experienced by the consumer in a marketing context can be more accurately described as a “Consumer Processual State of Confusion” (CP-SoC).

3.3.1. Relationship between CP-SoC and the outcomes

A formative latent construct cannot be directly observed or measured (Borsboom, Mellenbergh, & van Heerden, 2003). The unobservable construct can only be inferred through its relationship with observable and measurable formative variables (Borsboom et al., 2003). As a cognitive state, CP-SoC is thus a formative latent construct and therefore can only be inferred through the summation of
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theoretically-derived and measurable manifest indicators that cause the construct, and through the physical stimuli that trigger it.

As discussed in the previous sections, CP-SoC is related to, but very different from, observable and measurable reflective outcome variables such as misidentification, misattribution, misunderstanding, and misinterpretation. Prior studies have tended to conflate the state of confusion with both the formation of incorrect beliefs or attributions and the behaviours that can result. Such attitudes (e.g. mistaken identity resulting from an incorrect choice or belief, or the consumer having been deceived into making an incorrect choice or holding an incorrect belief) may result, ultimately, in the incorrect purchase of some product, or the incorrect attribution of origin or source. Breaking these sequential effects into their components is essential for clear conceptualisation and correct modelling.

Figure 3 demonstrates the relationships between the sequential components of the process of consumer confusion from onset to resolution. The solid shapes and arrows denote the current understanding of the individual components and the relationships between them. This aspect of the model resembles prior models that have understated the prevalence of consumer confusion because they assume every correct purchase, choice, or decision implies a lack of, or absence of, confusion. The dotted shapes and arrows denote the addition of the indicator variables of CP-SoC, and the addition of the omitted outcome of a correct purchase being made.
This model explicitly addresses the previously omitted possibility of the presence of consumer confusion in the absence of an incorrect purchase, choice, or decision. As such, the conceptual model proposed here takes a broader approach and allows for the situation in which consumers may make a correct choice despite being confused. In this new model, CP-SoC, being a formative latent construct, cannot be directly measured, but instead, is inferred through the summation of these four proposed indicators:

1. Perceived confusion (i.e. confusion that triggers awareness; a state of mind),
2. Perceived discomfort (i.e. a state of affect),
3. Degree of perceived difficulty in making the relevant decision or choice,
4. Degree of confidence (or lack thereof) in their relevant decision or choice.

It is important to note that all four elements do not need to be ‘present’ for CP-SoC to occur; only that the combined effect results in an inference of the degree of CP-SoC experienced. The important addition to the general model is the instance of a correct purchase. Two dashed arrows indicate two different pathways from CP-
SoC being triggered that can lead to the correct decision or choice being made. Of course, the correct decision or choice can be made without the instance of CP-SoC (i.e. the consumer is not confused and therefore makes the correct, intended purchase)—however, this pathway is not within the scope of this research and is therefore omitted from further exploration in this model.

The first pathway that can result in the correct purchase, decision, or choice leads directly from the measurable indicators of CP-SoC (perceived confusion, perceived discomfort, perceived difficulty, and decision confidence). That is, a consumer may experience CP-SoC (measured by the four elements combined) but still make the correct purchase decision, having resolved the CP-SoC internally. The second pathway requires the consumer to have internally resolved CP-SoC in a manner that is considered to be incorrect (e.g. “I believe this brand Y is the same as brand X,” or “Brand Y must be made by the same company as brand X”) but still go on to purchase their intended (and therefore ‘correct’) brand. It is important to note here that these aspects of CP-SoC have not been measured in prior studies that focus on ‘confusion’ because the resultant behaviour does not demonstrate the presence of CP-SoC. Conceptualising CP-SoC in the way this research does allows for the theorisation that CP-SoC can occur even without an observable and reflective behavioural manifestation.

3.3.2. CP-SoC in the routine, low involvement purchase process

It is acknowledged that confusion can occur in any context of an individual’s life. However, for the purpose of this research, the fast-moving consumer goods (FMCG) context was chosen. This choice was made because confusion occurs frequently in these types of purchases. It is also the context where the goals and objects involved are aligned in a way that exacerbates confusion.

FMCG’s are categorised as routine, low involvement purchases. Over time, they have become saturated with extremely similar-looking packages (e.g. Friedman, 1966; Loken et al., 1986; Rutherford et al., 2000) leading to the creation of an environment that is prone to CP-SoC (e.g. any supermarket shelf). A consumer’s routine purchase process typically begins with an intention to buy a
Conceptual Development and Hypotheses

particular item (e.g. a product and a relevant brand, such as a Cadbury chocolate bar) that leads to the consumer exposing themselves to an array of different brands of the same type of product in a store. At this point in the process, potential influences are based on the stimuli (i.e. physical attributes of the array of brands), the individual (i.e. personal factors that influence cognition and choice), and the situation (i.e. promotional tactics, time constraints) (Bruner & Postman, 1949).

Stimulus characteristics are those that are inherent in the packaged product of interest. These include packaging features, such as the colour and shape of the package and the weight of the overall packaged product; shelf display characteristics, such as the placement of the product on the shelf and distribution locations; and marketing features, such as the way in which the packaged product is advertised and promoted. Stimulus characteristics influence bottom-up processing in cognition. Bottom-up cognitive processing describes the type of cognition that results from sensory perception. Individual consumer characteristics are idiosyncratic factors that influence the perception of the stimulus. These include cognitive style (individual differences in information processing) and the consumer’s schema (mental networks consisting of prior knowledge from prior experiences). Consumer characteristics influence top-down processing in cognition. Top-down processing describes the type of cognition that results from the contextualisation of sensory perception according to the individual’s world knowledge. Both stimulus and consumer characteristics influence how consumers attribute a particular packaged product to a brand (Bruner & Postman, 1949). Any given influence or combination thereof can lead to CP-SoC, thus resulting in a decision or choice on the part of the consumer.

The observable behaviour in this conceptual model is the purchase decision and its categorisation as ‘correct’ or ‘incorrect.’ This outcome results from the consumer associating or attributing a particular packaged product to a particular brand, based on the stimulus characteristics (a bottom-up process) and individual consumer characteristics (a top-down process). Correct purchase of a packaged product is considered as successful brand identification, i.e. the consumer is able to identify the brand that the product belongs to. On the other hand, an incorrect purchase is considered to be brand misidentification.
Further outcomes that result from the correct/incorrect purchase decision could be consumer satisfaction or dissatisfaction, positive or negative brand evaluation, positive or negative word of mouth, and many more. Brand evaluation is the outcome of both correct and incorrect brand attributions. A positive evaluation of the brand is considered as brand liking. A negative evaluation of the brand is brand disliking and is likely to lead to brand avoidance. Positive and negative brand evaluations ultimately influence consumers’ purchase intent. Positive brand evaluations are likely to result in purchase intent, whereas negative brand evaluations are not likely to result in purchase intent. However, these outcomes are beyond the scope of this research and are purposely omitted.

Figure 4 represents the typical FMCG purchase process for the consumer. The solid arrows represent the general and current conceptualisation, and the dashed arrows represent the proposition made in this research. As shown in Figure 4, CP-SoC moderates the process temporally between exposure and the decision or choice. One factor that empirical research on confusion tends to omit is the influence of CP-SoC on the complete abandonment of the actual purchase.

The antecedent of intent is particularly important in the FMCG routine purchase context. For products that require a higher level of involvement and evaluation, or much more risky purchases (e.g. luxury items or expensive electronics) a consumer may choose to expose themselves to an array of brands of the relevant product category, without intent—they may be ‘just browsing.’ In this context, there is much less clarity around the consumer’s decision being ‘correct’ or ‘incorrect’ as the consumer may not have any brand in mind to begin with and may form their preference at a later stage. This is the reason the process shown in Figure 4 begins with the intention to buy a particular brand and concludes upon either the correct or incorrect purchase decision being made.
Conceptual Development and Hypotheses

Figure 4. Conceptual model of the FMCG purchase process
3.4. Experimental variables and operationalisation

The experimental variables chosen for this research and the relationships between them are presented in Figure 5. A series of experiments examined these relationships (further discussed in Chapter 5). Importantly, because colour is such a central element of brand identity and can be a key contributor to either certainty or confusion, it is examined in two separate studies. Specifically, the first study examining colour explored the effects of three key colour attributes (hue, saturation, and lightness), while the second study investigated the effects of colour similarity of a packaged product on CP-SoC (the dependent variable). Moderating this relationship is the consumer’s level of familiarity with the brands involved.

![Figure 5. Overarching research model](image)

For the purposes of this research, colour similarity of the product packaging was operationalised and manipulated at three levels: (1) identical (exactly the same), (2) similar (somewhat the same), and (3) different (not at all the same). These terms describe the relative distinction between the colour attributes of the two stimuli of interest. Detailed pre-testing of stimuli was conducted to develop appropriate increments of colour differences.

Identical colours are self-explanatory. Similar and different colours were chosen based on Study 1A, which was preliminarily conducted to investigate the concept of colour and its attributes. CP-SoC was measured as a combination of four subscales consisting of three items each. The subscales measured the proposed four
Conceptual Development and Hypotheses

CP-SoC manifest elements: (1) perceived confusion, (2) perceived discomfort, (3) task difficulty, and (4) decision confidence. Brand familiarity was controlled through the choice of four experimental brands in two different product categories: chocolate (Hershey’s and Milka brands) and energy drinks (Red Bull and V Energy brands). Based on relative market shares in their respective categories in the United States (the country in which data was collected), Hershey’s and Red Bull were chosen as the familiar brands, and Milka and V Energy were chosen as the unfamiliar brands. A manipulation check was conducted to ensure that the differing levels of familiarity were appropriately recognised by participants.

3.5. Research hypotheses

A total of 9 hypotheses were tested for the main study in this research (Study 2). Figure 6 shows how 8 specific hypotheses relate to the research model; the remaining hypothesis is not illustrated here.

![Figure 6. Model of research hypotheses](image)

3.5.1. Hypothesised main effects

Psychological theories suggest that judgments of similarity and difference involve a feature-matching process (Podgorny & Garner, 1979; Tversky, 1977). Prior research on packaging suggests that the more similar the packaging features are between brands, the more likely it is for consumers to experience ‘confusion’ (K. M. Elliot, 1990; Falkowski et al., 2015; Kapferer, 1995; Mitchell, Walsh, & Yamin, 2004; Schweizer et al., 2006). Therefore:
Conceptual Development and Hypotheses

H1: As packaging colour becomes increasingly similar, confusion will increase.

H1a: Identical package colours will produce higher levels of confusion than similar or different colours.

H1b: Similar package colours will produce higher levels of confusion than different colours.

H1c: Different package colours will produce the lowest levels of confusion.

Prior research on familiarity indicates that the more familiar and experienced consumers are with a brand or product category, the more likely they will be able to discriminate between differences in packaging features due to the associated knowledge they hold above that of unfamiliar consumers (Bijmolt, Wedel, Pieters, & DeSarbo, 1998; Dubé & Schmitt, 1999; Herm & Möller, 2014). Therefore:

H2: As brand familiarity increases, confusion will decrease.

H2a: Familiar brands will produce lower levels of confusion than unfamiliar brands.

3.5.2. Hypothesised interaction effects

It is hypothesised that there will be an interaction effect between colour similarity and brand familiarity on CP-SoC. When consumers are faced with an identical or similarly coloured package, they will experience less confusion if the brand was familiar to them than if the brand was unfamiliar. This is because schema theory suggests that familiar brands will have stronger, more well-developed associations in the consumer’s mind than unfamiliar brands (Fiske & Linville, 1980). This suggests that the schema of a familiar brand will consist of stronger associations between the brand’s packaging features and products and the brand itself.
Consequently, it can be hypothesised that, for a particular brand, familiar consumers will be better at discriminating between similar packaging features—such as colour—than consumers who are unfamiliar with that brand. Better discriminability due to familiarity suggests a lower likelihood of experiencing CP-SoC. In other words, brand familiarity mitigates the effect of package colour similarity on levels of confusion. Specifically:

**H3a:** Increasing similarity in packaging colour will be less confusing for a familiar brand than an unfamiliar brand.

On the other hand, brand literature pertaining to the Elaboration Likelihood Model suggests that consumers use peripheral cues as heuristics instead of central cues, such as message arguments, when making low involvement purchases (R. E. Petty et al., 1983). This suggests that consumers more familiar with a brand are less likely to attend to the colour of a package and are more likely to make a faster decision based on simple cues. Routine purchase behaviours indicate that the more familiar a consumer is with a brand, the less attention and cognitive effort is put into the product search and purchase decision processes (Holden & Vanhuele, 1999; Hoyer & Brown, 1990; Stocchi et al., 2016). Instead, peripheral cues (i.e. heuristics) are used to speed up the identification and purchase process (Gierl & Huettl, 2011; R. E. Petty et al., 1983). As such, based on this stream of literature, it is likely that the more familiar a brand is for the consumer, the less cognitive effort they will expend in the brand identification process, thereby increasing the likelihood of confusion and misidentification. Therefore, in direct opposition to H3a, an alternative hypothesis is:

**H3b:** Increasing similarity in packaging colour will be more confusing for a familiar brand than an unfamiliar brand.

### 3.5.3. Other hypothesised effects

The conceptualisation of CP-SoC implies that the effects could be generalisable across different product types. To test this, two different categories of fast-moving consumer goods (FMCG) will be examined (milk chocolate and energy drinks). And it is hypothesised that:
**H4:** There will be no significant difference in levels of confusion across product categories.

A summary of the experimental hypotheses is provided in Table 3.

### Table 3. Research hypotheses

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1</td>
<td>As packaging colour becomes increasingly similar, confusion will increase.</td>
</tr>
<tr>
<td></td>
<td>H1a Identical package colours will produce higher levels of confusion than similar or different colours.</td>
</tr>
<tr>
<td></td>
<td>H1b Similar package colours will produce higher levels of confusion than different colours.</td>
</tr>
<tr>
<td></td>
<td>H1c Different package colours will produce the lowest levels of confusion.</td>
</tr>
<tr>
<td>H2</td>
<td>As brand familiarity increases, confusion will decrease.</td>
</tr>
<tr>
<td></td>
<td>H2a Familiar brands will produce lower levels of confusion than unfamiliar brands.</td>
</tr>
<tr>
<td>H3a</td>
<td>Increasing similarity in packaging colour will be less confusing for a familiar brand than an unfamiliar brand.</td>
</tr>
<tr>
<td>H3b</td>
<td>Increasing similarity in packaging colour will be more confusing for a familiar brand than an unfamiliar brand.</td>
</tr>
<tr>
<td>H4</td>
<td>There will be no significant difference in levels of confusion across product categories.</td>
</tr>
</tbody>
</table>

*Note: In all hypotheses confusion is operationalised as CP-SoC.*
Chapter 4. Research Philosophy

With any research project, the justification of the soundness of the research process is required in order to evaluate the research outcomes (Crotty, 1998b). Before explaining the methods used to gather the data, the research philosophy is discussed in this chapter. In order to do so, the scaffold approach to discussing the research perspective provided by Crotty (1998b) is used as a structure, and takes the philosophical stance of perspectivism.

This chapter provides the epistemological and theoretical background that informs and guides the research methodology of this project. In following the Crotty (1998b) framework, the epistemological perspectives that constitute the foundation of this research are firstly discussed, followed by the theoretical perspective that underpins the experimental design methodology that is used to collect the data. The next chapter will discuss the specific design and methods used to gather the data.

4.1. Perspectivism

Science has been confined to mono-epistemicism since its birth (Crotty, 1998c; Rahman, Symonds, Gabbay, & van Bendegem, 2009). Scientific enquiry is often assumed to be the search for an objective and absolute truth (P. F. Anderson, 1983; Crotty, 1998c; Hunt, 1990), and those who participate in scientific enquiry hold the view that “things exist as meaningful entities independently of consciousness and experience, that they have truth and meaning residing in them as objects” (Crotty, 1998b, p. 5). Therefore, it is said that scientific enquiry—using the scientific method—can ultimately attain this objective truth and meaning (Crotty, 1998c).

This epistemological view of objectivism is traditionally associated with positivist, quantitative, experimental studies that propose a set of hypotheses (i.e. ‘posit’ something about the observable world), and then test these in a controlled
experimental context (Crotty, 1998c). Objectivism also emphasises a detachment between the researcher and the measurement of facts about the world (Hunt, 1993). In addition, pursuing objectivity in research implies an integrity and commitment to controls, rather than assertion (Hunt, 1990, 1993). ‘World facts’, assumed to represent truths about the laws that govern life, are collected through ostensibly value-free methods—usually surveys and questionnaires (Curtis & Curtis, 2011; Giere, 2006b; Pendlebury, 2011). The outcomes of objective quantitative research are considered to be standardised and free from emotions and subjective thoughts (Crotty, 1998c; Zammito, 2004).

Adhering solely to this research perspective does not take into account the richness of data, and hence does not produce an in-depth understanding of a particular phenomenon, as does qualitative research (Braun & Clarke, 2006; Goulding, 2005; T. Wilson, 2013). Consequently, an opposing view of objectivism is one where truth and knowledge is assumed to be “contingent upon human practices” (Crotty, 1998a, p. 42)—the constructionist perspective. That is, meaning is created through individuals’ engagement and interactions with the world, and this meaning is interpreted to give rise and existence to a socially constructed world (Crotty, 1998a). From a purely constructionist perspective, meaning and the world—and therefore ‘truth’—do not exist without human interpretation. While the objectivist’s world—and therefore, knowledge—is one that exists above and beyond our perception, the constructionist’s world—and knowledge—is one that exists only due to our interpretation; without it, no world exists (Giere, 2006b; Packer & Goicoechea, 2000).

Scientific perspectivism lies in between these two alternate views. As Giere (2006b) summarises, it is “an understanding of scientific claims that mediates between the strong objectivism of most scientists, or the hard realism of many philosophers of science, and the constructivism found largely among historians and sociologists of science” (p. 3). It refers to a kind of researcher ‘attitude’ where there is an explicit “awareness that there are many possible conceptual schemes, or perspectives, in which judgments of truth can be made” (Agazzi, 2016, p. 350). The main assumptions of perspectivism are: (1) partiality of perspectives (i.e. ‘truth’ cannot be derived from a single perspective—thus in order to get closer to the ‘truth,’
more than one perspective is necessary); and (2) intersubjective objectivity (i.e. a common notion of ‘truth’ and realness derived from sharing and agreeing between the different perspectives) (R. L. Anderson, 1998; Giere, 2006b). The argument that scientific perspectivism makes is that human perspective is a limiting factor to our knowledge; that we cannot transcend the boundaries of our own perspectives (Giere, 2006b; van Fraassen, 2010). Thus, science and theory, scientific enquiry, scientific methods, and scientific instruments are all bounded by a perspective as they are created by humans (Giere, 2006b; van Fraassen, 2010). Giere (2006b) explains that it is the actual practice of science itself that imposes a limit to the claims about the world and its workings that can be made by scientists. Consequently, in a perspectivist’s world, all phenomena are perspectival—meaning that every single phenomenon relates to or involves perspective (Giere, 2006b).

Perspectivism, some may argue, is much the same as epistemological pluralism (Barris, 2015; Möller, 2007). Pluralism is the philosophical understanding that knowledge can be created in a multitude of ways, and that attempting to gain a full understanding of phenomena requires more than one theory and more than one approach. It could be argued that this may be the case for this research, and thus the term ‘pluralism’ could be more appropriate than ‘perspectivism.’ For example, discussions of schema theory are grounded in constructivism, discussions of brand familiarity across a group of individuals are grounded in constructionism, colour vision and sensory perception are grounded in objectivism and positivism, and the findings of experimentation are grounded in post-positivism. Objectivist, constructivist and constructionist, and post-positivist perspectives are all able to provide explanation and context—as well as a set of linguistic descriptions—to this research. As such, this project may be just as much a pluralistic endeavour as it is a perspectivistic one. In fact, as Giere (2016) suggests, very little separates perspectivism from pluralism. His view is that they purport much the same in slightly different frames of argument and emphasis.

The kind of perspectivist stance taken in this research is best explained by Giere (2006b). It is notably different from that of Nietzsche, where subjectivity holds ground over objectivity (Agazzi, 2016; R. L. Anderson, 1998; Hales & Welshon, 1994), and it is not interchangeable with social constructionism (Agazzi,
2016; Benson, 2006). Rather, Giere (2016) argues for ‘perspectival realism’ when considering science—where scientific claims are made with the intent of representing a genuine truth, and therefore should be considered as ‘realistic,’ despite being only a partial perspective on genuine truth. In alignment with the perspective of Giere (2006b), this research does not assert the validity of one perspective over another. Nor is it argued that the perspective of the findings of this research is the only one. This one piece of research is unable to provide all that is known about the nature of confusion in the world. Instead it is but one of many facets of the nature of confusion that can contribute to an ‘intended-genuine-truth.’ The arguments, hypotheses, and interpretations put forth in this research are the result of an evaluation of relevant perspectives provided by others (i.e. standing upon the shoulders of extant researchers) and the current researcher’s own perspective.

4.2. Post-positivism

Embedded in scientific perspectivism is the theoretical perspective of post-positivism. Taking the perspectivist view, by default, implies that no one perspective is complete and absolute. This directly aligns with the assertions of post-positivism: that research outcomes of any scientific method cannot be absolutely and totally objective or certain (Crotty, 1998c). The central argument of post-positivism is that “scientific beliefs are as much a function of cultural, political, social, and ideological factors as are many beliefs held by members of a society” (P. F. Anderson, 1983, p. 24). Perspectives are influenced by all these factors too, and as a consequence, scientific enquiry and scientific findings are also saturated with the different influences of these factors. The two (perspectivism and post-positivism) are philosophically strongly intertwined.

Post-positivism is different from positivism in the way that objectivity, certainty, and absoluteness are regarded (Crotty, 1998c). While positivism asserts a world “full of regularities, constancies, uniformities, iron-clad laws, absolute principles” (Crotty, 1998c, p. 28), post-positivism supports the notion that true and absolute objectivity cannot be attained through scientific enquiry, and that there will
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always be a certain ‘unknown’ or ‘error’ element in any scientific conclusion (Hunt, 1993). Post-positivism is grounded in critical realism whilst positivism is grounded in realism (Hunt, 1990). The key distinction between the two underpinnings is that post-positivism asserts that all scientific observations are inherently fallible and that all theories are, therefore, revisable (Crotty, 1998c; Giere, 2006b). Hence, post-positivists are ‘critical’ about their own approach to scientific enquiry. There is a demarcation between the truth that science hopes to find and the truth that science can realistically find. Just as perspectivists believe that multiple perspectives are required in order to form some kind of intersubjective truth, multiple measures and observations are required for post-positivism (Giere, 2006b; Jackson & Cox, 2013). Zammito (2004) succinctly summarises the ten philosophical challenges (originally composed by Clifford Hooker) that post-positivism brought to positivism. Of these ten, the main points that should be emphasised are: (1) science is not isolated from human individuals, and (2) science is not isolated from society (p. 14). In other words, post-positivism is the belief that all scientific observations and measurements are inherently imbued with cultural, social, and societal factors, and therefore reality can never be known with absolute certainty, or from an all-encompassing perspective (Zammito, 2004).

4.3. Summary

This research takes a post-positivist perspective that is grounded in a scientific perspectivism epistemology. This is the philosophical underpinning that guides and grounds this research. From this view, confusion is a perspectival phenomenon. Colour perception is a perspectival phenomenon. This research is a perspectival piece. Furthermore, the experimentation conducted in this research is imbued with various perspectives, including the current researcher’s own, and therefore the findings cannot be regarded as true and absolute. Instead, they should be regarded critically, always with the possibility and presence of uncertainty and error, and partiality.
Chapter 5. Research Methodology

This chapter provides a description of the experimental methodology used in this research. It is structured as follows: an overview of the overarching design is provided, followed by detailed description of the research process, analyses of the data collected, and findings of the analyses, structured by each of the studies conducted.

5.1. Experimental research methodology

This research employed an experimental methodology. Data was collected through a series of linked experiments. This methodology is based on four principles: (1) elimination of major predictable errors; (2) reasonably precise conclusions; (3) replicability; and (4) multiplicity of research questions or hypotheses (Jackson & Cox, 2013).

The first principle requires that prior related studies be evaluated prior to designing the experiment. In other words, using existing insights, assumptions are made as to which factors or elements within the experiment (and the participants) will introduce undesired errors in the data.

The second principle echoes the post-positivist perspective—the conclusions derived from the findings of an experiment must be reasonably precise—emphasising an element of uncertainty that inherently exists across all experimentation. Reasonable precision can be translated into statistical and probabilistic terms—that the probability of obtaining a particular finding, and therefore making a particular conclusion, is above that of pure chance. This suggests that some pattern that is separate from random chance exists in the data, and therefore further explanation and interpretation is necessary.

The third, replicability, allows for the judgment of the reliability of the findings. For instance, in simple terms, if a particular conclusion is made by another
researcher who replicates a particular study—and this conclusion matches that of the original study—then it can be said that the findings are reliable (when compared to chance findings).

Lastly, the fourth principle refers to the advantage of experimental design in comparison to other methodologies—the advantage of factorial experimentation (Jackson & Cox, 2013). That is, experimental methodology allows for multiple research questions to be investigated within a single factorial experiment. This enhances statistical power and is a much more efficient use of experimental resources (Aronson, Wilson, & Brewer, 1998; Curtis & Curtis, 2011; Howell, 2011; Jackson & Cox, 2013). Importantly, factorial designs also allow for statistical estimation of interaction effects present among the variables of interest, and (as in most cases) these effects are often the most influential and interesting (Jackson & Cox, 2013).

Experimental research methodology allows for the determination (to a certain extent) of causal relationships between real-world phenomena (Aronson et al., 1998; T. D. Wilson, Aronson, & Carlsmith, 2010) through these four principles. Eliminating predictable errors means that behaviours of interest should be separated and controlled in the experimental context. This allows more confidence in quantifying the effects of the experimental variables on the dependent variables (Jackson & Cox, 2013; T. D. Wilson et al., 2010). Such controlled experimentation ensures, to a reasonable degree, that systematic effects that appear in the data are attributable to the variables of interest and not to any other extraneous influence. Consequently, the researcher is then able to make reasonably precise conclusions from their data.

However, due to the nature of experimentation, there is often less external validity within experimental research than other types of methodologies (Aronson et al., 1998; Rossiter, 2003; Y. J. Wang & Minor, 2008). It is often by conscious choice that internal validity is prioritised over external validity. While certain measures can be taken to introduce an element of realism (in the sense that elements of the experiment are more realistic than sterile) to the overall design (Morales, Amir, & Lee, 2017), there will always be a limit to how much external validity can
be claimed through experimental methodology. Experimental approaches ensure rigour, reliability, and control, and thus will always be a little detached from other more realistic designs.

The following sections provide detail of the experimental design and methods used in this research. In total, three experimental studies were conducted—Study 1A, Study 1B, and Study 2. Each of the three studies were preceded by informal pre-testing and consultations with expert panels to ensure all elements of the experimentation process were appropriate for the research context and goals chosen for this research.

5.2. Experimental design overview

As discussed, this research conceptualises confusion in a more comprehensive manner than prior research. Hence, a new operationalisation needed to be developed in order to be able to examine confusion in the way it has been defined in this research (i.e. CP-SoC; see Chapter 3). Furthermore, in contrast to prior studies on colour in the marketing context, this research goes more in depth and explicitly examines the three main colour attributes (hue, saturation, and lightness) and how these interact.

A series of linked, sequential experiments were conducted in this research. Firstly, a pre-test was conducted to determine appropriate magnitudes of the experimental stimuli to be used in the preliminary study (Study 1A). Based on the findings of the pre-test, a range of colour stimuli were developed. Study 1A, which was computer-based, employed these colour stimuli in a choice response time experiment. Study 1B involved attitudinal measures gathered through a literature review. An expert panel was consulted to gain insight into the applicability, comprehension, and validity of a selection of attitudinal measures, and these were then explored using Principal Components Analysis. A 12-item “consumer state of confusion” (CP-SoC) scale was then developed and evaluated. For the final experiment in the series (Study 2), coloured branded packages were used as experimental stimuli. These were carefully created and calibrated on several iterations according to the findings of Study 1A and through consultations with
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experts. The CP-SoC scale was employed as the dependent measure for Study 2. The final execution of this experiment was conducted through an online questionnaire software programme. The interrelation between the experiments is demonstrated in Figure 7.

![Figure 7. Experimental series overlaid on overarching research model](image)

5.3. Pre-test

The first task was to establish boundaries of general colour categories (MacLaury, 1992). As this research focusses on confusion caused by colour, this means that the colours used as stimuli need to be relatively confusable—but also discriminable. This imposes a certain demarcation on the range of colours that are relevant and valid for experimental purposes—an upper limit (relatively confusable) and a lower limit (discriminable). For relative confusability, comparisons of colours that are considered to be absolutely different (for example, black versus white, or red versus green) provide no theoretical insights in the confusion context. On the other hand, comparisons of colours that are too similar (for example, very similar shades of red) with virtually undetectable differences also do not provide adequate theoretical meaning.

The human colour visual system (HCSV) is limited by biological factors (Chou & Liu, 2008; Leibovic, 1990); thus the nature of human colour vision itself
poses a biological limitation to colour discriminability, and thus, the lower limit. This limit is referred to as the difference threshold, or just-noticeable difference (JND) derived from the Weber-Fechner Law of Perception (S.-H. Britt & Nelson, 1976; S. H. Britt, 1975; Stern & Johnson, 2009). The JND is the minimum threshold at which an individual will perceive a difference between stimuli or sensations (S.-H. Britt & Nelson, 1976). The colour stimuli used in these series of experiments must reach, or exceed, the JND, or in other words, the lower limit.

Informal qualitative interviews were conducted on four voluntary participants, recruited through convenience sampling methods, in order to pre-test a basic set of colour stimuli as a starting point. The primary purpose of these interviews was to establish a general verbal evaluation of the upper and lower limit of the colours chosen for this research (purple, orange, and green) for each of the three colour attributes (hue, saturation, and lightness). The main experimental questions were:

1. When is a shade of purple (and orange, and green) no longer considered ‘purple’ (and ‘orange’, and ‘green’)?
2. Which shade or shades of purple (and orange, and green) are almost the same?

Using Microsoft PowerPoint, three sets of stimuli were created for each of the three colours, with set 1 containing only hue value changes, set 2 containing only saturation value changes, and set 3 containing only lightness value changes. These stimuli were presented to the participants, and their first task was to categorise them as ‘in the purple/orange/green family’ or ‘not in the purple/orange/green family.’ Their second task was to sort the stimuli into ‘almost the same or virtually identical’ and ‘different.’ During the debriefing process, participants corroborated the colour family distinction between stimuli, stating that the colours they categorised as ‘not in the (colour) family’ belonged to other ‘families’ (e.g. “this is more in the red family than purple”). From these informal interviews, general upper and lower limits were derived for each of the three colour attributes, for each of the three colours. The findings then guided the establishment of the colour category boundaries for the development of experimental stimuli for Study 1A.
5.4. Study 1A

5.4.1. Research purpose and justification

The purpose of Study 1A was to gain exploratory empirical knowledge in order to develop and calibrate appropriate stimuli for subsequent studies. The direct effects and interaction effects of the three main colour attributes (hue, saturation, and lightness) on choice response time (measured in seconds) was investigated through a discrimination task. No explicit experimental hypotheses were made a priori as the primary focus of this study was for full exploration of the three colour attributes. The three colour categories chosen for this research were purple, orange, and green. Although Study 1A was preliminary to the larger study—Study 2—conducted in this research, it contributes to extant knowledge in many novel ways. It addresses several gaps in marketing literature on colour and perception. How Study 1A addressed these research gaps is discussed in the following subsections.

5.4.1.1. Secondary colours

Extant research in marketing involving colour tends to focus on the effects of the two main primary colours red and blue (e.g. Bottomley & Doyle, 2006; Crowley, 1993; Labrecque & Milne, 2012); however, much less is known about secondary colours (purple, orange, and green) and their effects on consumers. While red and blue, along with black, are still the most popular colours that brands tend to use, these secondary colours are becoming more frequently used. Just under one quarter of the world’s top 100 brands use these secondary colours as their predominant colour scheme (Forbes, 2017), and in the United States approximately 1500 live trademark registrations are for these secondary colours (Trademark Electronic Search System, January, 2018).

Following the general colour schemes of leading brands in a particular category was considered a safe and reliable option for competitors and is a strategy that is still frequently used today. Many less-popular brands have benefitted from such imitation strategies in the past. However, with the market becoming overly saturated with numerous competitors for any given category, brands are stepping away from the status quo and claiming more unique and differentiated colour
strategies. Especially for brands that are determined to stand out from their competitors in a particular product category, the use of a colour that is less frequently used in that category proves beneficial. Moving away from the typical colour scheme of a product category will allow for a brand to stand out when on display on supermarket shelves, increasing the likelihood of brand recall and purchase.

With increasing uses of colours such as secondary colours (e.g. purple, orange, and green) by brands in the market, empirical research focussed on these less frequently used colours will be useful for both academic researchers and practitioners. This study employed a factorial experimental design in order to go beyond assessing the direct effects of the three colour attributes, to also evaluate possible two-way and three-way interaction effects between them and their effects on the three secondary colours, with the aim of providing empirical evidence to guide the use of secondary colours in branding.

5.4.1.2. Colour attributes and decision latency

Study 1A was critical to the operationalisation of the final study (Study 2), as it assisted in determining the degree at which the three colour attributes needed to be set for each of the coloured and branded stimuli presented to participants. This study, therefore, ensured that manipulations of the three colour attributes were greater than the just noticeable difference (JND), a necessary condition for there to be an observable effect (S.-H. Britt & Nelson, 1976). Prior studies in research in marketing do not provide empirical or theoretical guidance on the magnitudes at which the hue, saturation, and lightness differences are required for experimental investigation of the effects of colour.

Consequently, the main concern of this study was to identify which of the three colour attributes affected choice response time (decision latency) to the greatest extent. Hence, the dependent variable in Study 1A was the objectively-measured duration (in seconds) it took the participant to be able to provide a yes or no answer to a decision task. This is because decision latency indicates the level of difficulty in discrimination tasks. In other words, the longer the participant took to decide whether two stimuli presented are different, then this is an indication of
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increased confusion between the stimuli, meaning that the discriminable differences in the stimuli are relatively small.

This was a necessary point to clarify through empirical research because prior colour research in marketing has tended to focus only on the effect of hue without explicitly controlling for (or addressing) the effects of saturation and lightness. As a result, the differential effects of each of the attributes in a marketing context are still elusive. Hence, for this study, the dependent variable—choice response time—was used to infer the perceived difficulty of identifying a difference (i.e. discrimination) between the stimuli presented to participants. Using response times as a measure of decision latency is frequently used in perceptual research in psychology (Podgorny & Garner, 1979). Longer choice response times indicated a higher degree of difficulty experienced in identifying a difference between stimuli, and shorter choice response times indicated a lower degree. Based on the results of Study 1A, the stimuli for Study 2 were created to ensure maximum control of extraneous variables that might affect the data.

5.4.1.3. Semantic differences in discriminability

Semantic differences lie in the language associated with discriminability. On a continuum, it can be described in terms of a ‘difference’ (i.e. these colours are different and therefore discriminable), a ‘similarity’ (i.e. these colours are similar and therefore not discriminable), or in terms of ‘sameness’ (i.e. these colours are the same, and therefore they are identical). Figure 8 represents this continuum.

![Figure 8. Discriminability continuum](image-url)
While some may assume the semantic opposite to ‘different’ is ‘same,’ this research explicitly examined both terms when asking participants to discriminate between two coloured stimuli. It is argued that non-identical referential directions are implied by the two terms. That is, when asking an individual to find a ‘difference,’ this primes the individual’s discriminating efforts to be focused on identifying a difference. On the other hand, when asking an individual to find a ‘sameness,’ this primes the individual’s efforts to be focused on identifying a similarity. It is argued that these two goals are related but distinct from one another. Hence, rather than this research assuming that these terms are semantic opposites to one another, data using both terms were gathered and analysed separately.

5.4.2. Participants

The sample of participants obtained for Study 1A was collected from a population of students and staff from a large New Zealand University. A convenience sampling method was used to recruit participants. A total of 15 voluntary participants engaged in Study 1A. 10 participants were female, and 5 were male. The ages of the participants ranged from 26 years to 61+ years.

5.4.3. Stimuli

All experimental stimuli were created on Microsoft Office PowerPoint 2016 on a Windows 7 Operating System. A single stimulus was composed of a grey background with two coloured squares positioned in the centre. One square was the baseline square (with no changes of hue, saturation, or lightness from the original) and the other was the manipulated comparison (created by manipulating hue, saturation, and lightness values). A decision-task question in black typeface was positioned below the squares (see Figure 9).
Figure 9. Study 1A sample stimuli

The HSL (hue, saturation, and lightness) colour values of each of the stimuli are presented in Appendix 1. The three baseline colour values and grey background value chosen for Study 1A are detailed in Table 4. These values are deformations of the base RGB (red, green, and blue) colour space and are able to be directly converted into the winHSL255 colour model used in Microsoft Office computer software (Color converter, 2013). The full series of stimuli used in Study 1A is provided in Appendix 2.
Table 4. Study 1A HSL baseline values

<table>
<thead>
<tr>
<th>Colour category</th>
<th>H (Hue)</th>
<th>S (Saturation)</th>
<th>L (Lightness)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purple</td>
<td>270°</td>
<td>83%</td>
<td>34%</td>
</tr>
<tr>
<td>Orange</td>
<td>27°</td>
<td>92%</td>
<td>55%</td>
</tr>
<tr>
<td>Green</td>
<td>84°</td>
<td>65%</td>
<td>45%</td>
</tr>
<tr>
<td>Grey (background)</td>
<td>0°</td>
<td>0%</td>
<td>58%</td>
</tr>
</tbody>
</table>

5.4.4. Design

A 3 (hue) × 3 (saturation) × 3 (lightness) full factorial, counterbalanced, repeated-measures experimental design was employed for Study 1A. Choice response time was measured in seconds (with millisecond precision) as the dependent variable, and each of the continuous independent variables (hue, saturation, and lightness) was operationalised as ordinal variables with three levels: (1) baseline value—no value change, (2), negative value change from the baseline value, and (3) positive value change from the baseline value.

A full factorial experiment requires every single possible combination of the variables and variable levels. This resulted in a total of 27 experimental conditions (outlined in Table 5; specific HSL values provided in Appendix 1). These conditions were repeated across three colour categories (purple, orange, and green). The participant’s main task was to provide a ‘YES’ or ‘NO’ response in the form of a key press to the choice questions: “are these colours different?” and “are these colours the same?” The key press data were collected but not used in the overall data analysis, as they were secondary to the dependent variable of interest—choice response time. The order of presentation of the baseline versus the manipulation colour was randomised, i.e. the baseline square was positioned on either the left or right of the manipulated comparison square. Each participant completed a total of 324 randomised experimental trials in Study 1A (27 conditions × 3 colour categories × 2 choice questions × 2 baseline positions). Counterbalancing and trial randomisation ensured that any order effects that may be present were controlled to a minimum. The total duration of the experimental task was approximately 25 minutes.
Table 5. Study 1A experimental conditions

<table>
<thead>
<tr>
<th>Saturation</th>
<th>Lightness</th>
<th>Hue</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>00014</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>00111</td>
</tr>
<tr>
<td>0</td>
<td>2</td>
<td>00217</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>01013</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>01110</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>01216</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>02015</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>02112</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>02218</td>
</tr>
</tbody>
</table>

Key
0 Baseline value
1 Negative value change from baseline
2 Positive value change from baseline
1-27 Experimental condition (see Appendix 1 for corresponding HSL values)

5.4.5. Administration and procedure

The experimental task was programmed using PsychoPy (version 1.84.2), an open-source psychophysics software application in Python programming language (Peirce, 2007, 2009), to measure and collect choice response times. PsychoPy was chosen for two main reasons. Firstly, it is a platform-independent experimental control system, allowing fluid transfer between PC operating systems and Mac operating systems. Secondly, it is able to provide temporal precision with standard hardware specifications of approximately 4ms to 25ms (Peirce, 2015).

As the PsychoPy software is platform-independent, timing precision depends on the computer system clock—these usually have microsecond precision, and have “sub-millisecond precision on any modern machine for the purpose of measuring user responses” (Peirce, 2007, p. 11). Typical human response times generally vary between 200ms and 400ms (Peirce, 2015; Reaction time statistics, 2007-2018), hence this precision is more than adequate for measuring accurate choice response time in a meaningful manner for Study 1A.

Although using a web-based system would have allowed for faster data collection from a larger population, doing so introduces significant variances in the
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accuracy of response times collected. This occurs for various reasons, including Internet connection speed, screen refresh rate, input and output lag, and so forth. Such uncontrollable extraneous variation in the data would render the collected choice response times meaningless. Hence, an offline method was deliberately used to ensure the quality of the data for Study 1A.

The experiment was conducted on a portable laptop computer with 1366 × 768 display resolution, operating on macOS Sierra (version 10.12.3) with an Intel HD Graphics 4000 card. Participants completed the experiment under researcher supervision so that the participant’s position from the screen could be instructed and controlled. Key presses in response to experimental questions were ‘1’ (which indicated a ‘YES’ response) and ‘2’ (which indicated a ‘NO’ response). The 324 experimental trials were presented in two blocks (one block for each question type), with a one-second inter-stimulus interval after the instructions screen to reduce increased choice response time for the first stimulus presented in each block. Instructions were given throughout the experiment. Demographic data and other covariates were collected after the main trials. The participant was able to exit and terminate the experiment at any point by pressing the ‘ESC’ key. A verbal debriefing discussion was held after each participant’s completion of the experiment.

5.4.6. Statistical analysis and results

Data collected was analysed using IBM SPSS Statistics (version 24) software, through a three-way Repeated-Measures Analysis of Variance (RM-ANOVA). The purpose of this analysis was to compare the effects of hue, saturation, and lightness (independent variables) on choice response time (dependent variable). The interval-scaled independent variables were operationalised as a categorical variable with three levels each and dummy-coded. The three levels were: baseline value, positive value change, and negative value change. Prior to conducting the RM-ANOVA, data were cleaned and checked for outliers that might bias the results of the analysis. A visual inspection of histograms and boxplots of the raw data suggested that there were no significant outliers present that might adversely affect the results of
5.4.6.1. Statistical assumptions

Repeated-Measures Analysis of Variance (RM-ANOVA) is an extended version of the linear model and is subject to satisficing three main assumptions. These are: (1) additivity and linearity, (2) normality, and (3) sphericity (Davis, 2002; Field, 2013; Howell, 2011).

Additivity and linearity refer to the core assumption of the linear model. Linearity assumes that the dependent variable is a function of linearly-related independent variables, and additivity assumes that adding together the effects of the independent variables produces the total combined effect of the variables (Field, 2013; Zeisel & Kaye, 1997). In Study 1A, the dependent and independent variables are modelled in the linear model form:

\[
\text{Choice response time} = \beta_0 + \beta_1 \text{hue} + \beta_2 \text{saturation} + \beta_3 \text{lightness} + (\beta_1 \text{hue} \times \beta_2 \text{saturation}) + (\beta_1 \text{hue} \times \beta_3 \text{lightness}) + (\beta_2 \text{saturation} \times \beta_3 \text{lightness}) + (\beta_1 \text{hue} \times \beta_2 \text{saturation} \times \beta_3 \text{lightness}) + \epsilon
\]

Hence, the additivity and linearity assumptions are met by the statistical model.

To meet the assumption of normality, the sampling distribution of the test statistic (in the case of Study 1A, this is the difference in means) must be normal (Davis, 2002; Field, 2013). A total of 4860 observations were collected, which provides 405 observations per experimental condition. This sample size per experimental condition is more than adequate for the central limit theorem to apply (Lumley, Diehr, Emerson, & Chen, 2002). Under this theorem, “regardless of the shape of the population, parameter estimates of that population will have a normal distribution” (Field, 2013, p. 170).

The assumption of sphericity applies when repeated measures of at least three experimental conditions are used (Field, 2013). Sphericity assumes that the relationship between each of the pairs of experimental conditions is approximately
similar (Davis, 2002; Field, 2013; Howell, 2011). In other words, it is assumed that the variation within experimental conditions is similar, and no two conditions are any more dependent than other pairs (Field, 2013). Mauchly’s test of sphericity (Mauchly, 1940) is often used to assess whether the assumption has been met. However, this test is not robust against large sample sizes, as is the case in Study 1A. Hence, in performing the RM-ANOVA, where sphericity was violated the Greenhouse-Geisser estimate (Greenhouse & Geisser, 1959) was used to adjust the degrees of freedom in calculation of the $F$-statistic, and the Bonferroni adjustment was used to control the alpha levels ($\alpha$) of post hoc comparisons (Field, 2013; Howell, 2011).

In sum, the assumptions of the RM-ANOVA are met (and where violated, appropriate correction measures were taken to adjust for statistical error) for Study 1A.

5.4.6.2. Manipulation checks

Conventionally, manipulation checks in experimental design are required for experiments with independent variables or constructs that are indirectly (not directly) measured (Perdue & Summers, 1986; Steenkamp, 2001). As Study 1A involved explicitly measurable independent variables, i.e. colour attributes (hue, saturation, and lightness) and colour categories (purple, orange, and green), a separate manipulation check to assess the independent variables was not required. However, to ensure that participants understood the experimental task they were performing, two manipulation checks on the overall design were performed.

The first check assessed perceived task difficulty. This was measured at the end of the experiment to assess whether participants subjectively found the task too difficult (which would indicate that they did not understand the task). A 7-point Likert-type scale was used to measure responses to the question, “I found the main tasks difficult,” where 1 indicated ‘completely disagree’ and 7 indicated ‘completely agree.’ On average, participants reported finding the task to be low in difficulty ($M = 2.60, SD = 1.59$). This indicates that the experimental tasks were adequately designed and subjectively well-understood by the participants.
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The second check assessed experimental accuracy using the key press data concurrently collected with measures of the dependent variable (choice response time). This check allowed for further assessment of participants’ task comprehension on a more objective level. Each key press provided a ‘YES’ or ‘NO’ response to the associated experimental question and stimulus. These were compared against actual correct versus incorrect responses of each task. Of a total of 4860 responses, 4322 (89%) key press responses were correct, indicating a high degree of experimental task comprehension by the participants on an objective level. In sum, these results are deemed sufficient for main statistical analyses on the dependent variable.

5.4.6.3. Omnibus analysis

A grand omnibus RM-ANOVA was conducted to examine the effects of the baseline colour position, choice question, colour category, as well as the effects of the specified independent variables hue, saturation, and lightness on choice response time. This initial overall omnibus RM-ANOVA was found to be significant ($F_{(1, 14)} = 239.70, p < .001, \eta^2_p = .95$). Colour category, as well as hue, saturation, and lightness were found to be significant. The position of the baseline colour did not have a significant effect on choice response time. No significant differences were present whether the baseline colour was on the left ($M = 1.12, SD = .87$) or the right ($M = 1.14, SD = .97, p > .05$) of the manipulated colour. The effect of choice question was initially found to be significant. The two questions were asked in sequential order (i.e. “are these colours different?” then “are these colours the same?”) for all participants. Hence, there was potentially an order effect present for this variable. A robust paired-samples t-test was conducted to further examine the validity of this effect using the bootstrap technique with a simple sampling method for 100 samples. With this test, it was found that there was no significant difference in choice response time between the questions, “are these colours different?” ($M = 1.23, SD = .34$) and “are these colours the same?” ($M = 1.05, SD = .27, p > .05$). Consequently, these two variables (baseline colour position and choice question) were omitted from further analyses and the data was pooled.
A second omnibus RM-ANOVA was conducted on the pooled data to examine the effect of colour category, hue, saturation, and lightness on choice response time. All main effects met the assumption of sphericity as indicated by Mauchly’s test (colour category $\chi^2(2) = 2.64$; hue $\chi^2(2) = 4.43$; saturation $\chi^2(2) = 2.89$; lightness $\chi^2(2) = 1.81$; all $p$’s > .05). Again, the effect of colour category was found to be significant, that is, that there was a significant difference in choice response time between purple, orange, and green. Post-hoc tests with Bonferroni adjustment revealed that choice response times were significantly slower for purple ($M = 1.24$, $SD = .36$) in comparison to orange ($M = 1.09$, $SD = .28$, $p = .009$) and green ($M = 1.08$, $SD = .25$, $p < .006$). There was no significant difference in choice response time between orange and green ($p > .05$). This indicates that, in general, green differences and orange differences were able to be the more easily detected than purple differences. A profile plot of the effect of colour category is provided in Figure 10.

![Mean Choice Response Time (+1 SD) for Colour Category](image)

**Figure 10. Main effect of colour category**

Additionally, as expected, the effects of the colour attributes hue, saturation, and lightness were also significant. In order to further examine the effects of hue, saturation, and lightness within each of these colours, three separate RM-ANOVA analyses were conducted for purple, orange, and green.
The main effect of hue met the assumption of sphericity, as indicated by Mauchly’s test ($\chi^2(2) = 5.37, p > .05$). However, the main effects of saturation ($\chi^2(2) = 9.38, p = .009$) and lightness ($\chi^2(2) = 6.53, p = .038$) violated the sphericity assumption, as did the two-way interaction effects (hue × saturation $\chi^2(9) = 30.52, p < .001$; hue × lightness $\chi^2(9) = 25.31, p = .003$; saturation × lightness $\chi^2(9) = 37.82, p < .001$), and the three-way interaction effect (hue × saturation × lightness $\chi^2(35) = 103.35, p < .001$). As such, the degrees of freedom were corrected using the Greenhouse-Geisser estimate of sphericity (saturation $\varepsilon = .66$; lightness $\varepsilon = .72$; hue × saturation $\varepsilon = .41$; hue × lightness $\varepsilon = .49$; saturation × lightness $\varepsilon = .48$; hue × saturation × lightness $\varepsilon = .29$) where sphericity was violated.

There was a significant main effect of hue on choice response times ($F_{(2, 28)} = 6.41, p = .005, \eta_p^2 = .31$). Post hoc tests with Bonferroni adjustment revealed that a positive hue value change ($M = 1.09, SD = .32$) produced choice response times that were significantly faster than the baseline hue value ($M = 1.46, SD = .48, p = .003$), but not in comparison to a negative hue value change ($M = 1.18, SD = .47, p > .05$). There was no significant difference in choice response times between the baseline hue value and a negative hue value change ($p > .05$). For the colour purple, a positive hue value change can be translated visually to describe a warmer colour (i.e. closer to red, further away from blue), and a negative hue value change can be translated visually to describe a cooler colour (i.e. closer to blue, further away from red). Hence, colour discrimination occurred faster when the purple colour was warmer than the baseline purple colour, but a cooler purple colour did not affect discriminability. Figure 11 shows this effect.
The main effects of saturation ($F_{(1.32, 18.50)} = 3.30, \eta_p^2 = .19$) and lightness ($F_{(1.43, 20.07)} = 1.92, \eta_p^2 = .12$) were not significant (all $p$’s $>.05$). This indicates that the discriminability of purple colours was unaffected by changes in saturation (vibrant or dull) or lightness (lighter or darker). There were no significant two-way (hue × saturation $F_{(1.64, 22.97)} = 1.50, \eta_p^2 = .10$; hue × lightness $F_{(1.95, 27.32)} = 2.44, \eta_p^2 = .15$; saturation × lightness $F_{(1.93, 27.02)} = 1.19, \eta_p^2 = .08$) or three-way (hue × saturation × lightness $F_{(2.30, 32.15)} = .82, \eta_p^2 = .06$) interaction effects (all $p$’s $>.05$). All means and standard deviations are provided in Table 6.
Table 6. Descriptive statistics for purple experimental conditions (N = 15)

<table>
<thead>
<tr>
<th>Condition</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (H- / S- / L-)</td>
<td>1.09</td>
<td>.38</td>
</tr>
<tr>
<td>2 (H+ / Sb / L-)</td>
<td>.98</td>
<td>.28</td>
</tr>
<tr>
<td>3 (H- / S+ / L-)</td>
<td>1.64</td>
<td>2.79</td>
</tr>
<tr>
<td>4 (H- / S- / Lb)</td>
<td>1.04</td>
<td>.44</td>
</tr>
<tr>
<td>5 (H- / Sb / Lb)</td>
<td>1.10</td>
<td>.44</td>
</tr>
<tr>
<td>6 (H- / S+ / Lb)</td>
<td>1.33</td>
<td>1.33</td>
</tr>
<tr>
<td>7 (H- / S- / L+)</td>
<td>1.22</td>
<td>1.02</td>
</tr>
<tr>
<td>8 (H- / Sb / L+)</td>
<td>1.15</td>
<td>.30</td>
</tr>
<tr>
<td>9 (H- / S+ / L+)</td>
<td>.99</td>
<td>.43</td>
</tr>
<tr>
<td>10 (Hb / S- / L-)</td>
<td>1.10</td>
<td>.31</td>
</tr>
<tr>
<td>11 (Hb / Sb / L-)</td>
<td>1.28</td>
<td>.34</td>
</tr>
<tr>
<td>12 (Hb / S+ / L-)</td>
<td>1.56</td>
<td>.69</td>
</tr>
<tr>
<td>13 (Hb / S- / Lb)</td>
<td>1.62</td>
<td>.96</td>
</tr>
<tr>
<td>14 (Hb / Sb / Lb)</td>
<td>1.98</td>
<td>.51</td>
</tr>
<tr>
<td>15 (Hb / S+ / Lb)</td>
<td>1.13</td>
<td>.73</td>
</tr>
<tr>
<td>16 (Hb / S- / L+)</td>
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</tr>
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<td>17 (Hb / Sb / L+)</td>
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<td>1.23</td>
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<td>18 (Hb / S+ / L+)</td>
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<td>.65</td>
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<tr>
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<td>.99</td>
<td>.37</td>
</tr>
<tr>
<td>20 (H+ / Sb / L-)</td>
<td>1.10</td>
<td>.44</td>
</tr>
<tr>
<td>21 (H+ / S+ / L-)</td>
<td>1.23</td>
<td>.50</td>
</tr>
<tr>
<td>22 (H+ / S- / Lb)</td>
<td>1.07</td>
<td>.52</td>
</tr>
<tr>
<td>23 (H+ / Sb / Lb)</td>
<td>1.12</td>
<td>.51</td>
</tr>
<tr>
<td>24 (H+ / S+ / Lb)</td>
<td>1.10</td>
<td>.26</td>
</tr>
<tr>
<td>25 (H+ / S- / L+)</td>
<td>1.05</td>
<td>.48</td>
</tr>
<tr>
<td>26 (H+ / Sb / L+)</td>
<td>1.08</td>
<td>.45</td>
</tr>
<tr>
<td>27 (H+ / S+ / L+)</td>
<td>1.05</td>
<td>.47</td>
</tr>
</tbody>
</table>

Notes: H = hue, S = saturation, L = lightness
b = baseline, + = positive value change, - = negative value change

5.4.6.5. Effects: orange

Mauchly’s test indicated that the sphericity assumption had been met by the main effects of lightness (χ²(2) = 2.52, p > .05) and saturation (χ²(2) = 5.74, p > .05), but had been violated by the main effect of hue (χ²(2) = 8.84, p = .012), the two-way interaction effects (hue × saturation χ²(9) = 30.91, p < .001; hue × lightness χ²(9) = 19.34, p = .024; saturation × lightness χ²(9) = 18.45, p = .032), and the three-way interaction effect (hue × saturation × lightness χ²(35) = 75.35, p < .001).
As such, the degrees of freedom were corrected using the Greenhouse-Geisser estimate of sphericity (hue $\varepsilon = .67$; hue $\times$ saturation $\varepsilon = .47$; hue $\times$ lightness $\varepsilon = .65$; saturation $\times$ lightness $\varepsilon = .64$; hue $\times$ saturation $\times$ lightness $\varepsilon = .43$) where sphericity was violated.

All three main effects on choice response times were significant (hue $F_{(1.34, 18.75)} = 32.98, p < .001, \eta^2_p = .70$; saturation $F_{(2, 28)} = 6.55, p = .005, \eta^2_p = .32$; lightness $F_{(2, 28)} = 7.85, p = .002, \eta^2_p = .36$). Post hoc tests with Bonferroni adjustment revealed that, for hue, both a positive hue value change ($M = .99, SD = .27$) and a negative hue value change ($M = .92, SD = .20$) produced choice response times that were significantly faster than the baseline hue value ($M = 1.34, SD = .41$, all $p$’s < .001). There was no significant difference in choice response times between positive and negative hue value changes ($p > .05$). For the colour orange, a positive hue value change can be translated visually to describe a warmer colour (i.e. closer to red, further away from yellow), and a negative hue value change can be translated visually to describe a cooler colour (i.e. closer to yellow, further away from red). Hence, colour discrimination occurred faster when the orange colour was warmer than the baseline orange colour and also when the orange colour was cooler than the baseline orange colour.

For saturation, a negative saturation value change ($M = .97, SD = .23$) produced response times that were significantly faster than both the baseline saturation value ($M = 1.17, SD = .36, p = .017$) and a positive saturation value change ($M = 1.12, SD = .31, p = .004$). There was no significant difference in choice response times between the baseline saturation value and a positive saturation value change ($p > .05$). A positive saturation value change can be translated visually to describe a more vibrant orange colour and a negative saturation value change can be translated visually to describe a duller orange colour. Hence, colour discrimination occurred faster when the orange colour was duller than the baseline orange colour, but not when it was more vibrant than the baseline orange colour.

For lightness, a negative lightness value change ($M = .99, SD = .23$) produced response times that were significantly faster than the baseline lightness value ($M = 1.17, SD = .32, p = .001$), but not in comparison to a positive lightness value change.
(\(M = 1.09, SD = .34, p > .05\)). There was no significant difference in choice response times between the baseline lightness value and a positive lightness value change (\(p > .05\)). A positive lightness value change can be translated visually to describe a lighter orange colour and a negative lightness value change can be translated visually to describe a darker orange colour. Hence, colour discrimination occurred faster when the orange colour was darker than the baseline orange colour, but not when it was lighter than the baseline orange colour. Figure 12 graphically presents the three main effects of hue, saturation, and lightness for the orange colour category.

![Mean Choice Response Time (+1 SD) for Colour Attributes](Orange)

**Figure 12. Main effects of hue, saturation, and lightness for orange**

All two-way interaction effects on choice response times were significant. Simple effects analyses were conducted to further explore these interactions. For the interaction between hue \(\times\) saturation \((F_{(1.88, 26.33)} = 6.10, p = .008, \eta_p^2 = .30)\), at the baseline saturation value, both a negative hue value change (\(M = .90, SD = .18, p = .002\)) and a positive hue value change (\(M = 1.00, SD = .36, p = .006\)) produced choice response times that were significantly faster than for the baseline hue value (\(M = 1.60, SD = .71\)). The same pattern emerged for a positive saturation value change; both a negative hue value change (\(M = .95, SD = .26\)) and a positive hue value change (\(M = 1.02, SD = .32\)) produced choice response times that were
significantly faster than for the baseline hue value ($M = 1.38$, $SD = .43$, all $p$’s < .001). For a negative saturation value change, only a negative hue value change ($M = .90$, $SD = .21$) produced significantly faster choice response times than for the baseline hue value ($M = 1.05$, $SD = .31$, $p = .029$). In addition, a negative saturation value change produced significantly faster choice response times when compared to both the baseline saturation value ($p = .013$) and a positive saturation value change ($p = .007$), but only at the baseline hue value. All other comparisons within the hue × saturation interaction were not significant (all $p$’s > .05).

In other words, the pattern of the main effect of hue was consistent within the hue × saturation interaction effect for the baseline saturation value and positive saturation value change, but not at a negative saturation value change. A negative saturation value change moderated the hue effect. Furthermore, the pattern of the main effect of saturation was only consistent at the baseline hue value. Both a negative hue value change and a positive hue value change moderated the saturation effect. A profile plot of the two-way interaction effect is provided in Figure 13.

![Mean Choice Response Time (+1 SD) for Hue × Saturation](image)

**Figure 13. Hue × saturation interaction effect for orange**

For the interaction between hue × lightness ($F(2.61, 36.58) = 7.49$, $p = .001$, $\eta_p^2 = .35$), at the baseline lightness value, both a negative hue value change ($M = .90$,
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$SD = .24, p < .001$ and a positive hue value change ($M = 1.02, SD = .31, p = .003$) produced choice response times that were significantly faster than for the baseline hue value ($M = 1.59, SD = .58$). The same pattern emerged for a positive lightness value change. Again, both a negative hue value change ($M = .90, SD = .20, p = .005$) and a positive hue value change ($M = .95, SD = .25, p = .005$) produced choice response times that were significantly faster than for the baseline hue value ($M = 1.43, SD = .64$). For a negative lightness value change, there were no significant differences between levels of hue ($p > .05$). In addition, a negative lightness value change ($M = 1.01, SD = .21, p = .002$) produced significantly faster choice response times when compared to both the baseline lightness value and a positive lightness value change ($p = .024$), but only at the baseline hue value. All other comparisons within the hue × lightness interaction were not significant (all $p$’s $> .05$).

In other words, the pattern of the main effect of hue was consistent within the hue × lightness interaction effect for the baseline lightness value and positive lightness value change, but not at a negative lightness value change. A negative lightness value change moderated the hue effect. Furthermore, the pattern of the main effect of lightness was not consistent at any of the hue levels. Hue levels moderated all lightness effects. The effect of lightness was more pronounced at the baseline hue value, but there was no effect of lightness at neither a negative hue value change or a positive hue value change. A profile plot of the two-way interaction effect is provided in Figure 14.
For the interaction between saturation × lightness \((F_{(2.57,36.01)} = 5.03, p = .007, \eta_p^2 = .26)\) on choice response time, at the baseline lightness value, a negative saturation value change \((M = 1.00, SD = .28)\) produced significantly faster choice response times in comparison to both the baseline saturation value \((p = .015)\) and a positive saturation value change \((p = .006)\). At a negative lightness value change, a positive saturation value change \((M = 1.10, SD = .29)\) produced significantly slower choice response times in comparison to both the baseline saturation value \((p = .035)\) and a negative saturation value change \((M = .93, SD = .24, p = .026)\). For a positive lightness value change, there were no significant differences between levels of saturation \((p > .05)\). In addition, at the baseline saturation value, a negative lightness value change \((M = .93, SD = .22)\) produced significantly faster choice response times when compared to both the baseline lightness value \((M = 1.29, SD = .46, p = .015)\) and a positive lightness value change \((M = 1.28, SD = .58, p = .026)\). For a positive saturation value change, only a positive lightness value change \((M = 1.02, SD = .33)\) produced significantly faster choice response times than for the baseline lightness value \((M = 1.23, SD = .37, p = .006)\). All other comparisons within the saturation × lightness interaction were not significant \((all p’s > .05)\).
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In other words, the pattern of the main effect of saturation was consistent within the saturation × lightness interaction effect for the baseline lightness value, but not for a negative lightness value change or a positive lightness value change. Both a negative lightness value change and a positive lightness value change moderated the saturation effect. Furthermore, the pattern of the main effect of lightness was not consistent at any of the saturation levels. Saturation levels moderated all lightness effects. The effect of lightness was more pronounced at the baseline saturation value but was reversed at a positive saturation value change, and there was no effect of lightness at a negative saturation value change. A profile plot of the two-way interaction effect is provided in Figure 15.

![Image of bar graph showing mean choice response time (±1 SD) for saturation × lightness interaction effect for orange](image)

**Figure 15. Saturation × lightness interaction effect for orange**

The three-way interaction effect of hue × saturation × lightness on choice response time was also significant ($F_{(3.43, 47.97)} = 3.50, p = .018, \eta^2_p = .20$). A simple, simple main effects analysis was conducted to explore this three-way interaction to determine where the differences lie. The significant differences are summarised in Table 7.
Table 7. Significant Bonferroni comparisons of hue, saturation, and lightness

<table>
<thead>
<tr>
<th>Comparisons</th>
<th>Mean choice response time difference (s)</th>
<th>Std. Error</th>
<th>Lower bound</th>
<th>Upper bound</th>
</tr>
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<td>L- / S-</td>
<td>H- vs. Hb</td>
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<td>.04</td>
<td>-.24</td>
</tr>
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<td>Lb / Sb</td>
<td>H- vs. Hb</td>
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<td>-1.74</td>
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<td>H+ vs. Hb</td>
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<td>.26</td>
<td>-1.54</td>
</tr>
<tr>
<td>Lb / S+</td>
<td>H- vs. Hb</td>
<td>-.91***</td>
<td>.16</td>
<td>-1.34</td>
</tr>
<tr>
<td></td>
<td>H+ vs. Hb</td>
<td>-.72**</td>
<td>.19</td>
<td>-1.23</td>
</tr>
<tr>
<td>L+ / Sb</td>
<td>H- vs. Hb</td>
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<td>.33</td>
<td>-1.95</td>
</tr>
<tr>
<td></td>
<td>H+ vs. Hb</td>
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<td>.33</td>
<td>-1.90</td>
</tr>
<tr>
<td>L+ / S+</td>
<td>H- vs. Hb</td>
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<td>.12</td>
<td>-.71</td>
</tr>
<tr>
<td>Hb / S-</td>
<td>L- vs. Lb</td>
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<td>.06</td>
<td>-.32</td>
</tr>
<tr>
<td>Hb / Sb</td>
<td>L- vs. Lb</td>
<td>-.94*</td>
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<td>-1.70</td>
</tr>
<tr>
<td></td>
<td>L- vs. L+</td>
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<td>.34</td>
<td>-1.94</td>
</tr>
<tr>
<td>Hb / S+</td>
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</tr>
<tr>
<td></td>
<td>L+ vs. Lb</td>
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<td>.15</td>
<td>-0.95</td>
</tr>
<tr>
<td>H- / L-</td>
<td>S- vs. S+</td>
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<td>-.59</td>
</tr>
<tr>
<td>Hb / L-</td>
<td>S+ vs. Sb</td>
<td>.18**</td>
<td>.05</td>
<td>.05</td>
</tr>
<tr>
<td>Hb / Lb</td>
<td>S- vs. Sb</td>
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<tr>
<td></td>
<td>S- vs. S+</td>
<td>-.66**</td>
<td>.16</td>
<td>-1.08</td>
</tr>
</tbody>
</table>

Notes: H = hue, S = saturation, L = lightness

b = baseline, + = positive value change, - = negative value change

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

For differences between hue levels, at a negative lightness value change × a negative saturation value change, only a negative hue value change (M = .82, SD = .20) produced choice response times that were significantly faster than the baseline hue value (M = .96, SD = .28, p = .01). The same pattern emerged at a positive lightness value change × positive saturation value change (negative hue value change M = .86, SD = .21; baseline hue value M = 1.23, SD = .58, p = .03). On the other hand, at the baseline lightness value × baseline saturation value, both a negative hue value change (M = .91, SD = .27, p = .01) and a positive hue value change (M = 1.06, SD = .43, p = .022) produced significantly faster choice response
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times than the baseline hue value \((M = 1.89, SD = 1.07)\). The same pattern emerged at the baseline lightness value \(\times\) a positive saturation value change, both a negative hue value change \((M = .87, SD = .24, p < .001)\) and a positive hue value change \((M = 1.06, SD = .41, p = .006)\) produced significantly faster choice response times than the baseline hue value \((M = 1.78, SD = .74)\); as well as at a positive lightness value change \(\times\) baseline saturation value, both a negative hue value change \((M = .91, SD = .27, p = .018)\) and a positive hue value change \((M = .96, SD = .30, p = .024)\) produced significantly faster choice response times than the baseline hue value \((M = 1.97, SD = 1.38)\).

For differences between lightness levels, at the baseline hue value \(\times\) a negative saturation value change, a negative lightness value change produced significantly faster choice response times than the baseline lightness value \((M = 1.12, SD = .42, p = .038)\). At the baseline hue value \(\times\) baseline saturation value, a negative lightness value change \((M = .95, SD = .19)\) produced significantly faster choice response times than both the baseline lightness value \((p = .014)\) and a positive lightness value change \((p = .028)\). At the baseline hue value \(\times\) a positive saturation value change, both a negative lightness value change \((M = 1.13, SD = .28, p = .016)\) and a positive lightness value change \((p = .007)\) produced significantly faster choice response times than the baseline lightness value.

For differences between saturation levels, at a negative hue value change \(\times\) a negative lightness value change, a negative saturation value change produced significantly faster choice response times only in comparison to a positive saturation value change \((M = 1.13, SD = .51, p = .035)\). On the other hand, at the baseline hue value \(\times\) a negative lightness value change, a positive saturation value change produced significantly slower choice response times than the baseline saturation value \((p = .005)\). At the baseline hue value \(\times\) baseline lightness value, a negative saturation value change produced significantly faster choice response times than both the baseline saturation value \((p = .018)\) and a positive saturation value change \((p = .003)\).
All other comparisons were not significant within the hue × saturation × lightness three-way interaction effect (all p’s > .05). The means and standard deviations of each of the experimental conditions are provided in Table 8.

Table 8. Descriptive statistics for orange experimental conditions (N = 15)

<table>
<thead>
<tr>
<th>Condition</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (H- / S+ / L-)</td>
<td>.82</td>
<td>.20</td>
</tr>
<tr>
<td>2 (H- / Sb / L-)</td>
<td>.87</td>
<td>.21</td>
</tr>
<tr>
<td>3 (H- / S+ / L-)</td>
<td>1.13</td>
<td>.51</td>
</tr>
<tr>
<td>4 (H- / S- / Lb)</td>
<td>.93</td>
<td>.35</td>
</tr>
<tr>
<td>5 (H- / Sb / Lb)</td>
<td>.91</td>
<td>.27</td>
</tr>
<tr>
<td>6 (H- / S+ / Lb)</td>
<td>.87</td>
<td>.24</td>
</tr>
<tr>
<td>7 (H- / S- / L+)</td>
<td>.94</td>
<td>.29</td>
</tr>
<tr>
<td>8 (H- / Sb / L+)</td>
<td>.91</td>
<td>.27</td>
</tr>
<tr>
<td>9 (H- / S+ / L+)</td>
<td>.86</td>
<td>.21</td>
</tr>
<tr>
<td>10 (Hb / S- / L-)</td>
<td>.96</td>
<td>.28</td>
</tr>
<tr>
<td>11 (Hb / Sb / L-)</td>
<td>.95</td>
<td>.19</td>
</tr>
<tr>
<td>12 (Hb / S+ / L-)</td>
<td>1.13</td>
<td>.28</td>
</tr>
<tr>
<td>13 (Hb / S- / Lb)</td>
<td>1.12</td>
<td>.42</td>
</tr>
<tr>
<td>14 (Hb / Sb / Lb)</td>
<td>1.89</td>
<td>1.07</td>
</tr>
<tr>
<td>15 (Hb / S+ / Lb)</td>
<td>1.78</td>
<td>.74</td>
</tr>
<tr>
<td>16 (Hb / S- / L+)</td>
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<td>.35</td>
</tr>
<tr>
<td>17 (Hb / Sb / L+)</td>
<td>1.97</td>
<td>1.38</td>
</tr>
<tr>
<td>18 (Hb / S+ / L+)</td>
<td>1.23</td>
<td>.58</td>
</tr>
<tr>
<td>19 (H+ / S- / L-)</td>
<td>1.00</td>
<td>.35</td>
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<td>20 (H+ / Sb / L-)</td>
<td>.98</td>
<td>.39</td>
</tr>
<tr>
<td>21 (H+ / S+ / L-)</td>
<td>1.04</td>
<td>.38</td>
</tr>
<tr>
<td>22 (H+ / S- / Lb)</td>
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<td>.24</td>
</tr>
<tr>
<td>23 (H+ / Sb / Lb)</td>
<td>1.06</td>
<td>.43</td>
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<td>24 (H+ / S+ / Lb)</td>
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<td>26 (H+ / Sb / L+)</td>
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</tr>
<tr>
<td>27 (H+ / S+ / L+)</td>
<td>.98</td>
<td>.34</td>
</tr>
</tbody>
</table>

Notes: H = hue, S = saturation, L = lightness  
   b = baseline, + = positive value change, - = negative value change

In other words, the combined effects of hue, saturation, and lightness changed the overall effect of each colour attribute on choice response time. In general, the effect of hue in the three-way interaction remained consistent with the overall main effect of hue. The effect of saturation was moderated by the hue × lightness
interaction; whereas the main effect of saturation showed that a negative saturation value change produced significantly faster choice response times than both the baseline saturation value and a positive saturation value change, this was not the case in the three-way interaction. This effect was only consistent at the baseline hue and lightness values. On the other hand, only half of the saturation effect was found with a negative hue value change × a negative lightness value change, and a reversal of the effect between a negative saturation value change and a positive saturation value change with the baseline hue value × a negative lightness value change. There was no saturation effect with a positive hue value change × all lightness levels.

The effect of lightness was moderated by the hue × saturation interaction; whereas the main effect of lightness showed that only a negative lightness value change produced significantly faster choice response times than the baseline lightness value, this effect was only found with the baseline hue value × a negative saturation value change. In addition, at the baseline hue value × baseline saturation value, this effect was present in conjunction with another significant difference with a positive lightness value change. Furthermore, both a negative lightness value change and a positive lightness value change produced faster choice response times at the baseline hue value × positive saturation value change. For a negative hue value change × all levels of saturation and a positive hue value change × all levels of saturation, there was no effect of lightness. The combined effects of saturation and lightness were moderated by hue. Profile plots of the three-way interaction effect are shown in Figure 16.
Figure 16. Saturation x lightness at each hue level for orange
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5.4.6.6. Effects: green

All main effects (hue $\chi^2(2) = 1.56$; saturation $\chi^2(2) = 1.04$; lightness $\chi^2(2) = .54$) and all interaction effects (hue $\times$ saturation $\chi^2(9) = 15.89$; hue $\times$ lightness $\chi^2(9) = 16.84$; saturation $\times$ lightness $\chi^2(9) = 12.45$; hue $\times$ saturation $\times$ lightness $\chi^2(35) = 49.07$) met the assumption of sphericity, as indicated by Mauchly’s test (all $p$’s > .05). As such, no corrections to the degrees of freedom were performed.

The main effect of hue and saturation on choice response times were significant (hue $F_{(2, 28)} = 16.26$, $p < .001$, $\eta_p^2 = .54$; saturation $F_{(2, 28)} = 13.04$, $p < .001$, $\eta_p^2 = .48$). The main effect of lightness was not significant ($F_{(2, 28)} = 4.19$, $p > .05$, $\eta_p^2 = .23$), but was involved in a higher-order interaction effect. Post hoc tests with Bonferroni adjustment revealed that, for hue, both a negative hue value change ($M = 1.03$, $SD = .25$, $p < .001$) and a positive hue value change ($M = 1.01$, $SD = .26$, $p = .001$) produced choice response times that were significantly faster than the baseline hue value ($M = 1.22$, $SD = .28$). There was no significant difference between negative and positive hue value changes ($p > .05$). For the colour green, a positive hue value change can be translated visually to describe a cooler colour (i.e. closer to blue, further away from yellow), and a negative hue value change can be translated visually to describe a warmer colour (i.e. closer to yellow/orange, further away from blue). Hence, colour discrimination occurred faster when the green colour was warmer than the baseline green colour and also when the green colour was cooler than the baseline green colour.

For saturation, a negative saturation value change ($M = .98$, $SD = .26$) produced choice response times that were significantly faster than both the baseline saturation value ($M = 1.14$, $SD = .23$, $p = .001$) and a positive saturation value change ($M = 1.13$, $SD = .29$, $p = .001$). There was no significant difference in response times between the baseline saturation value and a positive saturation value change ($p > .05$). A positive saturation value change can be translated visually to describe a more vibrant green colour and a negative saturation value change can be translated visually to describe a duller green colour. Hence, colour discrimination occurred faster when the green colour was duller than the baseline green colour, but
not when it was more vibrant than the baseline green colour. Figure 17 shows the significant main effects.

**Figure 17. Main effects of hue and saturation for green**

The two-way interaction effect of hue × lightness on choice response times was significant \( F(4, 56) = 7.59, p < .001, \eta^2_p = .35 \). Simple effects analysis was conducted to further explore this interaction. At the baseline hue value, a negative lightness value change \( (M = .98, SD = .22) \) produced significantly faster choice response times than both the baseline lightness value \( (M = 1.49, SD = .53, p = .005) \) and a positive lightness value change \( (M = 1.19, SD = .32, p = .017) \). At the baseline lightness value, both a negative hue value change \( (M = 1.00, SD = .27, p = .004) \) and a positive hue value change \( (M = 1.00, SD = .32, p = .009) \) produced significantly faster choice response times than the baseline hue value \( (p = .017) \). For a positive lightness value change, only a positive hue value change \( (M = .93, SD = .25, p = .002) \) produced significantly faster choice response times than the baseline hue value. There was no effect of a negative lightness value change across all hue levels. All other comparisons within the hue × lightness interaction were not significant (all \( p \)'s > .05). Figure 18 shows the profile plots of the two-way interaction.
Figure 18. Hue × lightness interaction effect for green

The other interaction effects were not significant (hue × saturation \( F_{(4, 56)} = 1.63, \eta^2_p = .10 \); saturation × lightness \( F_{(4, 56)} = 2.26, \eta^2_p = .14 \); hue × saturation × lightness \( F_{(8, 112)} = 1.45, \eta^2_p = .09 \); all \( p \)'s > .05). All means and standard deviations are provided in Table 9.
Table 9. Descriptive statistics for green experimental conditions (N = 15)

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<tr>
<th>Condition</th>
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<th>Standard Deviation</th>
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</tr>
<tr>
<td>18</td>
<td>1.22</td>
<td>.53</td>
</tr>
<tr>
<td>19</td>
<td>.97</td>
<td>.33</td>
</tr>
<tr>
<td>20</td>
<td>1.06</td>
<td>.52</td>
</tr>
<tr>
<td>21</td>
<td>1.22</td>
<td>.44</td>
</tr>
<tr>
<td>22</td>
<td>.95</td>
<td>.34</td>
</tr>
<tr>
<td>23</td>
<td>1.07</td>
<td>.47</td>
</tr>
<tr>
<td>24</td>
<td>.99</td>
<td>.38</td>
</tr>
<tr>
<td>25</td>
<td>.91</td>
<td>.26</td>
</tr>
<tr>
<td>26</td>
<td>1.04</td>
<td>.57</td>
</tr>
<tr>
<td>27</td>
<td>.84</td>
<td>.21</td>
</tr>
</tbody>
</table>

Notes: H = hue, S = saturation, L = lightness
b = baseline, + = positive value change, - = negative value change

5.4.7. Summary

This study was conducted to calibrate appropriate stimuli for subsequent experiments. It also clearly demonstrated the effects of colour similarity on discriminability as measured by choice response time. Individual elements of colour—hue, saturation, and lightness—were also evaluated for their effects on discriminability. Differences across colour categories were exhibited.

For purple, the findings showed a main effect for hue only. For orange, the findings showed all main effects for hue, saturation, and lightness, all two-way interactions between hue × saturation, hue × lightness, and saturation × lightness,
and a three-way interaction between hue $\times$ saturation $\times$ lightness. For green, the findings showed main effects for hue and saturation, but only one two-way interaction between hue $\times$ lightness. In general, the effect of hue across all three colour categories was salient. Choice response times for orange were the most sensitive to changes in all three colour attributes, followed by green, and choice response times for purple were only sensitive to changes in hue.

5.5. Study 1B

5.5.1. Research purpose and justification

The purpose of Study 1B was twofold. The first was to develop and pre-test a scale to measure different attitudinal measures of consumer confusion. The second purpose was to establish the appropriateness of this scale for use as a proxy measure for choice response time in an online environment. This proxy was to be used as the dependent variable measured in Study 2, in an online administration environment, where response time accuracy can highly variable (due to uncontrollable factors, such as Internet connection quality and speed) and, therefore, inadequate for meaningful analysis.

The consumer confusion concept, operationalised as a *consumer processual state of confusion* (CP-SoC), was deconstructed through extensive literature review, evaluation, and discussion with experts in the field. Four main formative constructs represent the extent of confusion perceived by the consumer. These are: feelings of discomfort (state of affect), feelings of difficulty (process), feelings of confidence (mental outcome), and feelings of confusion (state of mind); all relating to the decision task at hand (see Chapter 3 for a detailed explanation). These formative constructs were concluded to be the most representative of the consumer confusion experience in the context of this research (i.e. the fast-moving consumer goods [FMCG] context), however in other contexts the saliency of each of these constructs may differ from the FMCG context.
5.5.2. Scale items

Existing scales were adapted for three of the four constructs. Feelings of discomfort were measured using adaptations of the psychological discomfort scale (A. J. Elliot & Devine, 1994) and the general anxiety scale (Winterich & Haws, 2011); feelings of difficulty were measured using adaptations of the difficulty of task scale (Argo, Popa, & Smith, 2010) and the choice difficulty scale (Xu, Jiang, & Dhar, 2013); and feelings of confidence were measured using an adaptation of the general confidence scale (Argo et al., 2010).

A new scale containing three items was developed to measure feelings of confusion. Much of the prior research in this area has focussed on the behavioural outcome of confusion (i.e. misidentification and misattribution) and, therefore, prior research did not provide guidance on possible scales that could be used to measure a consumer’s perceived confusion. Furthermore, more recent research in the area is heavily contextualised, rendering their scales unusable in alternative contexts. As such, a parsimonious approach was taken for this current research that resulted in three succinct items to measure feelings of confusion that was appropriate for this study, but also generalisable across any decision context. All scale items used in Study 1B are provided in Table 10.
Table 10. Adapted scale items

<table>
<thead>
<tr>
<th>Construct</th>
<th>Existing scale</th>
<th>Adapted items</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Psychological discomfort</td>
<td>I felt uncomfortable making the decision.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I felt uneasy making the decision.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I felt bothered making the decision.</td>
</tr>
<tr>
<td></td>
<td>General anxiety</td>
<td>I felt tense when I evaluated the colours.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I felt nervous when I evaluated the colours.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I felt anxious when I evaluated the colours.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I felt stressed when I evaluated the colours.</td>
</tr>
<tr>
<td></td>
<td>Difficulty of task</td>
<td>The task was difficult.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The task was hard.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The task was easy.</td>
</tr>
<tr>
<td></td>
<td>Choice difficulty</td>
<td>It was difficult for me to choose the answer I wanted.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I was frustrated when making the choice.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I was hesitant when making the choice.</td>
</tr>
<tr>
<td></td>
<td>General confidence</td>
<td>I am confident about the decision I made.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I am certain about the decision I made.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I am sure about the decision I made.</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>The decision was confusing to make.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I felt confused while making my decision.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I was certain about my decision.</td>
</tr>
</tbody>
</table>

Notes: *Reverse-coded items
All item responses were measured using a seven-point Likert-type scale
(1 = strongly disagree; 7 = strongly agree)

5.5.3. Participants

Study 1B was conducted on a voluntary sample of participants, collected from a population of students and staff from a large New Zealand University. The recruitment involved a convenience sampling method. A total of 9 participants (4 female and 5 male; age range 27 to 61+ years) chose to take part in the study. One participant dropped out of the study but provided consent for the use of the data collected until the point of drop-out.

5.5.4. Stimuli

A total of 15 experimental stimuli and one practice stimulus were presented in an identical manner to Study 1A. The 15 experimental stimuli were chosen from
the set of stimuli used in Study 1A. The criterion for choosing this subset was choice response time. In other words, for each of the three colours (purple, orange, and green), two images that elicited shorter response times (i.e. different colours), and two images that elicited longer response times (i.e. similar colours) were chosen. In addition, the stimulus with identical coloured squares (i.e. the baseline colours) was also included. Thus, a total of five stimuli for each of the three secondary colours were chosen. The full range of experimental stimuli images are provided in Appendix 3. Details of the 15 stimuli are provided in Table 11.

Table 11. Experimental stimuli details for Study 1B

<table>
<thead>
<tr>
<th>Stimulus</th>
<th>Colour</th>
<th>H (°)</th>
<th>S (%)</th>
<th>L (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Purple</td>
<td>226 (-)</td>
<td>50 (-)</td>
<td>23 (-)</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>270 (0)</td>
<td>50 (-)</td>
<td>34 (0)</td>
</tr>
<tr>
<td>3</td>
<td>Purple</td>
<td>270 (0)</td>
<td>83 (0)</td>
<td>34 (0)</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>270 (0)</td>
<td>100 (+)</td>
<td>34 (0)</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>283 (+)</td>
<td>100 (+)</td>
<td>39 (+)</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>17 (-)</td>
<td>71 (-)</td>
<td>44 (-)</td>
</tr>
<tr>
<td>7</td>
<td>Orange</td>
<td>27 (0)</td>
<td>70 (-)</td>
<td>55 (0)</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>27 (0)</td>
<td>92 (0)</td>
<td>55 (0)</td>
</tr>
<tr>
<td>9</td>
<td></td>
<td>27 (0)</td>
<td>100 (+)</td>
<td>55 (0)</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>36 (+)</td>
<td>100 (+)</td>
<td>61 (+)</td>
</tr>
<tr>
<td>11</td>
<td></td>
<td>57 (-)</td>
<td>43 (-)</td>
<td>38 (-)</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td>84 (0)</td>
<td>43 (-)</td>
<td>45 (0)</td>
</tr>
<tr>
<td>13</td>
<td>Green</td>
<td>84 (0)</td>
<td>65 (0)</td>
<td>45 (0)</td>
</tr>
<tr>
<td>14</td>
<td></td>
<td>84 (0)</td>
<td>83 (+)</td>
<td>45 (0)</td>
</tr>
<tr>
<td>15</td>
<td></td>
<td>118 (+)</td>
<td>83 (+)</td>
<td>55 (+)</td>
</tr>
</tbody>
</table>

Notes: 
(-) Negative value change from baseline
(0) No value change from baseline
(+ ) Positive value change from baseline

The findings of Study 1A indicated that no significant differences in choice response time were present between the two different question wordings (i.e. “are these colours different?” and “are these colours the same?”), as well as between the different positions of the baseline square (i.e. left and right). As question wording and the baseline square position had no effect on overall choice response time, the latter for both (“are these colours the same?” and the right baseline position) were used for Study 1B. In addition, to ensure maximum task comprehension, the key
press response options were changed so that ‘1’ indicated ‘SAME’ and ‘2’ indicated ‘DIFFERENT.’ See Figure 19 for stimulus formatting and sample stimuli.

Figure 19. Study 1B sample stimuli

5.5.5. Design

A full factorial, repeated-measures experimental design was employed for Study 1B. This resulted in a total of 304 response observations and 16 choice response times per participant, except for the participant who dropped out. As such, a total of 2679 question responses and a total of 141 choice response times were
collected for Study 1B. It took approximately 20 minutes for each participant to complete the experimental questionnaire.

5.5.6. Administration and procedure

The experiment was conducted in the same manner as Study 1A, using the same equipment and software. However, the PsychoPy software version was updated for this current pre-test to version 1.85.1. This did not produce any executonal differences to Study 1A. All participants completed the experimental questionnaire under researcher supervision.

Participants were presented with a set of instructions (see Figure 20) and were then presented with the practice trial first (a pair of black and white squares; see Appendix 3). Choice response times were measured using a keypress of ‘1’ for ‘SAME’ or ‘2’ for ‘DIFFERENT.’ Immediately after the practice trial, participants were presented with the adapted scale items in randomised order. They were asked to respond to each of the questions using the number keys ranging from ‘1’ to ‘7.’ This process was repeated for the remaining 15 experimental stimuli in randomised order. A verbal debriefing discussion was held after each participant’s completion of the experiment.

Thank you for choosing to participate in this research. Your responses are valuable to us.

**Questionnaire Instructions**

This questionnaire contains blocks of questions. Each block begins with a 1 second pause. There are a total of 16 blocks. The first block is a practice one.

For each block, you will see two coloured squares on the screen.

The question asked will be, "Are these colours the same?"

Your task is to answer this question as quickly as possible, by pressing either 1 or 2 on the keyboard.

1 – SAME
2 – DIFFERENT

Once you answer this question, a few more questions will be asked based on the coloured squares you saw.

Instructions will be given for these questions at the top of the screen, so please ensure you read them carefully before selecting your response.

Please remember there are no right or wrong answers in this questionnaire, because we all see colours differently.

Press the SPACEBAR to continue.

Figure 20. Study 1B instructions
Research Methodology

5.5.7. Statistical analysis and results

The Principal Components Analysis (PCA) dimension reduction technique was conducted using IBM SPSS Statistics 24 software to explore the 19 scale items. This approach is consistent with formative measurement that the conceptual model stipulates (Edwards, 2011; Jolliffe, 1986). Orthogonal rotation (varimax) was used to ensure the most interpretable and uncorrelated clusters of components (Field, 2013). A summary of the scale item names and descriptions used in the PCA is provided in Table 12.

Table 12. Scale item summary descriptions

<table>
<thead>
<tr>
<th>Item name</th>
<th>Item description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMQ1</td>
<td>The decision was confusing to make.</td>
</tr>
<tr>
<td>CMQ2</td>
<td>I felt confused while making my decision.</td>
</tr>
<tr>
<td>CMQ3_RC</td>
<td>I was certain about my decision.</td>
</tr>
<tr>
<td>CMQ4</td>
<td>I felt tense when I evaluated the colours.</td>
</tr>
<tr>
<td>CMQ5</td>
<td>I felt nervous when I evaluated the colours.</td>
</tr>
<tr>
<td>CMQ6</td>
<td>I felt anxious when I evaluated the colours.</td>
</tr>
<tr>
<td>CMQ7</td>
<td>I felt stressed when I evaluated the colours.</td>
</tr>
<tr>
<td>CMQ8</td>
<td>I felt uncomfortable making the decision.</td>
</tr>
<tr>
<td>CMQ9</td>
<td>I felt uneasy making the decision.</td>
</tr>
<tr>
<td>CMQ10</td>
<td>I felt bothered making the decision.</td>
</tr>
<tr>
<td>CMQ11</td>
<td>The task was difficult.</td>
</tr>
<tr>
<td>CMQ12</td>
<td>The task was hard.</td>
</tr>
<tr>
<td>CMQ13_RC</td>
<td>The task was easy.</td>
</tr>
<tr>
<td>CMQ14</td>
<td>It was difficult for me to choose the answer I wanted.</td>
</tr>
<tr>
<td>CMQ15</td>
<td>I was frustrated when making the choice.</td>
</tr>
<tr>
<td>CMQ16</td>
<td>I was hesitant when making the choice.</td>
</tr>
<tr>
<td>CMQ17_RC</td>
<td>I am confident about the decision I made.</td>
</tr>
<tr>
<td>CMQ18_RC</td>
<td>I am certain about the decision I made.</td>
</tr>
<tr>
<td>CMQ19_RC</td>
<td>I am sure about the decision I made.</td>
</tr>
</tbody>
</table>

Notes: \( RC \) Reverse-coded items

5.5.7.1. Statistical assumptions

Principal Components Analysis (PCA) requires two main assumptions to be satisfied. These are: (1) sampling adequacy and (2) sphericity (Field, 2013). Sampling adequacy is assessed using the Kaiser-Meyer-Olkin measure of sampling adequacy (KMO statistic) and indicates whether the sample size is appropriate for
PCA. This value should be above the minimum criterion of .5 (Field, 2013). Sphericity is assessed using Bartlett’s test of sphericity and indicates whether the correlations between the variables are appropriate for PCA and suitable for the detection of underlying structures. This test should be significant as an indication of appropriately correlated items (Field, 2013).

5.5.7.2. First iteration of PCA

An initial iteration of the PCA was run on all 19 scale items. The test of sampling adequacy (KMO statistic = .94), and all individual KMO values for the 19 items were above .8. Both these values are above the minimum criterion, verifying the sampling adequacy for the first iteration of the PCA. In addition, Bartlett’s test indicated that there was an appropriate correlation between the items and the data is, therefore, suitable for detecting structures ($\chi^2(191) = 2754.18, p < .001$). Hence, the data met both assumptions of the PCA.

Three components were extracted using Kaiser’s criterion, which requires eigenvalues greater than 1 (Bradlow, 2002; Field, 2013). The scree plot also showed a point of inflection following the third component, also indicative of a three-component solution (see Figure 21). Furthermore, linguistic, conceptual, and theoretical evaluation of the component items confirmed the three-component solution. Therefore, the solution was deemed appropriate.
The results of the initial PCA also indicated that four of the 19 items were eligible for removal (items CMQ4, CMQ6, CMQ8, and CMQ18_RC) based on weak component loadings. A further three items (CMQ5, CMQ9, and CMQ_16) were also removed after evaluation of the communalities, factor loadings, and theoretical coherence, in order to reduce the overall number of items for the first component. This resulted in a reduced set of 12 items from the full set of 19 items.

5.5.7.3. Second iteration of PCA

A second iteration of the PCA was run on the reduced set of 12 items with orthogonal rotation and a fixed three-component extraction. The test of sampling adequacy (KMO statistic = .93), and all individual KMO values for the 12 items were above .8. Both these values are above the minimum criterion, verifying the sampling adequacy for the second iteration of the PCA. In addition, Bartlett’s test indicated that there was an appropriate correlation between the items and the data.

Figure 21. Scree plot of first iteration of PCA with point of inflection
is, again, suitable for detecting structures ($\chi^2(66) = 1443.09, p < .001$). Hence, the reduced set of data met both assumptions of the PCA.

The fixed three components had eigenvalues close to 1, and in combination explained 79.3% of the variance in the items. The scree plot, like the initial PCA, showed an inflection point following the third component (see Figure 22). In addition, the average communality was .788, the R-matrix and anti-image correlations were appropriate, and the rotated component loadings were well-above the minimum criterion of .4 required for substantive importance (Field, 2013). Taken together, this indicated that the fixed three-component extraction is reliable and stable.

![Scree Plot](image)

**Figure 22. Scree plot of second iteration of PCA with point of inflection**

The final rotated extraction provided a simple component structure. All items loaded heavily on a single component. The components and component loadings are provided in Table 13.
Table 13. Final rotated component matrix

<table>
<thead>
<tr>
<th>Item Code</th>
<th>Description</th>
<th>Component 1</th>
<th>Component 2</th>
<th>Component 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMQ1</td>
<td>The decision was confusing to make.</td>
<td>.850</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CMQ14</td>
<td>It was difficult for me to choose the answer I wanted.</td>
<td>.795</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CMQ11</td>
<td>The task was difficult.</td>
<td>.793</td>
<td>.349</td>
<td></td>
</tr>
<tr>
<td>CMQ12</td>
<td>The task was hard.</td>
<td>.790</td>
<td>.313</td>
<td></td>
</tr>
<tr>
<td>CMQ2</td>
<td>I felt confused while making my decision.</td>
<td>.773</td>
<td>.419</td>
<td></td>
</tr>
<tr>
<td>CMQ13_RC</td>
<td>The task was easy.</td>
<td>.673</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CMQ10</td>
<td>I felt bothered making the decision.</td>
<td>.365</td>
<td>.835</td>
<td></td>
</tr>
<tr>
<td>CMQ15</td>
<td>I was frustrated when making the choice.</td>
<td>.420</td>
<td>.833</td>
<td></td>
</tr>
<tr>
<td>CMQ7</td>
<td>I felt stressed when I evaluated the colours.</td>
<td>.440</td>
<td>.825</td>
<td></td>
</tr>
<tr>
<td>CMQ19_RC</td>
<td>I am sure about the decision I made.</td>
<td></td>
<td></td>
<td>.850</td>
</tr>
<tr>
<td>CMQ17_RC</td>
<td>I am confident about the decision I made.</td>
<td></td>
<td></td>
<td>.802</td>
</tr>
<tr>
<td>CMQ3_RC</td>
<td>I was certain about my decision.</td>
<td></td>
<td></td>
<td>.780</td>
</tr>
</tbody>
</table>

Notes: \( ^{RC} \) Reverse-coded items
Loadings below .3 omitted
Loadings above .5 in bold

The items that clustered on the same components suggested that component 1 represents perceived confusion and task difficulty, component 2 represents perceived discomfort, and component 3 represents decision confidence. This clustering not only conforms to prior research findings, it also supports the hypothesised constructs that represent a consumer processual state of confusion (CP-SoC). It is not surprising that perceived confusion and task difficulty have loaded on the same factor. These constructs are, conceptually, interrelated. If one perceives a task to be difficult, they would perceive some form of confusion, and vice versa. For meaningful interpretation and analysis, discussions with experts led to the separation of these two constructs based on linguistic and conceptual evaluation.

5.5.7.4. Reliability analysis

A reliability analysis was conducted on each component, with component 1 separated into two linguistically and conceptually distinct constructs. All four subscales had high reliabilities (perceived confusion Cronbach’s \( \alpha = .93 \); task difficulty Cronbach’s \( \alpha = .84 \); perceived discomfort Cronbach’s \( \alpha = .95 \); decision
confidence Cronbach’s α = .82). A summary of the final subscales and Cronbach’s α values are presented in Table 14.

**Table 14. Consumer processual state of confusion (CP-SoC) subscales**

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Cronbach’s α</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived confusion</td>
<td>0.925</td>
<td>The decision was confusing to make.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>It was difficult for me to choose the answer I wanted.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I felt confused while making my decision.</td>
</tr>
<tr>
<td>Task difficulty</td>
<td>0.841</td>
<td>The task was difficult.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The task was hard.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The task was easy.</td>
</tr>
<tr>
<td>Perceived discomfort</td>
<td>0.947</td>
<td>I felt bothered making the decision.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I was frustrated when making the choice.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I felt stressed when I evaluated the (stimulus).</td>
</tr>
<tr>
<td>Decision confidence</td>
<td>0.818</td>
<td>I am sure about the decision I made.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I am confident about the decision I made.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I was certain about my decision.</td>
</tr>
</tbody>
</table>

*Notes: 1 Reverse-coded items*

5.5.7.5. Choice response time proxy

The component scores using the final three-component PCA extraction were correlated with choice response time to validate the appropriateness of the final four consumer confusion subscales to be used as a proxy for choice response time in Study 2. Component 1 (perceived confusion and task difficulty) had a significant and positive correlation with choice response time (r = 0.43, p < 0.001). That is, as perceived confusion and task difficulty increased, it took longer for the participant to make a choice. Component 2 (perceived discomfort) had a significant and negative correlation with choice response time (r = -0.24, p = 0.004). That is, as perceived discomfort increased, it took less time for the participant to make a choice. This may indicate that increased discomfort leads to the desire to exit the situation or task, or even the desire to abandon the task at hand (as making the decision in the experiment was the only option for the participant to move on to the next task).

Component 3, however, did not have a significant correlation with choice response time (p > .05). This finding may be due to the nature of the specific task...
required of the participants for Study 1B, where decision confidence was not a defining characteristic of the overall confusion experienced. In general, however, this finding aligns with the overall conceptualisation and theorisation of the consumer processual state of confusion (CP-SoC) construct, where the situation or context would make certain aspects of CP-SoC more salient over other aspects. Hence, this third component was included in the overall CP-SoC scale for Study 2, and overall, all three components and correlations with choice response time was deemed appropriate for use as a proxy variable in Study 2.

5.5.8. Summary

This study was conducted to test a scale of consumer confusion, in the form of a consumer processual state of confusion (CP-SoC) that had been developed through an analysis of extant literature and related term etymologies. A reduced set of subscales were derived from the study, and the scale reliabilities were verified through statistical analysis. A final 12-item scale that was appropriate for use as a proxy variable instead of choice response latency was developed. This scale was employed in the final and main study of this research, Study 2.

5.6. Study 2

5.6.1. Research purpose and justification

The purpose of Study 2 was to investigate the influence of colour similarity on confusion experienced by the consumer in the fast-moving consumer goods (FMCG) context. This context was chosen because consumer confusion is an important concern in these highly-branded categories. The study was designed based on the findings of Study 1A and Study 1B. As Study 2 was the primary interest of this research, a much larger sample was needed to increase statistical power and the generalisability of the findings.

For logistical reasons, it was not practical to administer a large online sample using the PsychoPy software and associated response latency measurements employed in Study 1A and 1B. Experiments administered online rely on the speed
of the Internet access obtained by the participant at any given time, as well as the responsiveness of the domain server used by the experimental platform. These variations in effective speed are large, random, uncontrollable, and immeasurable, and they overwhelm the millisecond-level differences that need to be measured for response times. This renders any type of web-based response or reaction times unreliable, especially in the context of scientific investigation.

An alternative approach was developed for Study 2. A consumer confusion scale was derived from Study 1B and used as the dependent variable for Study 2. The scale employed attitudinal measures that were significantly correlated with response times, providing convergent validity to the measure. Although measuring choice response times in addition to the scale would have been desirable, it was not possible for methodological reasons.

5.6.2. Participants

Participants for Study 2 were supplied by the Qualtrics Online Panel. The sample was collected from a population of adults over the age of 18 years, representative of age, gender, and ethnicity demographics in the United States. A total of 741 individual responses were collected. Of these, 310 participants were screened out based on: type of device used, consent for participation, and age. The questionnaire was only compatible with desktop or laptop computers; thus all other devices were screened out. In addition, those who explicitly indicated that they did not provide consent were also screened out. Lastly, those below the age of 18 years were screened out.

Of the remaining 431 participants, 19 participants were excluded for (1): incomplete responses \((n = 8)\), and (2) low-quality responses \((n = 11)\). Criteria for low-quality responses were:

1. Total time taken to complete questionnaire was less than six minutes;
2. Total time taken to complete questionnaire was more than 60 minutes;
3. Amount of effort put into the questionnaire tasks was low (measured on a 1 – 7 point Likert-type scale—responses with values 1 to 3 were removed).
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The final remaining sample consisted of 412 valid participants. Of these, 196 (47.6%) were female and 216 (52.4%) were male. The average age of participants was 45.39 years \((SD = 16.86)\). Participants of the Qualtrics Online Panel are remunerated on a points-based system, which they accrue and can spend on items, such as gift vouchers. Points collected through participation in this study translated to a cash value between USD $0.50 and USD $3.00.

5.6.3. Stimuli

Stimuli for Study 2 consisted of four branded images obtained from a Google Image search (see Figure 23, Figure 24, Figure 25, and Figure 26). Images chosen for this study were labelled for non-commercial reuse with modification. Images chosen were all: (1) standard front-facing packages, (2) packages of the original and brand-representative product, and (3) in the original brand colours. The four brands and brand-representative products chosen were:

1. Hershey’s milk chocolate,
2. Milka milk chocolate,
3. Red Bull original flavour energy drink,
4. V Energy original flavour energy drink.
Figure 23. Hershey’s package image

Figure 24. Milka package image

Figure 25. Red Bull package image

Figure 26. V Energy package image
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These brands were chosen based on expected levels of brand familiarity within the population of interest. Specifically, based on market share, Hershey’s and Red Bull were expected to be more familiar to the population of interest than Milka and V Energy (Chocolate, 2017; Del Buono, 2017). Both Hershey’s and Red Bull are one of the leading brands in their respective product categories, whereas Milka and V Energy brands are not sold in the United States as they are not directly imported.

The colour of the images was altered using Adobe Photoshop Creative Cloud 2017. Four versions of colour alterations were performed on each of the four brands and were visually tested by an expert panel. Of these, two versions of each brand were selected to be used as experimental stimuli for Study 2—one visually similar in colour to the original image, and one visually different in colour to the original image. These two versions were then tested again with the same expert panel for further colour adjustments to ensure the visual similarity (and difference) in colour were perceptually comparable in magnitude across the four brands. This adjustment process had to be conducted qualitatively as colour perception is complex, subjective, and varied across different individuals and different colour categories (as was empirically demonstrated in Study 1A).

Each stimulus consisted of a pair of images of the same brand. One image was the original-coloured image (‘baseline’) and the second was the colour-altered image (‘similar’ or ‘different’). To minimise contrast effects when displayed on a computer screen, the stimuli were presented on the same neutral grey background used in Study 1A and 1B. Figure 27 provides a sample of the experimental stimuli used. The full series of images used in Study 2 are provided in Appendix 4.
5.6.4. Design

A 3 (colour similarity: identical, similar, different) × 2 (brand familiarity: unfamiliar, familiar) × 2 (product category: milk chocolate, energy drink) repeated-measures, balanced, full factorial experimental design was employed. This resulted in 12 different experimental conditions, and participants were exposed to a total of 12 corresponding stimuli that had been manipulated on colour, brand, and product
category, and their degree of consumer processual state of confusion (CP-SoC) was measured using the CP-SoC scale developed in Study 1B.

Two different scenarios were used to separate and signal familiar and unfamiliar brands to participants (see Appendix 5). Special efforts were made to minimise potential extraneous variation. All conditions and stimuli presentations were counterbalanced and randomised for all participants. Study 1A found that the position of the baseline image (i.e. the original image in Study 2) did not influence choice response time. However, as the CP-SoC scale was used to obtain scores as the dependent variable (instead of a latency measure), both left and right baseline positions were used for this study. To minimise participant fatigue, each participant was only presented with one of the two positions for each brand, resulting in a total of three stimuli for each of the four brands used in Study 2. A summary of the experimental conditions is provided in Table 15.

<table>
<thead>
<tr>
<th>Product category (PC)</th>
<th>Brand familiarity (BF)</th>
<th>Colour similarity (CS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk chocolate PC(^1)</td>
<td>Familiar BF(^1)</td>
<td>Identical CS(^1)</td>
</tr>
<tr>
<td></td>
<td>Unfamiliar BF(^2)</td>
<td>Similar CS(^2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Different CS(^3)</td>
</tr>
<tr>
<td>Energy drink PC(^2)</td>
<td>Familiar BF(^1)</td>
<td>Identical CS(^1)</td>
</tr>
<tr>
<td></td>
<td>Unfamiliar BF(^2)</td>
<td>Similar CS(^2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Different CS(^3)</td>
</tr>
</tbody>
</table>

5.6.5. Administration and procedure

The experimental questionnaire was both programmed and administered online, through the Qualtrics Survey Software platform. Participants were sent an email invitation with a link to the questionnaire for completion at their leisure. The first screen of the questionnaire was the participant information sheet and indication of consent. This was then followed by screener questions. Once participants
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successfully reached the end of the screener questions, their familiarity with a selection of brands consisting of both experimental brands and filler brands was measured.

Upon completion of all brand familiarity questions, the participant then moved on to completing the main experimental tasks. The main task was in the form of a decision choice task, and the participant's goal was to select between two branded packages, in response to the question: “which one is the original flavour?” The options were between 1 (right-hand package) or 2 (left-hand package). The stimulus was presented for approximately two seconds, and then was programmed to automatically move on to the choice task. Once participants indicated their choice, confusion was measured using the consumer processual state of confusion (CP-SoC) scale. This process was repeated for the remaining 11 trials. Basic demographic information was collected at the end of the questionnaire. A full script of the experimental questionnaire is provided in Appendix 6.

5.6.6. Statistical analysis procedure

The data collected for Study 2 was analysed using IBM SPSS Statistics (version 24) software, using a three-way Repeated-Measures Analysis of Variance (RM-AVOVA). The purpose of this analysis was to test the hypotheses presented in Chapter 3, section 3.5. Specifically, the effects of colour similarity and brand familiarity on consumer processual state of confusion (CP-SoC) were examined.

The interval-scaled independent variable, colour similarity, was operationalised as an ordinal categorical variable with three levels (identical, similar, and different). Brand familiarity was measured using the three semantic differential scales adapted by Zhou, Yang, and Hui (2010). This specific measure was for the purpose of manipulation checks upon completion of data collection. The variable was manipulated using existing brands and their expected levels of awareness within the sample population. Furthermore, CP-SoC scores were calculated as an aggregate score of the mean values of each of the four subscales. Each scale item was measured on a Likert-type scale ranging from 1 to 7. Hence,
the minimum CP-SoC score was 4 and the maximum was 28, with higher scores representing higher levels of confusion.

Prior to conducting the main RM-ANOVA, data were cleaned and screened for outliers using absolute z-scores. Typically, approximately 95% of absolute z-scores should be in the normal range \((z < 1.95)\), 5% or less should be in the mid-range \((z > 1.96)\), 1% or less should be in the high range \((z > 2.58)\), and only a few cases should be in the extreme range \((z > 3.29)\) (Field, 2013). Across all experimental conditions, 96.1% or greater of absolute z-score values were found to be in the normal range, less than 4% in the mid-range, approximately 1% in the high range, and only one case was above 3.29. These percentages were broadly consistent with the expectations of a normal distribution, and thus no significant outliers that may severely bias the data were present.

5.6.6.1. Statistical assumptions

The same analysis technique used to analyse data from Study 1A was employed (i.e. RM-ANOVA). As such, the same set of assumptions apply to the analysis method in Study 2. These are: (1) additivity and linearity, (2) normality, and (3) sphericity (Davis, 2002; Field, 2013; Howell, 2011; Zeisel & Kaye, 1997).

Additivity and linearity refer to the core assumption of the linear model, which, for Study 2 is:

\[
\text{CP-SoC} = \beta_0 + \beta_1 \text{ colour similarity} + \beta_2 \text{ brand familiarity} + \beta_3 \text{ product category} + (\beta_1 \text{ colour similarity} \times \beta_2 \text{ brand familiarity}) + (\beta_1 \text{ colour similarity} \times \beta_3 \text{ product category}) + (\beta_2 \text{ brand familiarity} \times \beta_3 \text{ product category}) + (\beta_1 \text{ colour similarity} \times \beta_2 \text{ brand familiarity} \times \beta_3 \text{ product category}) + \varepsilon
\]

This model assumes that CP-SoC, the dependent variable, is a function of the linearly-related, additive, independent variables. Consequently, the additivity and linearity assumptions are met by this statistical model.

Like the data analysed in Study 1A, the central limit theorem can be applied in order to meet the assumption of normality (Davis, 2002; Field, 2013). A total of 4944 observations were collected from 412 participants. This sample size is more
than adequate for the central limit theorem to apply (Lumley et al., 2002). Hence, it can be assumed that the parameter estimates are normally distributed (Field, 2013).

Lastly, the assumption of sphericity also applies to this repeated-measures study. To reiterate, sphericity assumes that the relationship between each of the pairs of experimental conditions is approximately similar (Davis, 2002; Field, 2013; Howell, 2011). Mauchly’s test of sphericity (Mauchly, 1940) was used to assess whether the assumption is met, but as this test is not robust against large sample sizes, the Greenhouse-Geisser estimate (Greenhouse & Geisser, 1959) was used to adjust the degrees of freedom in calculation of the $F$-statistic, and the Bonferroni adjustment was used to control the alpha levels ($\alpha$) of post hoc comparisons (Field, 2013; Howell, 2011) where sphericity was violated.

In sum, the assumptions of the RM-ANOVA are met (and where violated, appropriate correction measures were taken to adjust for statistical error) for Study 2.

5.6.6.2. Manipulation checks

Both independent variables for Study 2 (colour similarity and brand familiarity) were explicitly measurable variables. Manipulations of colour similarity were done on the basis of the findings of Study 1A and the effects of hue, saturation, and lightness. As such, manipulation checks were not conducted for this variable. On the other hand, as brand familiarity was a newly-introduced variable, hence, a manipulation check was required in order to ensure the effect of this variable functioned as expected (Perdue & Summers, 1986; Steenkamp, 2001). Brand familiarity scores across the four experimental brands (Hershey’s, Milka, Red Bull, and V Energy) were examined using paired-samples $t$-tests for each product category.

For the milk chocolate product category, there was a significant difference in mean brand familiarity scores ($t_{(411)} = 27.53, p < .001$) between the two brands. As expected, on average, the levels of familiarity for the Hershey’s brand ($M = 6.14, SD = .93$) was significantly higher than the levels of familiarity for the Milka brand ($M = 3.04, SD = 2.09$). This indicates that participants were more familiar with the
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Hershey’s brand and less familiar with the Milka brand. Likewise, for the energy
drink category, there was also a significant difference in mean brand familiarity
scores ($t_{(411)} = 23.66, p < .001$) between the two brands. On average, the levels of
familiarity for the Red Bull brand ($M = 5.15, SD = 1.58$) was significantly higher
than the levels of familiarity for the Milka brand ($M = 2.64, SD = 2.01$). This, again,
indicates that participants were more familiar with the Red Bull brand and less
familiar with the V Energy brand.

In sum, these results are deemed more than sufficient for the main statistical
analyses on the dependent variable, as the brand familiarity manipulation in Study
2 was successful.

5.6.7. Hypothesis tests

The research hypotheses proposed in Chapter 3, section 3.5 were tested using
the data collected for Study 2. The omnibus RM-ANOVA was significant ($F_{(1, 411)}$
$= 2658.36, p < .001, \eta^2_p = .87$). This suggests that one or more of the independent
variables, and their interaction effects, had an effect on the dependent variable
(consumer processual state of confusion [CP-SoC] scores). Further analyses to test
the research hypotheses were conducted. Statistical output for the tests of
hypotheses are provided in Appendix 7.

Mauchly’s test (Mauchly, 1940) indicated that the assumption of sphericity
had been violated for the main effect of colour similarity ($\chi^2_{(2)} = 292.12, p < .001$),
the two-way interaction effects of brand familiarity $\times$ colour similarity ($\chi^2_{(2)} = 6.49,$
$p = .039$) and colour similarity $\times$ product category ($\chi^2_{(2)} = 7.25, p = .027$), as well
as the three-way interaction effect of brand familiarity $\times$ colour similarity $\times$ product
category ($\chi^2_{(2)} = 36.61, p < .001$). Therefore, the degrees of freedom were corrected
using the Greenhouse-Geisser estimates of sphericity (colour similarity $\varepsilon = .66$;
brand familiarity $\times$ colour similarity $\varepsilon = .99$; colour similarity $\times$ product category $\varepsilon$
$= .98$; brand familiarity $\times$ colour similarity $\times$ product category $\varepsilon = .92$).
5.6.7.1. Test of hypothesis H1: effect of colour similarity

The main effect of colour similarity on confusion (CP-SoC scores) was significant ($F_{(1.33, 544.52)} = 205.80, p < .001, \eta^2_p = .33$). Post hoc tests with Bonferroni correction revealed that identical colours ($M = 14.17, SD = 5.92$) produced significantly higher confusion scores than similar colours ($M = 11.75, SD = 4.99, p < .001$) and different colours ($M = 9.71, SD = 5.05, p < .001$), and similar colours produced significantly higher confusion scores than different colours ($p < .001$).

It was proposed that:

**H1**: As packaging colour becomes increasingly similar, confusion will increase.

**H1a**: Identical package colours will produce higher levels of confusion than similar or different colours.

**H1b**: Similar package colours will produce higher levels of confusion than different colours.

**H1c**: Different package colours will produce the lowest levels of confusion.

These results suggest that hypothesis H1 and associated sub-hypotheses H1a, H1b, and H1c were all supported. In other words, this indicates that when colour similarity increased (different < similar < identical), levels of confusion also increased (see Figure 28). This suggests that discriminability, and therefore confusion, was driven by the degree of similarity in packaging colours.
5.6.7.2. Test of hypothesis H2: effect of brand familiarity

The main effect of brand familiarity on confusion scores was significant ($F_{(1, 411)} = 8.70, p = .003, \eta^2_p = .021$). Post hoc tests with Bonferroni correction revealed that unfamiliar brands ($M = 12.07, SD = 4.94$) produced significantly higher confusion scores than familiar brands ($M = 11.68, SD = 4.80$).

It was proposed that:

**H2:** As brand familiarity increases, confusion will decrease.

**H2a:** Familiar brands will produce lower levels of confusion than unfamiliar brands.

Therefore, as the results indicate, hypothesis H2 and associated sub-hypothesis H2a were supported. This suggests that as brand familiarity increased, levels of confusion decreased (see Figure 29). In other words, familiarity with a particular brand can prevent, to a certain degree, consumer confusion.
5.6.7.3. Test of hypothesis H4: effect of product category

The main effect of product category alone was not significant (F(1, 411) = 1.62, p > .05, ηp² = .004). This indicates that mean confusion scores between milk chocolate and energy drinks were not significantly different.

It was proposed that:

**H4:** There will be no significant difference in levels of confusion across product categories.

As such, the findings suggest that hypothesis H4 is supported. However, the variable was involved in a significant, higher-order interaction effect, thus it was included in subsequent analyses.

A summary of the means and standard deviations of the independent variables, for each of their levels is provided in Table 16.

**Figure 29. Main effect of brand familiarity**
Table 16. Descriptive statistics of independent variables (N = 412)

<table>
<thead>
<tr>
<th>Independent variable</th>
<th>Level</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colour similarity</td>
<td>1 (Identical)</td>
<td>14.17</td>
<td>5.92</td>
</tr>
<tr>
<td></td>
<td>2 (Similar)</td>
<td>11.75</td>
<td>4.99</td>
</tr>
<tr>
<td></td>
<td>3 (Different)</td>
<td>9.71</td>
<td>5.05</td>
</tr>
<tr>
<td>Brand familiarity</td>
<td>1 (Familiar)</td>
<td>11.68</td>
<td>4.80</td>
</tr>
<tr>
<td></td>
<td>2 (Unfamiliar)</td>
<td>12.07</td>
<td>4.94</td>
</tr>
<tr>
<td>Product category</td>
<td>1 (Milk Chocolate)</td>
<td>11.79</td>
<td>4.83</td>
</tr>
<tr>
<td></td>
<td>2 (Energy Drink)</td>
<td>11.96</td>
<td>4.91</td>
</tr>
</tbody>
</table>

5.6.7.4. Test of hypothesis H3: moderating effects

Two significant two-way interaction effects were found: brand familiarity × colour similarity ($F_{(1.97, 809.29)} = 11.87, p < .001, \eta_p^2 = .028$) and brand familiarity × product category ($F_{(1, 411)} = 48.99, p < .001, \eta_p^2 = .107$). The interaction effect of brand familiarity × colour similarity was hypothesised, however the second interaction effect of brand familiarity × product category was not expected, and therefore no specific hypotheses related to this effect. As expected, the two-way interaction of colour similarity × product category was not significant ($F_{(1, 807.85)} = .264, p > .05, \eta_p^2 = .001$). In addition, the three-way interaction of brand familiarity × colour similarity × product category was also found to be significant ($F_{(1.84, 757.31)} = 32.24, p < .001, \eta_p^2 = .073$).

This three-way interaction effect of brand familiarity × colour similarity × product category was prioritised over the two two-way interactions for further analyses and interpretation. This is because without taking into account the third variable (product category), interpretation of the two-way interactions would only be partial explanations of the nature of the full interaction effect. Therefore, further analyses to investigate the comparisons within the interaction effects are prioritised for the three-way interaction. In order to investigate the nature of the three-way interaction effect, simple, simple main effects analyses were conducted.

The simple, simple main effects analysis revealed that there were significant differences in confusion score comparisons between identical, similar, and different colours for both unfamiliar and familiar brands, as well as across the two product
categories. That is, the main effect of colour similarity was consistent across all levels of the independent variables. In general, the smaller the difference between the colours of a pair of stimuli presented, the greater the level of confusion. More specifically, identical colours were more confusing than similar colours, and similar colours were more confusing than different colours. All Bonferroni comparisons of colour similarity levels across brand familiarity and product category are provided in Table 17.

Table 17. Bonferroni comparisons of colour similarity for brand familiarity × product category

<table>
<thead>
<tr>
<th>Comparisons</th>
<th>Mean Difference in CP-SoC score</th>
<th>Std. Error</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>F / MC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Id vs. Sim</td>
<td>2.82</td>
<td>.30</td>
<td>2.09 3.54</td>
</tr>
<tr>
<td>Id vs. Dif</td>
<td>4.60</td>
<td>.33</td>
<td>3.80 5.41</td>
</tr>
<tr>
<td>Sim vs. Dif</td>
<td>1.79</td>
<td>.23</td>
<td>1.24 2.34</td>
</tr>
<tr>
<td>F / ED</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Id vs. Sim</td>
<td>1.43</td>
<td>.24</td>
<td>.86 1.99</td>
</tr>
<tr>
<td>Id vs. Dif</td>
<td>4.78</td>
<td>.36</td>
<td>3.92 5.64</td>
</tr>
<tr>
<td>Sim vs. Dif</td>
<td>3.35</td>
<td>.31</td>
<td>2.62 4.09</td>
</tr>
<tr>
<td>U / MC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Id vs. Sim</td>
<td>1.86</td>
<td>.26</td>
<td>1.22 2.49</td>
</tr>
<tr>
<td>Id vs. Dif</td>
<td>4.23</td>
<td>.34</td>
<td>3.41 5.04</td>
</tr>
<tr>
<td>Sim vs. Dif</td>
<td>2.37</td>
<td>.26</td>
<td>1.74 3.01</td>
</tr>
<tr>
<td>U / ED</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Id vs. Sim</td>
<td>3.58</td>
<td>.33</td>
<td>2.79 4.37</td>
</tr>
<tr>
<td>Id vs. Dif</td>
<td>4.23</td>
<td>.34</td>
<td>3.41 5.05</td>
</tr>
<tr>
<td>Sim vs. Dif</td>
<td>.65</td>
<td>.18</td>
<td>.21 1.08</td>
</tr>
</tbody>
</table>

Notes: F = familiar, U = unfamiliar
MC = milk chocolate, ED = energy drink
Id = identical, Sim = similar, Dif = different
All p’s </.001

The results also showed that there were significant differences in confusion scores between unfamiliar and familiar brands for identical, similar, and different packaging colours, but these were found to vary according to the product category. In other words, when packaging colours were identical, for the milk chocolate category, unfamiliar brands were rated as more confusing than familiar brands ($M_{diff} = .88, SE = .23, p < .001$), but there was no significant difference in confusion
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between unfamiliar and familiar brands for the energy drink category ($M_{\text{Diff}} = .00$, $SE = .23$, $p > .05$). When packaging colours were similar, for the milk chocolate category, unfamiliar brands were rated as more confusing than familiar brands ($M_{\text{Diff}} = 1.84$, $SE = .30$, $p < .001$), but for the energy drink category, this effect was reversed and unfamiliar brands were rated as less confusing than familiar brands ($M_{\text{Diff}} = -2.15$, $SE = .31$, $p < .001$). When packaging colours were different, for both product categories, unfamiliar brands were rated as more confusing than familiar brands (milk chocolate $M_{\text{Diff}} = 1.26$, $SE = .26$, $p < .001$; energy drink $M_{\text{Diff}} = .55$, $SE = .24$, $p = .021$).

Lastly, the final simple, simple main effects analysis of product category levels on brand familiarity and colour similarity revealed that significant differences in confusion scores were found between milk chocolate and energy drinks, but not for all colour similarity levels. That is, for familiar brands, milk chocolate brands were rated as less confusing than energy drink brands for all colour similarity levels (identical packaging colours $M_{\text{Diff}} = -.70$, $SE = .24$, $p = .004$; similar packaging colours $M_{\text{Diff}} = -2.10$, $SE = .33$, $p < .001$; different $M_{\text{Diff}} = -.53$, $SE = .22$, $p = .018$). However, for unfamiliar brands, only similar colours produced significant differences in confusion scores between milk chocolate and energy drink brands—but in the opposite direction to the effect of familiar brands. That is, milk chocolate brands were rated as more confusing than energy drink brands ($M_{\text{Diff}} = 1.91$, $SE = .32$, $p < .001$). Identical or different packaging colours did not produce any significant differences in confusion scores across product categories for unfamiliar brands ($p > .05$). Table 18 provides all means and standard deviations for the experimental conditions in Study 2.
Table 18. Descriptive statistics of all experimental conditions (N = 412)

<table>
<thead>
<tr>
<th>Brand Familiarity</th>
<th>Colour Similarity</th>
<th>Product Category</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (Familiar)</td>
<td>1 (Identical)</td>
<td>1 (Milk Chocolate)</td>
<td>13.60</td>
<td>6.61</td>
</tr>
<tr>
<td></td>
<td>2 (Similar)</td>
<td>1 (Milk Chocolate)</td>
<td>10.78</td>
<td>6.02</td>
</tr>
<tr>
<td></td>
<td>3 (Different)</td>
<td>1 (Milk Chocolate)</td>
<td>9.00</td>
<td>5.73</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 (Energy Drink)</td>
<td>12.87</td>
<td>6.57</td>
</tr>
<tr>
<td>2 (Unfamiliar)</td>
<td>1 (Identical)</td>
<td>1 (Milk Chocolate)</td>
<td>14.48</td>
<td>6.60</td>
</tr>
<tr>
<td></td>
<td>2 (Similar)</td>
<td>1 (Milk Chocolate)</td>
<td>12.63</td>
<td>6.38</td>
</tr>
<tr>
<td></td>
<td>3 (Different)</td>
<td>1 (Milk Chocolate)</td>
<td>10.25</td>
<td>6.10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 (Energy Drink)</td>
<td>10.72</td>
<td>6.05</td>
</tr>
</tbody>
</table>

The unexpected effect of product category led to the support of both sets of opposing sub-hypotheses for hypothesis H3, but support for each was found under different conditions. It was proposed that:

**H3a:** Increasing similarity in packaging colour will be less confusing for a familiar brand than an unfamiliar brand.

However, in direct opposition to these sub-hypotheses, it was also proposed that:

**H3b:** Increasing similarity in packaging colour will be more confusing for a familiar brand than an unfamiliar brand.

The reversal of the brand familiarity × product category effect for similar packaging colours lends partial support to both hypotheses H3a and H3b. Findings of the patterns of confusion scores for the milk chocolate category provide support for hypotheses H3a. On the other hand, the patterns of confusion scores for the energy drink category provide support for hypotheses H3b. As such, both H3a and H3b were partially supported under different conditions. Profile plots of the three-way interaction between brand familiarity × colour similarity × product category are provided in Figure 30.
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Figure 30. Mean confusion scores for product category x brand familiarity by colour similarity levels
5.6.8. Summary

To summarise, this research proposed 9 hypotheses related to the effects of colour similarity, brand familiarity, and product category, on consumer confusion (operationalised as CP-SoC). The findings of the Repeated-Measures Analysis of Variance (RM-ANOVA) lends support to 7 hypotheses and partial support to 2 hypotheses.

In general, increasing colour similarity (and therefore, decreasing discriminability) causes higher degrees of a consumer processual state of confusion—CP-SoC (and therefore, consumer confusion). Brand familiarity, in general, tends to moderate this effect by minimising the degree of CP-SoC. However, the effect of product category moderates this moderation effect. In other words, milk chocolate and energy drinks produced opposite effects in relation to similar packaging colours. When packaging colours were visually similar, familiar brands of milk chocolate produced less confusion than unfamiliar brands. Conversely, in the same scenario, familiar brands of energy drinks produced more confusion than unfamiliar brands.

A possible explanation for this finding is product category age. As milk chocolate brands have been in the market for much longer than energy drinks, the product category and its associated brands have had a longer duration and more opportunity for brand exposure in the market. This, in turn, would generate stronger associations in consumers’ memories and their schemas. On the other hand, energy drinks are a relatively new product category, and thus have had less opportunity for market exposure (in comparison to milk chocolates). Hence, as a whole, associations of the energy drink category and its associated brands would be weaker in consumers’ schemas. As such, product category age, as a variable, could have produced confounding effects, that were partly captured by the inclusion of the product category variable in the overall RM-ANOVA.
Discussion and Conclusion

Chapter 6. Discussion and Conclusion

This final chapter considers the contributions of this research and evaluates the wider contributions and implications of the findings. It also addresses specific research limitations and provides suggestions for future research.

To start, a reiteration of the justification for the research and a summary of the research findings are provided. This is followed by the research objectives that guided this project as a whole are revisited in light of the research findings. Following this is a discussion of the theoretical, methodological, and substantive contributions, as well as the theoretical and practical implications of the research findings. Finally, the limitations of this research are addressed, and future research suggestions that will assist in moving the field forward are provided.

6.1. Justification reiterated

The consumer environment is becoming over-saturated with the manifestation of marketing activities. Products, services, brands, line-extensions, joint ventures, and advertisements—in all these areas there are countless different options and offerings that are competing with one each other for another consumer dollar—ubiquitously overwhelming consumers. How, then, has this impacted on the consumer? With too much choice and too many persuasion messages, it is not surprising that consumer confusion has become more salient. In some situations, consumer confusion is deliberately created by some brands to impinge on competitors. In other situations, despite marketers’ best efforts to avoid it, consumers end up confused in the most unexpected ways. Although the causes effects of consumer confusion are often evident, we still have little understanding of the exact nature of the state of confusion and the processes that create it.

Within the chaotic consumer environment, marks and signs are being fought over—sometimes successfully, sometimes not—for one company’s exclusive use.
Discussion and Conclusion

In this context, research on confusion is imperative. Deeper insights into confusion—what it is, how it occurs, and when it occurs—is needed in order to guide practitioners to better provide for consumers, and to guide the regulators and legal actors who protect those consumers.

In answer to this pressing need, three linked empirical studies were conducted in this research to address the need for research on confusion. The first study examined the effects of the three main colour attributes—hue, saturation, and lightness—and how these impacted on consumer decision response times. The second study focussed on examining a new scale of confusion—one that is specific to consumers, but generalisable across contexts. The final study investigated the effects of colour similarity of packaged fast moving consumer goods and the effects of brand familiarity on consumer confusion.

The findings of these three studies revealed several things. Firstly, the effects of colour on perception and choice are complex. Even a single change in only one colour attribute (either hue, saturation, or lightness) significantly impacts perceptions, and therefore behaviour. In addition, these elements of colour have effects of differing strength, and interact in complex ways.

Secondly, although confusion cannot be directly measured as it occurs, the level of confusion can be measured through a specific manifest variable: decision response latency. The latent construct of confusion is strongly correlated with human response latency: greater confusion causes slower response times. We cannot view the thought processes related to confusion in real time, but we can see their footprint: the increased time it requires to create a decision and its associated behavioural response. The consistent experimental findings in this research show that confusion can be indirectly examined and measured.

Finally, this research shows a complex interaction between objective and subjective factors. The interaction effects show that the impact of objective physical cues in the environment (e.g. packaging colour) can be altered through subjective internal mechanisms (e.g. information processing) and knowledge (e.g. familiarity). The resulting influence is complex and manifests in equally complex ways.


Discussion and Conclusion

6.2. Research objectives revisited

The overarching research objectives that grounded and guided this project were:

1. *To explore the nature of consumer confusion in the context of brand choice.*
2. *To understand the cognitive and emotional effects of confusion on consumers.*
3. *To assess the effects of varying degrees of discriminability in packaging colour on consumer confusion.*
4. *To establish the role of brand familiarity in the relationship between colour and consumer confusion.*

This research first addressed these objectives through the review of a vast field of literature across several contexts to develop a parsimonious and generalisable conceptualisation of consumer confusion. For the purposes of this research, a new conceptualisation was proposed:

Confusion is a *cognitive state* characterised by feelings of discomfort and uncertainty (state of affect) triggered by a mismatch or contradiction between something in the external environment and the existing knowledge in the individual, that involves a *mental process* by which the two things (something in the external environment and existing knowledge) are considered simultaneously.

This definition was operationalised with a new scale for consumer confusion: *consumer processual state of confusion* (CP-SoC). Standard scale purification measures demonstrated that the scale has both validity and reliability. This new CP-SoC scale was used in subsequent experiments.

Extensive pre-testing was done to develop stimuli with empirically-appropriate levels of colour gradation and brand familiarity. Manipulation checks confirmed that the stimuli were perceived as intended. Subsequent experiments using these stimuli and the new scale found that confusion generated distinct feelings of discomfort and uncertainty for consumers. This confusion was
demonstrated to correlate with longer durations of processing—leading to a delay in decision-making. Although we cannot view confusion processes in real-time, we can measure their magnitude immediately post-confusion (in decision response latency) and in retrospect (using the CP-SoC scale).

Colour-related research in marketing has not evolved sufficiently to consider the important subtleties related to the nearly-infinite range of colour variations. This research took advantage of a widely-used existing schema for quantifying colour: the HSL (hue, saturation, and lightness) model. This approach allowed the systematic examination of the direct and interaction effects of three important aspects of colour (hue, saturation, and lightness) on consumer confusion. It was found that hue alone does not influence confusion, but that saturation and lightness also have an effect—and in particular, that the three colour attributes affect confusion differently across different colours.

Lastly, the final study in this research put the more abstract concept of colour in a realistic context with real-world applicability, to provide ecological validity to the experimentation. The package colours of actual brands—both familiar and unfamiliar—were manipulated to assess the effects that colour variations might have on consumer confusion. This provided empirical evidence that package colour similarity directly affects consumer confusion, and also for the theory that brand familiarity can actually increase confusion in certain contexts.

In sum, it is believed that this research—in its contribution to these four objectives—has fulfilled its overall research purpose, which was to shed light on confusion and explore the effects of colour similarity and brand familiarity on confusion in the consumer context.
Discussion and Conclusion

6.3. Research contributions

6.3.1. Theoretical contributions

6.3.1.1. Generalisable definition of consumer confusion

This research contributes to theory by proposing and empirically examining a comprehensive and multi-faceted generalisable definition of confusion that is not outcome-dependent. An exploration into extant research on confusion in the context of marketing uncovered a range of studies that conceptualised confusion in several different forms. These included confusion of source or commercial origin (e.g. DeRosia et al., 2011; Howard et al., 2000; Loken et al., 1986), confusion of value for price (e.g. Friedman, 1966), confusion of advertising messages (e.g. Brengman, Geuens, & Pelsmacker, 2001; Poiesz & Verhallen, 1989), e-confusion (e.g. Matzler, Bidmon, Faullant, Fladnitzer, & Waiguny, 2005), confusion of country of origin (e.g. Mitchell & Papavassiliou, 1999; Zhou, 2005), confusion of eco-labels (e.g. Brécard, 2014; Langer et al., 2007), and confusion of store environment (e.g. Garaus & Wagner, 2016), to list a few. In addition, there was a significant overlap between research in marketing and the legal context, namely the protection of trademarks and the likelihood of confusion (e.g. Allen, 1991b; Falkowski et al., 2015; Swann Sr, Aaker, & Reback, 2001).

A deeper investigation of the extant research on the confusion concept revealed that most of these studies had—rather than focussing on the concept of confusion as a formative latent construct—focussed on measuring specific reflective outcomes thought to be caused by confusion. As Miaoulis and D’Amato (1978) suggest, the salience of confusion as a legal issue (especially in the area of trademarks) had perhaps limited prior research in such a way that “researchers, who otherwise might approach research problems creatively, have been constricted by research designs used in previous infringement cases” (p. 49). This prior focus on measurable outcomes is understandable, considering that commercial trademark protection relies on empirical demonstrating of the presence of confusion.

For legal purposes, it seems logical to demonstrate that confusion has occurred, by demonstrating that consumers have mistaken one brand (or product)
Discussion and Conclusion

for another. Presenting such unequivocal evidence (for instance, the proportion of consumers who mistakenly purchased brand X instead of brand Y, or the proportion of consumers who misattributed brand X’s advertisement to brand Y) allows for a more substantive argument in the context of trying to enforce the legal protection of one’s trademark. However, even though this practical focus has produced valuable knowledge of confusion outcomes, it did not reveal much about the underlying confusion that led to these measured outcomes, nor did it address confusion that occurred internally without observable manifestations. Consequently, this research has contributed theoretically by addressing this need to understand the latent construct of confusion (i.e. CP-SoC). Theoretical consideration was given to the various themes in the differing conceptualisations to compose a definition that was context-fluid. As a result, a generalisable definition of confusion (see Chapter 3) was proposed and empirically examined (see Chapter 5).

6.3.1.2. Linking colour, brand, and confusion

This research contributes to theory by providing evidence of the effect of stimulus characteristics (such as packaging colour) on consumer confusion, and also of the moderating effect of brand familiarity, adding to the growing body of knowledge surrounding consumer confusion. It provides support for models of consumer confusion involving both stimulus and individual characteristics. More recently, the trend in consumer confusion research is to examine individual differences (Tjiptono et al., 2014; Walsh & Mitchell, 2010) and link consumer confusion to consequences on a corporate level (Garaus & Wagner, 2016; Kelkar, Coleman, Bahan, & Manago, 2014; Moon et al., 2017; Wobker et al., 2015). This research provides new empirical evidence for what was theoretically assumed to be a well-known effect (i.e. stimulus similarity).

6.3.1.3. Consumer confusion scale

Another theoretical contribution that this research makes is the CP-SoC (consumer processual state of confusion) scale. As previously proposed, this scale can be used in contexts beyond consumers and marketing. Reliabilities of each of the four subscales that, together, form the aggregate scale of CP-SoC were also
Discussion and Conclusion

provided in this research. These checks will be useful for future research and also for meta-analyses conducted in the future on this research topic.

The difference between the scale developed in this research and other existing scales of consumer confusion is that the items are specific to confusion, but general in terms of context. Unlike other scales that relate to observable outcomes of confusion (i.e. misidentification and misattribution) or to idiosyncratic characteristics of the consumer, this scale allows for confusion to be captured as a state of mind, state of affect, a process, and a mental outcome.

6.3.2. Academic contributions

This research offers valuable contributions to several streams of literature in marketing academia. Firstly, it contributes to literature on the effectiveness of various types of trademarks by providing insights into the role and function of packaging and brand colours (e.g. Melnyk, Giarratana, & Torres, 2014). As the proliferation of competitors across all product categories introduces more variety, this further increases the likelihood of confusion experienced by the customer for existing trademarked brands and packaging features. Through this research, a stronger argument for obtaining, prolonging, and enforcing of trademarks is provided.

Furthermore, as the findings of this research offers insight and empirical evidence regarding the effects of confusion caused by packaging colour similarity, it thus becomes valuable to the stream of literature that focusses on private versus national brands (e.g. Deleersnyder, Dekimpe, Steenkamp, & Koll, 2007; Steenkamp, Van Heerde, & Geyskens, 2010). This is particularly relevant as private brands are moving into the online environment in order to compete with national brands even beyond the physical retail store (Arce-Urriza & Cebollada, 2017).

Lastly, this research contributes to literature on consumer choices by providing further insights into the effects of colour and confusion in the packaged goods context (e.g. Aribarg, Arora, Henderson, & Kim, 2014). In particular, research on brand imitation has consistently found that brand similarity causes harm for the brand itself being imitated, consumers, as well as the store that sells similar-
looking brands. The findings of this research provide further insight into potential mechanisms regarding specific packaging colour choices made by companies that could driving consumer confusion, and therefore causing harm to all parties involved.

6.3.3. Methodological contributions

This research developed an empirical method for designing appropriate colour stimuli for confusion research. Colour is a complex phenomenon. The human eye has different sensitivities to different wavelengths of colour, and these perceptual differences must be accounted for in developing experimentally usable stimuli. Furthermore, the levels of colour difference must be calibrated within ranges. In most cases, a just noticeable difference is too small to be empirically useful, but a considerably larger difference in colour may be too extreme, and overwhelm the subtle effects being assessed. An extensive process of pre- and confirmatory testing was conducted to develop usable stimuli. As part of this process, this was the first research in the context of marketing to conduct experiments using PsychoPy open-source software for decision response latencies. The availability of such software can make future research more accessible. Furthermore, as it is open-source, researchers who are well-versed with Python coding language could add marketing-specific additions to the software.

This research is the first, in the context of marketing, to conduct a systematic investigation on the effects of hue, saturation, and lightness. This approach used a standard full-factorial experimental design but developed a distinctive contribution by splitting colour into its constituent parts and evaluating these elements separately and in combination. When differences in colour constituents were applied to actual brands, a new method was created that allows a package in its actual colour to be compared to package versions with subtle to large variations in colour. When combined with the consumer confusion scale, this method allows a precise and repeatable measurement of how colour contributes to consumer confusion. This method could easily be adapted as a method to inform trademark litigations by comparing the level of confusion caused by two different brand-package colour combinations.
6.3.4. Substantive contributions

The first study on the three colour attributes (hue, saturation, and lightness) across the three secondary colours (purple, orange, and green) provides several implications. First and foremost, discriminability differed across colour category, above and beyond the effects of hue, saturation, and lightness. In general, differences in the orange and green categories were more quickly recognised than those in the purple category. Note that the secondary colours are combinations of the three primary colours: red, blue, and yellow. Purple is the result of the combination between red and blue, orange is the combination of red and yellow, and green is the combination of blue and yellow. Considering this, the findings suggest that colours resulting from a combination of red and blue are more difficult to tell apart when compared, than the other two combinations of primary colours. There are practical implications of this finding. When practitioners are creating colours for a brand or a product, more care should be taken if the colours are in the purple colour category. Furthermore, to decrease potential consumer confusion, colours in the orange or green category could be used if it is relevant.

More specifically, individuals were quicker to recognise a difference in the purple colour category when the comparison was against a warmer hue (i.e. closer to red). This effect was found above and beyond the effects of saturation and lightness. This indicates two things: (1) in the purple category, the impact of hue is the strongest, and (2) for colours in between red and blue categories, smaller deviations towards red are more recognisable than towards blue. However, discrimination between colours in the orange category was more complex. The combined effects of hue, saturation, and lightness produced varied differences in response times. One attribute was not superior over the others in the orange category in terms of increasing discriminability. For green, hue and lightness had a larger effect on response times than saturation.

These findings align with specialised research in colour vision. The human visual system (HVS) is most sensitive to wavelengths of approximately 555 nanometres—in the general colour category of green. The HVS is the least sensitive to colours in the purple category. Sensitivity of colours in the orange category is in
between. Consequently, the findings of this research align with existing knowledge of how the HVS works and how this manifests in terms of colour perception. The specific findings of the effects of hue, saturation, and lightness within these three colour categories is a new contribution to existing knowledge of colour in the field of marketing. It extends existing knowledge by deconstructing the effects of specific colour attributes within these colour categories.

This research makes substantive contributions in the following ways. Firstly, it provides empirical evidence of choice response times for colour discrimination. The findings of this research can be directly applied to product packaging design decisions, packaging strategy, and commercial trademark applications. The findings are directly relevant to marketing practitioners, especially when considering updating an existing product or brand image. The findings also inform brands seeking to enter new markets. The managers of lookalike brands can also use the findings to assist them in their branding decisions. In these ways, this research has real-world impact and is considered to be valuable to marketing practitioners.

Most importantly, the empirical findings of this research can be used in courts of law to demonstrate the presence of confusion regardless of the manifest outcome (e.g. source misattribution, mistaken purchase, and so on). Having this empirical evidence could potentially assist firms in protecting their treasured packaging colour trademarks from infringement in broader ways than previously achieved.

6.4. Research implications

6.4.1. Theoretical implications

The definition of consumer confusion developed for this research can be applied to other contexts and fields, such as social psychology and neuroscience, and within business, to fields such as organisational management and human resources. Future research on confusion that uses this proposed definition will be useful in uncovering the nature of the latent construct of confusion, and for reconfirming the validity of the definition proposed in this research. In addition, as
Discussion and Conclusion

This research was focussed on the marketing context, confusion was operationalised as a “consumer confusion state of mind” (CP-SoC). This consumer-specific conceptualisation also provides a theoretically broader applicability—beyond the legal scope—and can provide a shift in how consumer confusion is framed and conceptualised.

This research focussed on packaging colour and involved an intensive study on the three main colour attributes hue, saturation, and lightness. The findings of this study strongly suggest that while the effects of hue are the most salient across the three secondary colour categories examined, the effects of lightness and saturation—separately, as well as combined—moderates the effect of hue for certain colours. As such, future studies on colour in marketing need to consider explicitly controlling for or directly exploring the effect of saturation and lightness, in conjunction with hue, or if only studying hue, to ensure that the colour under investigation does not fall within the wavelength range that is highly influenced by saturation and lightness.

6.4.2. Practical implications

This research defined the colours used in experimentation using the HSL (hue, saturation, lightness) model. While there are several different systems and models that can be used to define and specify colour, the HSL system is the one that best aligns with colour perception. Other systems such as the RGB (red, green, and blue) system or the CMYK (cyan, magenta, yellow, and key/black) system do not align well with actual visual colour perception, and therefore conceptually difficult to interpret and understand. It is strongly encouraged that future studies that involve colour also use the HSL model to define them. Doing so will allow for easier empirical replication, for evaluation of the colours used in experimentation, and even future meta-analysis across colour studies in marketing. This will enable a more systematic scientific investigation that will move this field forward.

The effect of packaging colour similarity was moderated by the influence of brand familiarity, but this influence differed across the two product categories chosen in this research. Specifically, familiarity of the brand in the milk chocolate
product category caused more confusion when the packaging colours were similar. However, familiarity of the brand in the energy drink category did not cause more confusion when the packaging colours were similar. One explanation for this surprising finding could be that milk chocolate as a product has existed in the consumer market for much longer than energy drinks. In other words, the milk chocolate product is more established in the market (having existed for longer than a century thus allowing for a better schema to be developed over time) than the energy drink product. This explanation has implications in terms of a semiotic approach to the brand concept.

A brand can be defined semiotically as a system of connected signs that is socially constructed and intersubjectively understood (Conejo & Wooliscroft, 2015). The system, thus, becomes stronger and more salient the longer it stays in existence. Existing for longer allows for more reiteration in society.

The examination of the moderating influence of brand familiarity on the relationship between packaging colour similarity and consumer brand confusion informs theoretical work on branding (especially brand familiarity and lookalike branding), and the information processing of colour. Not only that, this research informs the ongoing international marketing debate on globalisation versus standardisation of brands, by adding a new dimension to the discussion. When a brand seeks to enter a new international market, its managers will have to carefully identify and evaluate their brand image in relation to existing brands in that new market, before they decide to retain their original brand colours, or if they will adapt it to the new market.

In a legal discussion provided by Hall (2016), the importance of the practical realities of trademarks were considered. It was emphasised that “trademark law should continue to protect market morality” (p. 842). Hall noted that infringers continue to escape legal consequences as a result of the evidence of consumer confusion being less convincing or weak. The kind of evidence that is being considered when making such legal decisions, currently, are limited and are not an absolutely adequate measure of consumer confusion. As proposed in this research, the presence of consumer confusion is not limited to purely an observable behaviour.
Discussion and Conclusion

or other measurable manifestation, such as a mistaken purchase or belief. Consumer confusion can occur independently of the behavioural or attitudinal outcome. This suggests that the consequences of confusion on part of the consumer, too, are independent of these outcomes. It can be argued that the unobservable consequences of consumer confusion are more insidious—undetected by brand owners, a corrective effort cannot be made, and therefore the effects of this kind of unobserved consumer confusion are longer-lasting. This research has empirically found that CP-SoC occurs and varies through similarities in packaging colours. This is evidence of the presence of consumer confusion independent of the observable outcomes. As such, the CP-SoC scale can be used to evaluate the likelihood of confusion between two similarly-coloured trademarks. It can be used as a legal tool for law to continue protecting the morality of the market.

6.5. Research limitations

6.5.1. Demand characteristics

Efforts were made to design the experimental research systematically, so as to control for extraneous influences. However, this research, like all experimental research, still has its limitations. Firstly, because this study employed a within-subjects design, there is a possibility that the participants were biased due to potential demand characteristics (Charness, Gneezy, & Kuhn, 2012; Orne, 1962). Because perception and interpretation of colour is deeply-subjective, it was deemed more important to control for the large differences across individual colour perception (i.e. via a within-subjects design) than to minimise the demand effects (i.e. via a between-subjects design).

However, the presence of potential demand characteristics is hoped to be minimal because of the well-documented advantage of Internet-based experimentation is the minimisation of experimenter bias, which is another term for demand characteristics (Birnbaum, 2004; Reips, 2000). It is hoped that the online nature of this research mitigated the effects of any potential demand characteristics. Furthermore, specific experimental steps were taken to ensure these inherent
demand characteristics were minimised as much as possible. These were: (1) randomised presentation of all experimental stimuli and conditions; (2) concealing the true purpose of the study with a fictitious scenario prior to participants commencing each experimental task; and (3) main experimental tasks were interspersed with unrelated covariate questions to create a structured ‘break’ in order to reset the mind frame of the participants (see Chapter 5 for details regarding the experimental procedures for each study in this research).

6.5.2. Alternative explanations

In addition, while this study investigated the effects of similarity in packaging on consumer confusion, only colour has been used to operationalise packaging similarity. Although other aspects of packaging and branding (e.g. the typeface of the product name, or the shape of the product) were controlled for in Study 2, there is still the possibility that any one of these other factors have influenced consumer perceptions of packaging similarity in an unexpected manner and may provide alternative factors that are driving the findings of the study.

6.5.3. Limited generalisability

The final study was conducted in the context of fast-moving consumer goods (FMCG) using two different items: a confection-dessert item (chocolate) and a carbonated beverage (energy drink). The different stimuli used were manipulated to alternately respect and violate category norms. Because perceptual sensitivity to different colours varies, it is not possible to determine whether the level of colour sensitivity found in this research will be comparable in other products using different secondary or primary colour families. In addition, this research cannot address whether there are other interaction effects between package colour and other broader product categories (e.g. edible ‘healthy’ foods, edible discretionary foods, inedible products, durable goods, services, and so on).

Furthermore, both product categories employed in this study were hedonic products. As there are significant differences across hedonic versus utilitarian products in terms of cognitive processing (Klein & Melnyk, 2016; Melnyk, Klein,
Discussion and Conclusion

& Völkner, 2012), the findings of this research may not generalise to utilitarian products and their packaging similarities.

6.6. Suggestions for future research

Future research should explore the effects of other aspects of product packaging to comprehensively understand the role of packaging on consumer brand confusion. In particular, the Coca-Cola v Pepsi dispute (Wylie, 2013) hinged on Coca-Cola’s contention that Pepsi’s new bottle shape caused consumer brand confusion among those who would ordinarily have purchased Coca-Cola. Thus, future research should examine packaging similarity to guide branding and judicial decisions. Global companies need objective, empirical evidence in order to be able to protect their brands, and to argue and appeal their cases.

In addition, this study omitted the exploration of the consequences of consumer confusion as it was considered beyond the scope of the proposed theory. Hence, future research should focus on examining confusion (as defined in this research) and its consequences on consumers. Prior research has found that perceived happiness could be negatively impacted on through an environment consisting of ‘too much choice.’ The increasing prevalence of consumer confusion could be a contributing factor to this effect. Future research could examine confusion as an antecedent to consumer happiness and examine the potential consequences—this could be, for instance, a decrease in perceived volition or a perceived decrease in psychological wellbeing.

6.7. Conclusion

This research has fulfilled the proposed objectives through a series of three experimental studies. In addition, the proposed research hypotheses were all found to be supported, and a potentially novel approach to consumer confusion (i.e. the effect of product category age) was found during the analysis process.

This thesis began with an introduction to the overall research topic, its importance and relevance in the research and managerial contexts of today, and the
quantitative research approach taken for collecting and analysing empirical data. This was followed by an extensive literature review on not only consumer confusion, but also related topics that provided additional insights from alternative perspectives. A detailed explanation of the conceptualisation of the proposed concept, consumer processual state of confusion (CP-SoC), was provided in the following chapter. In addition, the research philosophy that underpinned this thesis was discussed in detail. The central focus of this thesis—the research methodology—was then described, and the findings of the quantitative analyses conducted were interpreted and evaluated. Lastly, this thesis concluded with this final chapter, which focussed on a discussion of the broader meanings of this research and its wider implications for both theory and practice.

6.8. Final remarks

Colour—in our everyday experiences—is perceived as a singular, amalgamated sign. Colour is perceived directly in a deep, wordless way. Colour can inform, persuade, attract or deter, and modify our moods. For all of these reasons, colour is a powerful communicator, and matters in business.

The semiotic meanings of colour are deeply, instinctively, and universally understood by all. But, like language, when it is not directly and clearly expressed, or when it is intentionally ambiguous, confusion occurs. Like language, meanings and associations become entangled and murky. It is perhaps for this reason that there is an inextricable link between the use of colour in marketing and consumer confusion. Like language, colour is potent in the way that it can communicate to and influence consumers. It is a non-verbal language that is ubiquitously used by marketing practitioners. The use of package colour in a clear and direct manner to avoid confusion as much as possible is clearly a legal issue for trademark protection—but it is also an issue of ethics and morality. The intentional use of verbal language to create confusion and misattribution is called ‘lying’ and ‘deception.’ Perhaps the intentional use of colour to do the same can and should be considered in the same manner.
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This research has attempted to develop a better understanding of consumer confusion, and the ways in which colour can reduce—or increase—that confusion. However, much remains to be known about this delicate relationship. It is hoped that research continues to focus on how unconscious and involuntary human responses are influenced by the efforts of marketing with the ultimate objective of creating a more honest, ethical, and moral market.
### Appendix 1: HSL values of stimuli (Study 1A)

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<td>20</td>
<td>283</td>
<td>83</td>
<td>23</td>
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<td>21</td>
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<td>100</td>
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<td>22</td>
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<td>23</td>
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<td>83</td>
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<td>24</td>
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<td>100</td>
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<td>25</td>
<td>283</td>
<td>50</td>
<td>39</td>
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<tr>
<td>26</td>
<td>283</td>
<td>83</td>
<td>39</td>
</tr>
<tr>
<td>27</td>
<td>283</td>
<td>100</td>
<td>39</td>
</tr>
</tbody>
</table>

**Note:** Bolded values (experimental condition 14) are the baseline/control HSL values for each colour.
Appendix 2: Experimental stimuli (Study 1A)

Purple / Baseline Left / Question: Different

1. Are these colours different?
   1 - YES
   2 - NO

2. Are these colours different?
   1 - YES
   2 - NO
Appendix 2: Experimental stimuli (Study 1A)

3. Are these colours different?
   1 - YES
   2 - NO

4. Are these colours different?
   1 - YES
   2 - NO
Appendix 2: Experimental stimuli (Study 1A)

5.

![Image of two squares, one purple and one blue, with text: Are these colours different? 1 - YES 2 - NO]

6.

![Image of two squares, one purple and one blue, with text: Are these colours different? 1 - YES 2 - NO]
Appendix 2: Experimental stimuli (Study 1A)

7. Are these colours different?
   1 - YES
   2 - NO

8. Are these colours different?
   1 - YES
   2 - NO
Appendix 2: Experimental stimuli (Study 1A)

9. Are these colours different?
   1 - YES
   2 - NO

10. Are these colours different?
    1 - YES
    2 - NO
Appendix 2: Experimental stimuli (Study 1A)

11.

Are these colours different?
1 - YES
2 - NO

12.

Are these colours different?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

13. Are these colours different?
   1 - YES
   2 - NO

14. Are these colours different?
   1 - YES
   2 - NO
Appendix 2: Experimental stimuli (Study 1A)

15. Are these colours different?
1 - YES
2 - NO

16. Are these colours different?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

17. Are these colours different?
   1 - YES
   2 - NO

18. Are these colours different?
   1 - YES
   2 - NO
Appendix 2: Experimental stimuli (Study 1A)

19.

Are these colours different?
1 - YES
2 - NO

20.

Are these colours different?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

21. Are these colours different?
   1 - YES
   2 - NO

22. Are these colours different?
   1 - YES
   2 - NO
Appendix 2: Experimental stimuli (Study 1A)

23.

Are these colours different?
1 - YES
2 - NO

24.

Are these colours different?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

25.

Are these colours different?
1 - YES
2 - NO

26.

Are these colours different?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

27. Are these colours different?
   1 - YES
   2 - NO
Appendix 2: Experimental stimuli (Study 1A)

Purple / Baseline Right / Question: Different

1.

Are these colours different?
1 - YES
2 - NO

2.

Are these colours different?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

3. Are these colours different?
   1 - YES
   2 - NO

4. Are these colours different?
   1 - YES
   2 - NO
Appendix 2: Experimental stimuli (Study 1A)

5.

Are these colours different?
1 - YES
2 - NO

6.

Are these colours different?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

7.

Are these colours different?
1 - YES
2 - NO

8.

Are these colours different?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

9. Are these colours different?
   1 - YES
   2 - NO

10. Are these colours different?
    1 - YES
    2 - NO
11. Are these colours different?
1 - YES
2 - NO

12. Are these colours different?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

13. Are these colours different?
   1 - YES
   2 - NO

14. Are these colours different?
   1 - YES
   2 - NO
Appendix 2: Experimental stimuli (Study 1A)

15. Are these colours different?
1 - YES
2 - NO

16. Are these colours different?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

17. Are these colours different?
   1 - YES
   2 - NO

18. Are these colours different?
   1 - YES
   2 - NO
Appendix 2: Experimental stimuli (Study 1A)

19.

Are these colours different?
1 - YES
2 - NO

20.

Are these colours different?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

21. Are these colours different?
   1 - YES
   2 - NO

22. Are these colours different?
   1 - YES
   2 - NO
23.

Are these colours different?
1 - YES
2 - NO

24.

Are these colours different?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

25.

Are these colours different?
1 - YES
2 - NO

26.

Are these colours different?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

27.

Are these colours different?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

Orange / Baseline Left / Question: Different

1.

![Image of two squares, one orange and one brown, with text: Are these colours different? 1 - YES 2 - NO]

2.

![Image of two squares, one orange and one brown, with text: Are these colours different? 1 - YES 2 - NO]
Appendix 2: Experimental stimuli (Study 1A)

3.

Are these colours different?
1 - YES
2 - NO

4.

Are these colours different?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

5. Are these colours different?
   1 - YES
   2 - NO

6. Are these colours different?
   1 - YES
   2 - NO
Appendix 2: Experimental stimuli (Study 1A)

7. Are these colours different?
   1 - YES
   2 - NO

8. Are these colours different?
   1 - YES
   2 - NO
Appendix 2: Experimental stimuli (Study 1A)

9.

Are these colours different?
1 - YES
2 - NO

10.

Are these colours different?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

11.

Are these colours different?
1 - YES
2 - NO

12.

Are these colours different?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

13. Are these colours different?
   1 - YES
   2 - NO

14. Are these colours different?
   1 - YES
   2 - NO
Appendix 2: Experimental stimuli (Study 1A)

15. Are these colours different?
1 - YES
2 - NO

16. Are these colours different?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

17. Are these colours different?
   1 - YES
   2 - NO

18. Are these colours different?
   1 - YES
   2 - NO
Appendix 2: Experimental stimuli (Study 1A)

19.

Are these colours different?
1 - YES
2 - NO

20.

Are these colours different?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

21.

![Image of two orange squares with a question: Are these colours different? 1 - YES 2 - NO]

22.

![Image of two orange and brown squares with a question: Are these colours different? 1 - YES 2 - NO]
Appendix 2: Experimental stimuli (Study 1A)

23.

Are these colours different?
1 - YES
2 - NO

24.

Are these colours different?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

25.

Are these colours different?
1 - YES
2 - NO

26.

Are these colours different?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

27.

Are these colours different?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

Orange / Baseline Right / Question: Different

1.

Are these colours different?
1 - YES
2 - NO

2.

Are these colours different?
1 - YES
2 - NO
3.

Are these colours different?
1 - YES
2 - NO

4.

Are these colours different?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

5.

[Image of two orange squares with a question: Are these colours different?
1 - YES
2 - NO]

6.

[Image of two orange squares with a question: Are these colours different?
1 - YES
2 - NO]
Appendix 2: Experimental stimuli (Study 1A)

7.

Are these colours different?
1 - YES
2 - NO

8.

Are these colours different?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

9.

Are these colours different?
1 - YES
2 - NO

10.

Are these colours different?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

11. Are these colours different?
   1 - YES
   2 - NO

12. Are these colours different?
    1 - YES
    2 - NO
Appendix 2: Experimental stimuli (Study 1A)

13.

Are these colours different?
1 - YES
2 - NO

14.

Are these colours different?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

15. Are these colours different?
1 - YES
2 - NO

16. Are these colours different?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

17.

Are these colours different?
1 - YES
2 - NO

18.

Are these colours different?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

19. Are these colours different?
   1 - YES
   2 - NO

20. Are these colours different?
   1 - YES
   2 - NO
Appendix 2: Experimental stimuli (Study 1A)

21.

Are these colours different?
1 - YES
2 - NO

22.

Are these colours different?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

23. Are these colours different?
   1 - YES
   2 - NO

24. Are these colours different?
   1 - YES
   2 - NO
Appendix 2: Experimental stimuli (Study 1A)

25.

[Image of two squares with one orange and one yellow, labeled: Are these colours different? 1 - YES 2 - NO]

26.

[Image of two orange squares, labeled: Are these colours different? 1 - YES 2 - NO]
Appendix 2: Experimental stimuli (Study 1A)

27.

Are these colours different?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

Green / Baseline Left / Question: Different

1. 

[Image of two squares, one green and one brown, with a question asking if the colors are different. Options: 1 - YES, 2 - NO.]

2. 

[Image of two squares, one green and one brown, with a question asking if the colors are different. Options: 1 - YES, 2 - NO.]
Appendix 2: Experimental stimuli (Study 1A)

3. 

Are these colours different?
1 - YES
2 - NO

4. 

Are these colours different?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

5. Are these colours different?
   1 - YES
   2 - NO

6. Are these colours different?
   1 - YES
   2 - NO
Appendix 2: Experimental stimuli (Study 1A)

7. Are these colours different?
   1 - YES
   2 - NO

8. Are these colours different?
   1 - YES
   2 - NO
Appendix 2: Experimental stimuli (Study 1A)

9. Are these colours different?
   1 - YES
   2 - NO

10. Are these colours different?
    1 - YES
    2 - NO
Appendix 2: Experimental stimuli (Study 1A)

11. Are these colours different?
   1 - YES
   2 - NO

12. Are these colours different?
   1 - YES
   2 - NO
Appendix 2: Experimental stimuli (Study 1A)

13. Are these colours different?
   1 - YES
   2 - NO

14. Are these colours different?
   1 - YES
   2 - NO
Appendix 2: Experimental stimuli (Study 1A)

15.

Are these colours different?
1 - YES
2 - NO

16.

Are these colours different?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

17. Are these colours different?
   1 - YES
   2 - NO

18. Are these colours different?
   1 - YES
   2 - NO
Appendix 2: Experimental stimuli (Study 1A)

19.

Are these colours different?
1 - YES
2 - NO

20.

Are these colours different?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

21.

[Image of two green squares with text: Are these colours different? 1 - YES 2 - NO]

22.

[Image of two green squares with text: Are these colours different? 1 - YES 2 - NO]
Appendix 2: Experimental stimuli (Study 1A)

23.

![Image 1](image1.png)

*Are these colours different?*

1 - YES
2 - NO

24.

![Image 2](image2.png)

*Are these colours different?*

1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

25.

[Image of two green squares with a question: Are these colours different? 1 - YES 2 - NO]

26.

[Image of two green squares with a question: Are these colours different? 1 - YES 2 - NO]
Appendix 2: Experimental stimuli (Study 1A)

27.

Are these colours different?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

Green / Baseline Right / Question: Different

1.

Are these colours different?
1 - YES
2 - NO

2.

Are these colours different?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

3. Are these colours different?
   1 - YES
   2 - NO

4. Are these colours different?
   1 - YES
   2 - NO
Appendix 2: Experimental stimuli (Study 1A)

5. Are these colours different?
   1 - YES
   2 - NO

6. Are these colours different?
   1 - YES
   2 - NO
Appendix 2: Experimental stimuli (Study 1A)

7. Are these colours different?
   1 - YES
   2 - NO

8. Are these colours different?
   1 - YES
   2 - NO
Appendix 2: Experimental stimuli (Study 1A)

9. Are these colours different?
   1 - YES
   2 - NO

10. Are these colours different?
    1 - YES
    2 - NO
Appendix 2: Experimental stimuli (Study 1A)

11. Are these colours different?
   1 - YES
   2 - NO

12. Are these colours different?
   1 - YES
   2 - NO
Appendix 2: Experimental stimuli (Study 1A)

13. Are these colours different?
1 - YES
2 - NO

14. Are these colours different?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

15.

Are these colours different?
1 - YES
2 - NO

16.

Are these colours different?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

17. Are these colours different?
   1 - YES
   2 - NO

18. Are these colours different?
   1 - YES
   2 - NO
Appendix 2: Experimental stimuli (Study 1A)

19. Are these colours different?
   1 - YES
   2 - NO

20. Are these colours different?
    1 - YES
    2 - NO
Appendix 2: Experimental stimuli (Study 1A)

21.

Are these colours different?
1 - YES
2 - NO

22.

Are these colours different?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

23.

Are these colours different?
1 - YES
2 - NO

24.

Are these colours different?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

25.

Are these colours different?
1 - YES
2 - NO

26.

Are these colours different?
1 - YES
2 - NO
27.

Are these colours different?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

Purple / Baseline Left / Question: Same

1.

Are these colours the same?
1 - YES
2 - NO

2.

Are these colours the same?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

3. Are these colours the same?
   1 - YES
   2 - NO

4. Are these colours the same?
   1 - YES
   2 - NO
Appendix 2: Experimental stimuli (Study 1A)

5.

![Image of two squares with a question asking if the colours are the same, with options 1 - YES and 2 - NO.]

6.

![Image of two squares with a question asking if the colours are the same, with options 1 - YES and 2 - NO.]

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Appendix 2: Experimental stimuli (Study 1A)

7.

Are these colours the same?
1 - YES
2 - NO

8.

Are these colours the same?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

9. Are these colours the same?
   1 - YES
   2 - NO

10. Are these colours the same?
    1 - YES
    2 - NO
Appendix 2: Experimental stimuli (Study 1A)

11. Are these colours the same?
   1 - YES
   2 - NO

12. Are these colours the same?
   1 - YES
   2 - NO
Appendix 2: Experimental stimuli (Study 1A)

13. Are these colours the same?
   1 - YES
   2 - NO

14. Are these colours the same?
   1 - YES
   2 - NO
Appendix 2: Experimental stimuli (Study 1A)

15. Are these colours the same?
   1 - YES
   2 - NO

16. Are these colours the same?
   1 - YES
   2 - NO
Appendix 2: Experimental stimuli (Study 1A)

17.

Are these colours the same?
1 - YES
2 - NO

18.

Are these colours the same?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

19. Are these colours the same?
1 - YES
2 - NO

20. Are these colours the same?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

21.

Are these colours the same?
1 - YES
2 - NO

22.

Are these colours the same?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

23.

Are these colours the same?
1 - YES
2 - NO

24.

Are these colours the same?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

25. Are these colours the same?
   1 - YES
   2 - NO

26. Are these colours the same?
   1 - YES
   2 - NO
Appendix 2: Experimental stimuli (Study 1A)

Are these colours the same?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

**Purple / Baseline Right / Question: Same**

1. 

![Image](image1)

Are these colours the same?
1 - YES
2 - NO

2. 

![Image](image2)

Are these colours the same?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

3. 

Are these colours the same?
1 - YES
2 - NO

4. 

Are these colours the same?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

5.

![Image of two squares, one blue and one purple, with a question asking if the colors are the same. Answers: 1 - YES, 2 - NO]

6.

![Image of two squares, one blue and one purple, with a question asking if the colors are the same. Answers: 1 - YES, 2 - NO]
Appendix 2: Experimental stimuli (Study 1A)

7.

Are these colours the same?
1 - YES
2 - NO

8.

Are these colours the same?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

9.

![Image of two squares, one blue and one purple, with text: Are these colours the same? 1 - YES 2 - NO]

10.

![Image of two squares, one purple and one violet, with text: Are these colours the same? 1 - YES 2 - NO]
Appendix 2: Experimental stimuli (Study 1A)

11. Are these colours the same?
   1 - YES
   2 - NO

12. Are these colours the same?
   1 - YES
   2 - NO
Appendix 2: Experimental stimuli (Study 1A)

13. Are these colours the same?
   1 - YES
   2 - NO

14. Are these colours the same?
   1 - YES
   2 - NO
Appendix 2: Experimental stimuli (Study 1A)

15. Are these colours the same?
   1 - YES
   2 - NO

16. Are these colours the same?
   1 - YES
   2 - NO
Appendix 2: Experimental stimuli (Study 1A)

17. Are these colours the same?
   1 - YES
   2 - NO

18. Are these colours the same?
   1 - YES
   2 - NO
Appendix 2: Experimental stimuli (Study 1A)

19. Are these colours the same?
   1 - YES
   2 - NO

20. Are these colours the same?
   1 - YES
   2 - NO
Appendix 2: Experimental stimuli (Study 1A)

21. Are these colours the same?
   1 - YES
   2 - NO

22. Are these colours the same?
   1 - YES
   2 - NO
Appendix 2: Experimental stimuli (Study 1A)

23.

![Image of two purple squares with question: Are these colours the same? 1 - YES 2 - NO.]

24.

![Image of two purple squares with question: Are these colours the same? 1 - YES 2 - NO.]
Appendix 2: Experimental stimuli (Study 1A)

25.

Are these colours the same?
1 - YES
2 - NO

26.

Are these colours the same?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

27.

Are these colours the same?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

Orange / Baseline Left / Question: Same

1. 

![Image 1]

Are these colours the same?
1 - YES
2 - NO

2. 

![Image 2]

Are these colours the same?
1 - YES
2 - NO

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Appendix 2: Experimental stimuli (Study 1A)

3. Are these colours the same?
   1 - YES
   2 - NO

4. Are these colours the same?
   1 - YES
   2 - NO
Appendix 2: Experimental stimuli (Study 1A)

5.

Are these colours the same?
1 - YES
2 - NO

6.

Are these colours the same?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

7.

Are these colours the same?
1 - YES
2 - NO

8.

Are these colours the same?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

9.

Are these colours the same?
1 - YES
2 - NO

10.

Are these colours the same?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

11.

Are these colours the same?
1 - YES
2 - NO

12.

Are these colours the same?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

13. 

Are these colours the same?

1 - YES
2 - NO

14. 

Are these colours the same?

1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

15. [Image of two orange squares with a question: Are these colours the same? Options: 1 - YES, 2 - NO]

16. [Image of two squares, one orange and one orange-brown, with a question: Are these colours the same? Options: 1 - YES, 2 - NO]
Appendix 2: Experimental stimuli (Study 1A)

17.

Are these colours the same?
1 - YES
2 - NO

18.

Are these colours the same?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

19.

Are these colours the same?
1 - YES
2 - NO

20.

Are these colours the same?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

21.

Are these colours the same?
1 - YES
2 - NO

22.

Are these colours the same?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

23.

Are these colours the same?
1 - YES
2 - NO

24.

Are these colours the same?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

25.

Are these colours the same?
1 - YES
2 - NO

26.

Are these colours the same?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

27.

Are these colours the same?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

**Orange / Baseline Right / Question: Same**

1. 

   ![Orange square on the left and right]

   Are these colours the same?
   
   1 - YES
   2 - NO

2. 

   ![Orange square on the left and right]

   Are these colours the same?
   
   1 - YES
   2 - NO
3. Are these colours the same?
1 - YES
2 - NO

4. Are these colours the same?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

5.

Are these colours the same?
1 - YES
2 - NO

6.

Are these colours the same?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

7.

Are these colours the same?
1 - YES
2 - NO

8.

Are these colours the same?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

9.

Are these colours the same?
1 - YES
2 - NO

10.

Are these colours the same?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

11. Are these colours the same?
   1 - YES
   2 - NO

12. Are these colours the same?
   1 - YES
   2 - NO
Appendix 2: Experimental stimuli (Study 1A)

13. Are these colours the same?
   1 - YES
   2 - NO

14. Are these colours the same?
   1 - YES
   2 - NO
Appendix 2: Experimental stimuli (Study 1A)

15. Are these colours the same?
   1 - YES
   2 - NO

16. Are these colours the same?
   1 - YES
   2 - NO
Appendix 2: Experimental stimuli (Study 1A)

17.

Are these colours the same?
1 - YES
2 - NO

18.

Are these colours the same?
1 - YES
2 - NO
19.

Are these colours the same?
1 - YES
2 - NO

20.

Are these colours the same?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

21.

Are these colours the same?
1 - YES
2 - NO

22.

Are these colours the same?
1 - YES
2 - NO
23.

Are these colours the same?
1 - YES
2 - NO

24.

Are these colours the same?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

25.

Are these colours the same?
1 - YES
2 - NO

26.

Are these colours the same?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

27.

Are these colours the same?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

**Green / Baseline Left / Question: Same**

1.

![Image 1](image1.png)

Are these colours the same?
1 - YES
2 - NO

2.

![Image 2](image2.png)

Are these colours the same?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

3. Are these colours the same?
   1 - YES
   2 - NO

4. Are these colours the same?
   1 - YES
   2 - NO
Appendix 2: Experimental stimuli (Study 1A)

5. 

[Image of two squares, one green and one yellow, with the text "Are these colours the same? 1 - YES 2 - NO"]

6. 

[Image of two squares, one green and one yellow, with the text "Are these colours the same? 1 - YES 2 - NO"]
Appendix 2: Experimental stimuli (Study 1A)

7. Are these colours the same?
   1 - YES
   2 - NO

8. Are these colours the same?
   1 - YES
   2 - NO
Appendix 2: Experimental stimuli (Study 1A)

9.

Are these colours the same?
1 - YES
2 - NO

10.

Are these colours the same?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

11.

Are these colours the same?
1 - YES
2 - NO

12.

Are these colours the same?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

13.

Are these colours the same?
1 - YES
2 - NO

14.

Are these colours the same?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

15.

Are these colours the same?
1 - YES
2 - NO

16.

Are these colours the same?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

17. Are these colours the same?
   1 - YES
   2 - NO

18. Are these colours the same?
   1 - YES
   2 - NO
Appendix 2: Experimental stimuli (Study 1A)

19.

Are these colours the same?
1 - YES
2 - NO

20.

Are these colours the same?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

21.

[Image of two squares with different colors]

Are these colours the same?
1 - YES
2 - NO

22.

[Image of two squares with the same color]

Are these colours the same?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

23.

Are these colours the same?
1 - YES
2 - NO

24.

Are these colours the same?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

25.

Are these colours the same?
1 - YES
2 - NO

26.

Are these colours the same?
1 - YES
2 - NO
27. Are these colours the same?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

**Green / Baseline Right / Question: Same**

1. Are these colours the same?
   1 - YES
   2 - NO

2. Are these colours the same?
   1 - YES
   2 - NO
Appendix 2: Experimental stimuli (Study 1A)

3. Are these colours the same?
   1 - YES
   2 - NO

4. Are these colours the same?
   1 - YES
   2 - NO
Appendix 2: Experimental stimuli (Study 1A)

5. Are these colours the same?
   1 - YES
   2 - NO

6. Are these colours the same?
   1 - YES
   2 - NO
Appendix 2: Experimental stimuli (Study 1A)

7.

Are these colours the same?
1 - YES
2 - NO

8.

Are these colours the same?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

9.

Are these colours the same?
1 - YES
2 - NO

10.

Are these colours the same?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

11.

![Image of two green squares]

Are these colours the same?
1 - YES
2 - NO

12.

![Image of two green squares]

Are these colours the same?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

13.

![Image](image13.png)

Are these colours the same?
1 - YES
2 - NO

14.

![Image](image14.png)

Are these colours the same?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

15.

Are these colours the same?
1 - YES
2 - NO

16.

Are these colours the same?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

17.

Are these colours the same?
1 - YES
2 - NO

18.

Are these colours the same?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

19. Are these colours the same?
   1 - YES
   2 - NO

20. Are these colours the same?
   1 - YES
   2 - NO
Appendix 2: Experimental stimuli (Study 1A)

21.

![Image](image1.png)

Are these colours the same?
1 - YES
2 - NO

22.

![Image](image2.png)

Are these colours the same?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

23.

![Image 1](image1.png)

Are these colours the same?
1 - YES
2 - NO

24.

![Image 2](image2.png)

Are these colours the same?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

25.

Are these colours the same?
1 - YES
2 - NO

26.

Are these colours the same?
1 - YES
2 - NO
Appendix 2: Experimental stimuli (Study 1A)

27.

Are these colours the same?
1 - YES
2 - NO
Appendix 3: Experimental stimuli (Study 1B)

Practice Trial

Are these colours the same?
1 - SAME
2 - DIFFERENT
Appendix 3: Experimental stimuli (Study 1B)

Purple Trials

1. Are these colours the same?
   1 - SAME
   2 - DIFFERENT

2. Are these colours the same?
   1 - SAME
   2 - DIFFERENT
Appendix 3: Experimental stimuli (Study 1B)

3. 

![Image](image3.png)

Are these colours the same?
1. SAME
2. DIFFERENT

4. 

![Image](image4.png)

Are these colours the same?
1. SAME
2. DIFFERENT
Appendix 3: Experimental stimuli (Study 1B)

5.

Are these colours the same?
1 - SAME
2 - DIFFERENT
Appendix 3: Experimental stimuli (Study 1B)

Orange Trials

1. Are these colours the same?
   1 - SAME
   2 - DIFFERENT

2. Are these colours the same?
   1 - SAME
   2 - DIFFERENT
Appendix 3: Experimental stimuli (Study 1B)

3. Are these colors the same?
   1 - SAME
   2 - DIFFERENT

4. Are these colors the same?
   1 - SAME
   2 - DIFFERENT
Appendix 3: Experimental stimuli (Study 1B)

5.

Are these colours the same?
1 - SAME
2 - DIFFERENT
Appendix 3: Experimental stimuli (Study 1B)

**Green Trials**

1.

![Image 1](image1.png)

Are these colours the same?
1 - SAME
2 - DIFFERENT

2.

![Image 2](image2.png)

Are these colours the same?
1 - SAME
2 - DIFFERENT
Appendix 3: Experimental stimuli (Study 1B)

3.

Are these colours the same?
1 - SAME
2 - DIFFERENT

4.

Are these colours the same?
1 - SAME
2 - DIFFERENT
5.

Are these colours the same?
1 - SAME
2 - DIFFERENT
Appendix 4: Experimental stimuli (Study 2)

Brand Familiarity Stimuli

1. Hershey’s / Familiar Brand / Milk Chocolate

2. Milka / Unfamiliar Brand / Milk Chocolate

3. Cadbury / Filler brand / Milk Chocolate
Appendix 4: Experimental stimuli (Study 2)

4. Red Bull / Familiar Brand / Energy Drink

5. V Energy / Unfamiliar Brand / Energy Drink

6. Lift Plus / Filler Brand / Energy Drink
Appendix 4: Experimental stimuli (Study 2)

**Familiar Brand Trials**

1. Identical Package Colour / Milk Chocolate

![Image of identical package colour](image1)

2. Similar Package Colour / Baseline Left / Milk Chocolate

![Image of similar package colour](image2)
Appendix 4: Experimental stimuli (Study 2)

3. Similar Package Colour / Baseline Right / Milk Chocolate

![Similar Package Colour / Baseline Right / Milk Chocolate](image1)

4. Different Package Colour / Baseline Left / Milk Chocolate

![Different Package Colour / Baseline Left / Milk Chocolate](image2)
Appendix 4: Experimental stimuli (Study 2)

5. Different Package Colour / Baseline Right / Milk Chocolate

![Images of different package colours of HERSHEY'S milk chocolate bars]

6. Identical Package Colour / Energy Drink

![Images of identical package colours of Red Bull energy drinks]
Appendix 4: Experimental stimuli (Study 2)

7. Similar Package Colour / Baseline Left / Energy Drink

8. Similar Package Colour / Baseline Right / Energy Drink
Appendix 4: Experimental stimuli (Study 2)

9. Different Package Colour / Baseline Left / Energy Drink

10. Different Package Colour / Baseline Left / Energy Drink
Appendix 4: Experimental stimuli (Study 2)

**Unfamiliar Brand Trials**

1. Identical Package Colour / Milk Chocolate

![Identical Package Colour / Milk Chocolate](image1)

2. Similar Package Colour / Baseline Left / Milk Chocolate

![Similar Package Colour / Baseline Left / Milk Chocolate](image2)
Appendix 4: Experimental stimuli (Study 2)

3. Similar Package Colour / Baseline Right / Milk Chocolate

4. Different Package Colour / Baseline Left / Milk Chocolate
Appendix 4: Experimental stimuli (Study 2)

5. Different Package Colour / Baseline Right / Milk Chocolate

6. Identical Package Colour / Energy Drink
Appendix 4: Experimental stimuli (Study 2)

7. Similar Package Colour / Baseline Left / Energy Drink

8. Similar Package Colour / Baseline Right / Energy Drink
Appendix 4: Experimental stimuli (Study 2)

9. Different Package Colour / Baseline Left / Energy Drink

10. Different Package Colour / Baseline Right / Energy Drink
Appendix 4: Experimental stimuli (Study 2)

**Brand Choice Task Questions**

**Milk Chocolate Choice Task**

![Diagram of Milk Chocolate Choice Task]

**Energy Drink Choice Task**

![Diagram of Energy Drink Choice Task]
Appendix 5: Experimental scenarios (Study 2)

1. Familiar Brand Milk Chocolate Scenario

Imagine you are on a holiday overseas...

You are in a rush to catch a tour bus.

You need a sugar boost, but you won't be able to buy anything once your trip starts.

Luckily, there is a vending machine right next to the bus stop, so you decide to buy something.

The sugar boost you are looking for is the original flavor of a familiar brand.

Suddenly, your tour bus arrives and people start boarding.

You notice the vending machine has two choices of the same brand.

You only have a few seconds to make your choice.
Appendix 5: Experimental scenarios (Study 2)

2. Familiar Brand Energy Drink Scenario

Imagine you are on a holiday overseas...

You are in a rush to catch a tour bus.

You need a sugar boost, but you won't be able to buy anything once your trip starts.

Luckily, there is a vending machine right next to the bus stop, so you decide to buy something.

The sugar boost you are looking for is the original flavor of a familiar brand.

Suddenly, your tour bus arrives and people start boarding.

You notice the vending machine has two choices of the same brand.

You only have a few seconds to make your choice.
3. Unfamiliar Brand Milk Chocolate Scenario

Imagine you are on a holiday overseas...

You are in a rush to catch a tour bus.

You need a sugar boost, but you won't be able to buy anything once your trip starts.

Luckily, there is a vending machine right next to the bus stop, so you decide to buy something.

The sugar boost you are looking for is the original flavor of a new and unusual brand.

Suddenly, your tour bus arrives and people start boarding.

You notice the vending machine has two choices of the same brand.

You only have a few seconds to make your choice.
Appendix 5: Experimental scenarios (Study 2)

4. Unfamiliar Brand Energy Drink Scenario

**Imagine you are on a holiday overseas...**

You are in a rush to catch a tour bus.

You need a sugar boost, but you won't be able to buy anything once your trip starts.

Luckily, there is a vending machine right next to the bus stop, so you decide to buy something.

The sugar boost you are looking for is the **original flavor of a new and unusual brand**.

Suddenly, your tour bus arrives and people start boarding.

You notice the vending machine has two choices of the same brand.

You only have **a few seconds** to make your choice.

![Original Flavor](image_url)
Appendix 6: Questionnaire script (Study 2)

Full Qualtrics Survey Software Script

JChoiPhD_QualtricsMainStudy_FullScript
Block 0 (Device)
  Q0_Device
  What type of device are you using to complete this questionnaire?
    o Desktop computer (1)
    o Laptop (2)
    o Mobile phone (97)
    o Tablet device (98)
    o Other (99)
  Skip To: End of Block If Q0_Device = Mobile phone (97)
  Skip To: End of Block If Q0_Device = Tablet device (98)
  Skip To: End of Block If Q0_Device = Other (99)
End of Block
Block 1 (Participant Information Sheet)
  Q1_PIS

PARTICIPANT INFORMATION SHEET

I, Jinyoung (Jane) Choi, am a Ph.D. Candidate at The University of Auckland, New Zealand, supervised by Dr. Rick Starr and Associate Professor Dr. Karen V. Fernandez. I would like to invite you to participate in my Ph.D. research questionnaire. It is expected to take about 15 minutes of your time.

You will be asked to provide your opinions of images and other general non-identifying information. Your participation is entirely voluntary and optional. You may decline this invitation to participate without penalty, by either indicating so below or simply by exiting the browser.

You have the right to withdraw from this project whilst completing the questionnaire without giving reason (simply exit the browser and your responses will be immediately discarded).

The research is anonymous; we will not gather nor keep any details which identify you and your responses personally (we will also not gather any IP addresses). As such, withdrawal of your responses after successful completion is not possible. Successful completion of the questionnaire will indicate your full consent for participation. If you choose to participate, you will be provided with reward points (as specified in the email invitation) as a thank-you.

Data from this research will be in aggregate form and therefore confidentiality will be preserved. Data will be securely retained as numerical data files for a period of six years, then destroyed. The results gathered from this project will be used for my Ph.D. thesis, and for academic publications and presentations. A copy of the research findings
can be made available to you if you wish. Please email me (the Ph.D. Candidate) at the email address below ("My Contact Details").

Please do not hesitate to contact me, my Ph.D. Supervisor, or my Head of Department, if you have any questions or concerns regarding this research.

<table>
<thead>
<tr>
<th>My Contact Details</th>
<th>My Ph.D. Supervisor's Details</th>
<th>My Head of Department Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ph.D. Candidate Jinyoung (Jane) Choi</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Department of Marketing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The University of Auckland</td>
<td></td>
<td></td>
</tr>
<tr>
<td><a href="mailto:jane.choi@auckland.ac.nz">jane.choi@auckland.ac.nz</a></td>
<td></td>
<td></td>
</tr>
<tr>
<td>+64 9 373 7599</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dr. Rick Starr</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graduate School of Management</td>
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<td>The University of Auckland</td>
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<td><a href="mailto:rg.starr@auckland.ac.nz">rg.starr@auckland.ac.nz</a></td>
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<tr>
<td>+64 9 923 2403</td>
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<tr>
<td>Professor Dr. Margo Buchanan-Oliver</td>
<td></td>
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<tr>
<td>Department of Marketing</td>
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</tr>
<tr>
<td><a href="mailto:m.buchanan-oliver@auckland.ac.nz">m.buchanan-oliver@auckland.ac.nz</a></td>
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<td></td>
</tr>
<tr>
<td>+64 9 923 6898</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For any queries regarding concerns of an ethical nature you can contact:
The Chair of The University of Auckland Human Participants Ethics Committee
The University of Auckland
Research Office
Private Bag 92019
Auckland 1142
ro-ethics@auckland.ac.nz
+64 9 373 7599
Ext 83711

APPROVED BY THE UNIVERSITY OF AUCKLAND HUMAN PARTICIPANTS ETHICS COMMITTEE ON 06/09/2017 FOR THREE YEARS.

Reference Number 019833

- I AGREE to participate in this research. (1)
- I DO NOT AGREE to participate in this research. (2)

End of Block

Block 2.0 (Welcome/Instructions)

Display This Question:
If Department of Marketing Owen G Glenn Building (Level 4)+64 9 923 3300 12 Grafton Road The Univers... = I AGREE
End of Block

Block 2.1 (Thanks/Close)

Display This Question:
If Department of Marketing Owen G Glenn Building (Level 4)+64 9 923 3300 12 Grafton Road The Univers... = I DO NOT AGREE
End of Block

Block 3 (Screener/Quota/Demographics)

Q3_Age What is your age?
Appendix 6: Questionnaire script (Study 2)

Age in years (18)

Skip To: End of Block If Q3_Age < Age in years (18)

Q4_Gender
What is your gender?
- Female (1)
- Male (2)

Q5_Ethnicity
What is the main ethnic group you belong to?
- European-American (1)
- Hispanic-American (2)
- African-American (3)
- Native American (4)
- Asian (5)
- Native Hawaiian (6)
- Pacific Islander (7)
- Other (please specify) (99) _____

Q6_Occupation
Which of the following options best describes your current occupation?
- Healthcare support (1)
- Constructions and extraction (2)
- Farming, fishing, and forestry (3)
- Education, training, and library (4)
- Protective service (5)
- Production (6)
- Legal (7)
- Personal care and service (8)
- Architecture and engineering (9)
- Building, and ground cleaning and maintenance (10)
- Food preparation and serving (11)
- Life, physical, and social science (12)
- Community and social service (13)
- Installation, maintenance, and repair (14)
- Business and financial operations (15)
- Management (16)
- Sales and related operations (17)
- Computer and mathematical (18)
- Arts, design, entertainment, sports, and media (19)
- Healthcare practitioners and technical operations (20)
- Office and administrative support (21)
- Transportation and materials-moving (22)
- Retired (24)
- Unemployed (25)
- Student (26)
- Other (please specify) (99) _____

Q7_Colorblind
Are you color-blind?
- Yes (1)
- No (2)
- Don’t know (3)

End of Block
Block 4 (Transition)
Appendix 6: Questionnaire script (Study 2)

M2_Transit
The following questions will ask about your opinions on some brands.

End of Block

Block 5.0 (Hershey's Brand Familiarity/Evaluation)
IMG1_BF_H

<table>
<thead>
<tr>
<th>Q8_BF_H</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>This brand is familiar to me. (1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I know a lot about this brand. (2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I have seen advertisements for this brand. (3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I like this brand. (4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I trust this brand. (5)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>This brand is of high quality. (6)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>This brand is desirable. (7)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

End of Block

Block 5.1 (Milka Brand Familiarity/Evaluation)
IMG2_BF_M

<table>
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<tr>
<th>Q9_BF_M</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>This brand is familiar to me. (1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I know a lot about this brand. (2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I have seen advertisements for this brand. (3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I like this brand. (4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I trust this brand. (5)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>This brand is of high quality. (6)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>This brand is desirable. (7)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix 6: Questionnaire script (Study 2)

<table>
<thead>
<tr>
<th>Statement</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>This brand is familiar to me. (1)</td>
<td>1-7</td>
</tr>
<tr>
<td>I know a lot about this brand. (2)</td>
<td>1-7</td>
</tr>
<tr>
<td>I have seen advertisements for this brand. (3)</td>
<td>1-7</td>
</tr>
<tr>
<td>I like this brand. (4)</td>
<td>1-7</td>
</tr>
<tr>
<td>I trust this brand. (5)</td>
<td>1-7</td>
</tr>
<tr>
<td>This brand is of high quality. (6)</td>
<td>1-7</td>
</tr>
<tr>
<td>This brand is desirable. (7)</td>
<td>1-7</td>
</tr>
</tbody>
</table>

End of Block
Block 5.2 (Red Bull Brand Familiarity/Evaluation)

Q10_BF_R
Please indicate the extent to which you agree/disagree with the following statements. Click and drag the sliding bar.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>This brand is familiar to me. (1)</td>
<td>1-7</td>
</tr>
<tr>
<td>I know a lot about this brand. (2)</td>
<td>1-7</td>
</tr>
<tr>
<td>I have seen advertisements for this brand. (3)</td>
<td>1-7</td>
</tr>
<tr>
<td>I like this brand. (4)</td>
<td>1-7</td>
</tr>
<tr>
<td>I trust this brand. (5)</td>
<td>1-7</td>
</tr>
<tr>
<td>This brand is of high quality. (6)</td>
<td>1-7</td>
</tr>
<tr>
<td>This brand is desirable. (7)</td>
<td>1-7</td>
</tr>
</tbody>
</table>

End of Block
Block 5.3 (V Brand Familiarity/Evaluation)
Appendix 6: Questionnaire script (Study 2)

**IMG4_BF_V**

![Image of a beverage can labeled V](image)

**Q11_BF_V**

Please indicate the extent to which you agree/disagree with the following statements. Click and drag the sliding bar.

<table>
<thead>
<tr>
<th>Statement</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>This brand is familiar to me. (1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>I know a lot about this brand. (2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>I have seen advertisements for this brand. (3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>I like this brand. (4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>I trust this brand. (5)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>This brand is of high quality. (6)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>This brand is desirable. (7)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

*End of Block*

**Block 5.4 (Cadbury Brand Familiarity/Evaluation)**

**IMG5_BF_C**

![Image of a chocolate bar labeled Dairy Milk](image)

**Q12_BF_C**

Please indicate the extent to which you agree/disagree with the following statements. Click and drag the sliding bar.

<table>
<thead>
<tr>
<th>Statement</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>This brand is familiar to me. (1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>
### Appendix 6: Questionnaire script (Study 2)

#### Block 5.5 (Lift Plus Brand Familiarity/Evaluation)

<table>
<thead>
<tr>
<th>Statement</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>I know a lot about this brand.</td>
<td>6</td>
</tr>
<tr>
<td>I have seen advertisements for this brand.</td>
<td>6</td>
</tr>
<tr>
<td>I like this brand.</td>
<td>6</td>
</tr>
<tr>
<td>I trust this brand.</td>
<td>6</td>
</tr>
<tr>
<td>This brand is of high quality.</td>
<td>6</td>
</tr>
<tr>
<td>This brand is desirable.</td>
<td>6</td>
</tr>
</tbody>
</table>

#### Block 6.0.0 (Hershey's Scenario)

Imagine you are on a holiday overseas...
You are in a rush to catch a tour bus.
Appendix 6: Questionnaire script (Study 2)

You need a sugar boost, but you won’t be able to buy anything once your trip starts. Luckily, there is a vending machine right next to the bus stop, so you decide to buy something. The sugar boost you are looking for is the original flavor of a familiar brand. Suddenly, your tour bus arrives and people start boarding. You notice the vending machine has two choices of the same brand. You only have a few seconds to make your choice.

End of Block
Block 6.0.1 (Hershey's Identical)
IMG7_Stim_H_Id

T1_Stim_H_Id Timing
First Click (1)
Last Click (2)
Page Submit (3)
Click Count (4)
Page Break
IMG8_Resp_H_Id
Appendix 6: Questionnaire script (Study 2)

Q14. Choice_H_Id
Which one is the original flavor?
- 1 (1)
- 2 (2)

Page Break

Q15. Conf_H_Id
Please indicate the extent to which you agree/disagree with the following statements. Click and drag the sliding bar.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>The decision was confusing to make. (1)</td>
<td></td>
</tr>
<tr>
<td>It was difficult for me to choose the answer I</td>
<td></td>
</tr>
<tr>
<td>wanted. (2)</td>
<td></td>
</tr>
<tr>
<td>I felt confused while making my decision. (3)</td>
<td></td>
</tr>
<tr>
<td>The task was difficult. (4)</td>
<td></td>
</tr>
<tr>
<td>The task was hard. (5)</td>
<td></td>
</tr>
<tr>
<td>The task was easy. (6)</td>
<td></td>
</tr>
<tr>
<td>I felt bothered making the decision. (7)</td>
<td></td>
</tr>
<tr>
<td>I was frustrated when making the choice. (8)</td>
<td></td>
</tr>
<tr>
<td>I felt stressed when I evaluated the options. (9)</td>
<td></td>
</tr>
<tr>
<td>I am sure about the decision I made. (10)</td>
<td></td>
</tr>
<tr>
<td>I am confident about the decision I made. (11)</td>
<td></td>
</tr>
</tbody>
</table>

345
Appendix 6: Questionnaire script (Study 2)

I was certain about my decision. (12)  

End of Block
Block 6.0.2 (Hershey’s Similar BLLeft)
IMG9_Stim_H_SimLeft

T2_Stim_H_SimLeft Timing
First Click (1)
Last Click (2)
Page Submit (3)
Click Count (4)
Page Break
IMG10_Resp_H_SimLeft

Q16_Choice_H_SimLeft
Which one is the original flavor?
- 1 (1)
- 2 (2)
Page Break

Q17_Conf_H_SimLeft
Please indicate the extent to which you agree/disagree with the following statements.
Click and drag the sliding bar.
The decision was confusing to make. (1) 1 7
It was difficult for me to choose the answer I wanted. (2) 1 7
I felt confused while making my decision. (3) 1 7
The task was difficult. (4) 1 7
The task was hard. (5) 1 7
The task was easy. (6) 1 7
I felt bothered making the decision. (7) 1 7
I was frustrated when making the choice. (8) 1 7
I felt stressed when I evaluated the options. (9) 1 7
I am sure about the decision I made. (10) 1 7
I am confident about the decision I made. (11) 1 7
I was certain about my decision. (12) 1 7

End of Block
Block 6.0.3 (Hershey's Similar BLRight)
IMG11_Stim_H_SimRig

T3_Stim_H_SimRig Timing
First Click (1)
Last Click (2)
Page Submit (3)
Click Count (4)
Page Break
Appendix 6: Questionnaire script (Study 2)

IMG12_Resp_H_SimRig

Q18_Choice_H_SimRig
Which one is the original flavor?
- 1 (1)
- 2 (2)

Page Break

Q19_Conf_H_SimRig
Please indicate the extent to which you agree/disagree with the following statements.
Click and drag the sliding bar.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>The decision was confusing to make. (1)</td>
<td></td>
</tr>
<tr>
<td>It was difficult for me to choose the answer I wanted. (2)</td>
<td></td>
</tr>
<tr>
<td>I felt confused while making my decision. (3)</td>
<td></td>
</tr>
<tr>
<td>The task was difficult. (4)</td>
<td></td>
</tr>
<tr>
<td>The task was hard. (5)</td>
<td></td>
</tr>
<tr>
<td>The task was easy. (6)</td>
<td></td>
</tr>
<tr>
<td>I felt bothered making the decision. (7)</td>
<td></td>
</tr>
<tr>
<td>I was frustrated when making the choice. (8)</td>
<td></td>
</tr>
<tr>
<td>I felt stressed when I evaluated the options. (9)</td>
<td></td>
</tr>
<tr>
<td>I am sure about the decision I made. (10)</td>
<td></td>
</tr>
<tr>
<td>I am confident about the decision I made. (11)</td>
<td></td>
</tr>
</tbody>
</table>
Appendix 6: Questionnaire script (Study 2)

I was certain about my decision. (12)

End of Block
Block 6.0.4 (Hershey's Different BLLeft)
IMG13_Stim_H_DifLeft

T4_Stim_H_DifLeft Timing
First Click (1)
Last Click (2)
Page Submit (3)
Click Count (4)
Page Break
IMG14_Resp_H_DifLeft

Q20_Choice_H_DifLeft
Which one is the original flavor?
  ○ 1 (1)
  ○ 2 (2)
Page Break

Q21_Conf_H_DifLeft
Please indicate the extent to which you agree/disagree with the following statements. Click and drag the sliding bar.
Appendix 6: Questionnaire script (Study 2)

<table>
<thead>
<tr>
<th>Statement</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>The decision was confusing to make. (1)</td>
<td>1</td>
</tr>
<tr>
<td>It was difficult for me to choose the answer I wanted. (2)</td>
<td>1</td>
</tr>
<tr>
<td>I felt confused while making my decision. (3)</td>
<td>1</td>
</tr>
<tr>
<td>The task was difficult. (4)</td>
<td>1</td>
</tr>
<tr>
<td>The task was hard. (5)</td>
<td>1</td>
</tr>
<tr>
<td>The task was easy. (6)</td>
<td>1</td>
</tr>
<tr>
<td>I felt bothered making the decision. (7)</td>
<td>1</td>
</tr>
<tr>
<td>I was frustrated when making the choice. (8)</td>
<td>1</td>
</tr>
<tr>
<td>I felt stressed when I evaluated the options. (9)</td>
<td>1</td>
</tr>
<tr>
<td>I am sure about the decision I made. (10)</td>
<td>1</td>
</tr>
<tr>
<td>I am confident about the decision I made. (11)</td>
<td>1</td>
</tr>
<tr>
<td>I was certain about my decision. (12)</td>
<td>1</td>
</tr>
</tbody>
</table>

End of Block
Block 6.0.5 (Hershey's Different BLRight)
IMG15_Stim_H_DifRig
Appendix 6: Questionnaire script (Study 2)

**Q22_Choice_H_DifRig**
Which one is the original flavor?
- 1 (1)
- 2 (2)

**Q23_Conf_H_DifRig**
Please indicate the extent to which you agree/disagree with the following statements. Click and drag the sliding bar.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>The decision was confusing to make. (1)</td>
<td></td>
</tr>
<tr>
<td>It was difficult for me to choose the answer I wanted. (2)</td>
<td></td>
</tr>
<tr>
<td>I felt confused while making my decision. (3)</td>
<td></td>
</tr>
<tr>
<td>The task was difficult. (4)</td>
<td></td>
</tr>
<tr>
<td>The task was hard. (5)</td>
<td></td>
</tr>
<tr>
<td>The task was easy. (6)</td>
<td></td>
</tr>
<tr>
<td>I felt bothered making the decision. (7)</td>
<td></td>
</tr>
<tr>
<td>I was frustrated when making the choice. (8)</td>
<td></td>
</tr>
<tr>
<td>I felt stressed when I evaluated the options. (9)</td>
<td></td>
</tr>
<tr>
<td>I am sure about the decision I made. (10)</td>
<td></td>
</tr>
<tr>
<td>I am confident about the decision I made. (11)</td>
<td></td>
</tr>
</tbody>
</table>
Appendix 6: Questionnaire script (Study 2)

I was certain about my decision. (12)

End of Block
Block 6.9.0 (Distractor Task Favorite Color)
Q90_Dist1_FavCol
What is your favorite color?
- Red (1)
- Blue (2)
- Yellow (3)
- Black (4)
- White (5)
- Green (6)
- Orange (7)
- Purple (8)
- Pink (9)
- Other (please specify) (99) _____

End of Block
Block 6.1.0 (Milka Scenario)
M4_Scenario_M
Imagine you are on a holiday overseas...
You are in a rush to catch a tour bus.
You need a sugar boost, but you won’t be able to buy anything once your trip starts.
Luckily, there is a vending machine right next to the bus stop, so you decide to buy something.
The sugar boost you are looking for is the original flavor of a new and unusual brand.
Suddenly, your tour bus arrives and people start boarding.
You notice the vending machine has two choices of the same brand.
You only have a few seconds to make your choice.

End of Block
Block 6.1.1 (Milka Identical)
IMG17_Stim_M_Id
Appendix 6: Questionnaire script (Study 2)

T6_Stim_M_Id Timing
First Click (1)
Last Click (2)
Page Submit (3)
Click Count (4)
Page Break
IMG18_Resp_M_Id

Q24_Choice_M_Id Which one is the original flavor?
  - 1 (1)
  - 2 (2)
Page Break

Q25_Conf_M_Id
Please indicate the extent to which you agree/disagree with the following statements.
Click and drag the sliding bar.
- The decision was confusing to make. (1)
- It was difficult for me to choose the answer I wanted. (2)
<table>
<thead>
<tr>
<th>Question</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>I felt confused while making my decision.</td>
<td>6</td>
</tr>
<tr>
<td>The task was difficult.</td>
<td>6</td>
</tr>
<tr>
<td>The task was hard.</td>
<td>6</td>
</tr>
<tr>
<td>The task was easy.</td>
<td>6</td>
</tr>
<tr>
<td>I felt bothered making the decision.</td>
<td>6</td>
</tr>
<tr>
<td>I was frustrated when making the choice.</td>
<td>6</td>
</tr>
<tr>
<td>I felt stressed when I evaluated the options.</td>
<td>6</td>
</tr>
<tr>
<td>I am sure about the decision I made.</td>
<td>6</td>
</tr>
<tr>
<td>I am confident about the decision I made.</td>
<td>6</td>
</tr>
<tr>
<td>I was certain about my decision.</td>
<td>6</td>
</tr>
</tbody>
</table>

*End of Block*

**Block 6.1.2 (Milka Similar BLLeft)**

IMG19_Stim_M_SimLeft

![Milka Similar BLLeft](image)

T7_Stim_M_SimLeft Timing

- First Click (1)
- Last Click (2)
- Page Submit (3)
- Click Count (4)
- Page Break

IMG20_Resp_M_SimLeft
Appendix 6: Questionnaire script (Study 2)

Q26_Choice_M_SimLeft Which one is the original flavor?
- 1 (1)
- 2 (2)

Page Break

Q27_Conf_M_SimLeft Please indicate the extent to which you agree/disagree with the following statements.
Click and drag the sliding bar.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>The decision was confusing to make.</td>
<td>1-7</td>
</tr>
<tr>
<td>It was difficult for me to choose the answer I wanted.</td>
<td>1-7</td>
</tr>
<tr>
<td>I felt confused while making my decision.</td>
<td>1-7</td>
</tr>
<tr>
<td>The task was difficult.</td>
<td>1-7</td>
</tr>
<tr>
<td>The task was hard.</td>
<td>1-7</td>
</tr>
<tr>
<td>The task was easy.</td>
<td>1-7</td>
</tr>
<tr>
<td>I felt bothered making the decision.</td>
<td>1-7</td>
</tr>
<tr>
<td>I was frustrated when making the choice.</td>
<td>1-7</td>
</tr>
<tr>
<td>I felt stressed when I evaluated the options.</td>
<td>1-7</td>
</tr>
<tr>
<td>I am sure about the decision I made.</td>
<td>1-7</td>
</tr>
<tr>
<td>I am confident about the decision I made.</td>
<td>1-7</td>
</tr>
<tr>
<td>I was certain about my decision.</td>
<td>1-7</td>
</tr>
</tbody>
</table>
Appendix 6: Questionnaire script (Study 2)

**End of Block**

**Block 6.1.3 (Milka Similar BLRight)**

**IMG21_Stim_M_SimRig**

![Image of Milka bars]

**T8_Stim_M_SimRig Timing**
- First Click (1)
- Last Click (2)
- Page Submit (3)
- Click Count (4)
- Page Break

**IMG22_Resp_M_SimRig**

![Image of Milka bars]

**Q28_Choice_M_SimRig** Which one is the original flavor?
- 1 (1)
- 2 (2)

**Page Break**

**Q29_Conf_M_SimRig**
Please indicate the extent to which you agree/disagree with the following statements.
Click and drag the sliding bar.

The decision was confusing to make. (1)
### Appendix 6: Questionnaire script (Study 2)

<table>
<thead>
<tr>
<th>Statement</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>It was difficult for me to choose the answer I wanted.</td>
<td></td>
</tr>
<tr>
<td>I felt confused while making my decision.</td>
<td></td>
</tr>
<tr>
<td>The task was difficult.</td>
<td></td>
</tr>
<tr>
<td>The task was hard.</td>
<td></td>
</tr>
<tr>
<td>The task was easy.</td>
<td></td>
</tr>
<tr>
<td>I felt bothered making the decision.</td>
<td></td>
</tr>
<tr>
<td>I was frustrated when making the choice.</td>
<td></td>
</tr>
<tr>
<td>I felt stressed when I evaluated the options.</td>
<td></td>
</tr>
<tr>
<td>I am sure about the decision I made.</td>
<td></td>
</tr>
<tr>
<td>I am confident about the decision I made.</td>
<td></td>
</tr>
<tr>
<td>I was certain about my decision.</td>
<td></td>
</tr>
</tbody>
</table>

**End of Block**

Block 6.1.4 (Milka Different BLLeft)

IMG23_Stim_M_DifLeft

---

First Click (1)  
Last Click (2)  
Page Submit (3)  
Click Count (4)  
Page Break  
IMG24_Resp_M_DifLeft
Appendix 6: Questionnaire script (Study 2)

### Q30. Choice_M_DiffLeft Which one is the original flavor?
- 1 (1)
- 2 (2)

---

### Q31. Conf_M_DiffLeft
Please indicate the extent to which you agree/disagree with the following statements. Click and drag the sliding bar.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>The decision was confusing to make. (1)</td>
<td></td>
</tr>
<tr>
<td>It was difficult for me to choose the answer I wanted. (2)</td>
<td></td>
</tr>
<tr>
<td>I felt confused while making my decision. (3)</td>
<td></td>
</tr>
<tr>
<td>The task was difficult. (4)</td>
<td></td>
</tr>
<tr>
<td>The task was hard. (5)</td>
<td></td>
</tr>
<tr>
<td>The task was easy. (6)</td>
<td></td>
</tr>
<tr>
<td>I felt bothered making the decision. (7)</td>
<td></td>
</tr>
<tr>
<td>I was frustrated when making the choice. (8)</td>
<td></td>
</tr>
<tr>
<td>I felt stressed when I evaluated the options. (9)</td>
<td></td>
</tr>
<tr>
<td>I am sure about the decision I made. (10)</td>
<td></td>
</tr>
<tr>
<td>I am confident about the decision I made. (11)</td>
<td></td>
</tr>
<tr>
<td>I was certain about my decision. (12)</td>
<td></td>
</tr>
</tbody>
</table>
End of Block
Block 6.1.5 (Milka Different BLRight)
IMG25_Stim_M_DifRig

T10_Stim_M_DifRig Timing
First Click (1)
Last Click (2)
Page Submit (3)
Click Count (4)
Page Break
IMG26_Resp_M_DifRig

Q32_Choice_M_DifRig Which one is the original flavor?
  o 1 (1)
  o 2 (2)
Page Break

Q33_Conf_M_DifRig
Please indicate the extent to which you agree/disagree with the following statements.
Click and drag the sliding bar.
The decision was confusing to make. (1)
Appendix 6: Questionnaire script (Study 2)

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>It was difficult for me to choose the answer I wanted. (2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I felt confused while making my decision. (3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The task was difficult. (4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The task was hard. (5)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The task was easy. (6)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I felt bothered making the decision. (7)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I was frustrated when making the choice. (8)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I felt stressed when I evaluated the options. (9)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am sure about the decision I made. (10)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am confident about the decision I made. (11)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I was certain about my decision. (12)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

End of Block

Block 6.9.1 (Distractor Task Brand Relevance)

Q91_Dist2_BrandRel
Please indicate the extent to which you agree/disagree with the following statements.
Click and drag the sliding bar.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>When I purchase a product in a given category, the brand plays, compared to other things, an important role. (1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>When purchasing, I focus mainly on the brand. (2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>To me, it is important to purchase a brand name product. (3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The brand plays a significant role as to how satisfied I am with the product. (4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

End of Block

Block 6.2.0 (Red Bull Scenario)

M5_Scenario_R
Imagine you are on a holiday overseas...
You are in a rush to catch a tour bus.
You need a sugar boost, but you won't be able to buy anything once your trip starts.
Luckily, there is a vending machine right next to the bus stop, so you decide to buy something.
The sugar boost you are looking for is the original flavor of a familiar brand.
Suddenly, your tour bus arrives and people start boarding.
You notice the vending machine has two choices of the same brand. You only have a few seconds to make your choice.
Q34 Choice_R_Id Which one is the original flavor?
- 1 (1)
- 2 (2)

Page Break

Q35 Conf_R_Id Please indicate the extent to which you agree/disagree with the following statements. Click and drag the sliding bar.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>The decision was confusing to make. (1)</td>
<td>5</td>
</tr>
<tr>
<td>It was difficult for me to choose the answer I wanted. (2)</td>
<td>5</td>
</tr>
<tr>
<td>I felt confused while making my decision. (3)</td>
<td>5</td>
</tr>
<tr>
<td>The task was difficult. (4)</td>
<td>5</td>
</tr>
<tr>
<td>The task was hard. (5)</td>
<td>5</td>
</tr>
<tr>
<td>The task was easy. (6)</td>
<td>5</td>
</tr>
<tr>
<td>I felt bothered making the decision. (7)</td>
<td>5</td>
</tr>
<tr>
<td>I was frustrated when making the choice. (8)</td>
<td>5</td>
</tr>
<tr>
<td>I felt stressed when I evaluated the options. (9)</td>
<td>5</td>
</tr>
<tr>
<td>I am sure about the decision I made. (10)</td>
<td>5</td>
</tr>
<tr>
<td>I am confident about the decision I made. (11)</td>
<td>5</td>
</tr>
<tr>
<td>I was certain about my decision. (12)</td>
<td>5</td>
</tr>
</tbody>
</table>
Appendix 6: Questionnaire script (Study 2)

**End of Block**
Block 6.2.2 (Red Bull Similar BLLeft)

IMG29_Stim_R_SimLeft

![Red Bull Cans](image)

1 2

T12_Stim_R_SimLeft Timing
First Click (1)
Last Click (2)
Page Submit (3)
Click Count (4)
Page Break

IMG30_Resp_R_SimLeft

![Decision Sliding Bar](image)

Q36_Choice_R_SimLeft Which one is the original flavor?
- 1 (1)
- 2 (2)

Page Break

Q37_Conf_R_SimLeft
Please indicate the extent to which you agree/disagree with the following statements. Click and drag the sliding bar.

The decision was confusing to make. (1)

[Sliding Bar]

1 7
Appendix 6: Questionnaire script (Study 2)

<table>
<thead>
<tr>
<th>Statement</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>It was difficult for me to choose the answer I wanted. (2)</td>
<td>1</td>
</tr>
<tr>
<td>I felt confused while making my decision. (3)</td>
<td>7</td>
</tr>
<tr>
<td>The task was difficult. (4)</td>
<td>7</td>
</tr>
<tr>
<td>The task was hard. (5)</td>
<td>7</td>
</tr>
<tr>
<td>The task was easy. (6)</td>
<td>7</td>
</tr>
<tr>
<td>I felt bothered making the decision. (7)</td>
<td>7</td>
</tr>
<tr>
<td>I was frustrated when making the choice. (8)</td>
<td>7</td>
</tr>
<tr>
<td>I felt stressed when I evaluated the options. (9)</td>
<td>7</td>
</tr>
<tr>
<td>I am sure about the decision I made. (10)</td>
<td>7</td>
</tr>
<tr>
<td>I am confident about the decision I made. (11)</td>
<td>7</td>
</tr>
<tr>
<td>I was certain about my decision. (12)</td>
<td>7</td>
</tr>
</tbody>
</table>

End of Block
Block 6.2.3 (Red Bull Similar BLRight)
IMG31_Stim_R_SimRig

T13_Stim_R_SimRig Timing
First Click (1)
Last Click (2)
Page Submit (3)
Click Count (4)
Page Break
IMG32_Resp_R_SimRig
Appendix 6: Questionnaire script (Study 2)

Q38 Choice R SimRig Which one is the original flavor?
- 1 (1)
- 2 (2)

Page Break

Q39 Conf R SimRig
Please indicate the extent to which you agree/disagree with the following statements.
Click and drag the sliding bar.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>The decision was confusing to make. (1)</td>
<td>1</td>
</tr>
<tr>
<td>It was difficult for me to choose the answer I wanted. (2)</td>
<td></td>
</tr>
<tr>
<td>I felt confused while making my decision. (3)</td>
<td></td>
</tr>
<tr>
<td>The task was difficult. (4)</td>
<td></td>
</tr>
<tr>
<td>The task was hard. (5)</td>
<td></td>
</tr>
<tr>
<td>The task was easy. (6)</td>
<td></td>
</tr>
<tr>
<td>I felt bothered making the decision. (7)</td>
<td></td>
</tr>
<tr>
<td>I was frustrated when making the choice. (8)</td>
<td></td>
</tr>
<tr>
<td>I felt stressed when I evaluated the options. (9)</td>
<td></td>
</tr>
<tr>
<td>I am sure about the decision I made. (10)</td>
<td></td>
</tr>
<tr>
<td>I am confident about the decision I made. (11)</td>
<td></td>
</tr>
<tr>
<td>I was certain about my decision. (12)</td>
<td></td>
</tr>
</tbody>
</table>

365
Appendix 6: Questionnaire script (Study 2)

End of Block
Block 6.2.4 (Red Bull Different BLLeft)
IMG33_Stim_R_DifLeft

T14_Stim_R_DifLeft Timing
First Click (1)
Last Click (2)
Page Submit (3)
Click Count (4)
Page Break
IMG34_Resp_R_DifLeft

Q40_Choice_R_DifLeft Which one is the original flavor?
  o 1 (1)
  o 2 (2)
Page Break

Q41_Conf_R_DifLeft
Please indicate the extent to which you agree/disagree with the following statements.
Click and drag the sliding bar.

  The decision was confusing to make. (1)
It was difficult for me to choose the answer I wanted. (2)  
I felt confused while making my decision. (3)  
The task was difficult. (4)  
The task was hard. (5)  
The task was easy. (6)  
I felt bothered making the decision. (7)  
I was frustrated when making the choice. (8)  
I felt stressed when I evaluated the options. (9)  
I am sure about the decision I made. (10)  
I am confident about the decision I made. (11)  
I was certain about my decision. (12)  

**End of Block**

**Block 6.2.5 (Red Bull Different BLRight)**

IMG35_Stim_R_DifRig  
T15_Stim_R_DifRig Timing  
First Click (1)  
Last Click (2)  
Page Submit (3)  
Click Count (4)  
Page Break  
IMG36_Resp_R_DifRig
Appendix 6: Questionnaire script (Study 2)

Q42_Choice_R_DifRig Which one is the original flavor?
- 1 (1)
- 2 (2)

Page Break

Q43_Conf_R_DifRig
Please indicate the extent to which you agree/disagree with the following statements.
Click and drag the sliding bar.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>The decision was confusing to make.</td>
<td>1-7</td>
</tr>
<tr>
<td>It was difficult for me to choose the answer I wanted.</td>
<td>1-7</td>
</tr>
<tr>
<td>I felt confused while making my decision.</td>
<td>1-7</td>
</tr>
<tr>
<td>The task was difficult.</td>
<td>1-7</td>
</tr>
<tr>
<td>The task was hard.</td>
<td>1-7</td>
</tr>
<tr>
<td>The task was easy.</td>
<td>1-7</td>
</tr>
<tr>
<td>I felt bothered making the decision.</td>
<td>1-7</td>
</tr>
<tr>
<td>I was frustrated when making the choice.</td>
<td>1-7</td>
</tr>
<tr>
<td>I felt stressed when I evaluated the options.</td>
<td>1-7</td>
</tr>
<tr>
<td>I am sure about the decision I made.</td>
<td>1-7</td>
</tr>
<tr>
<td>I am confident about the decision I made.</td>
<td>1-7</td>
</tr>
<tr>
<td>I was certain about my decision.</td>
<td>1-7</td>
</tr>
</tbody>
</table>
Appendix 6: Questionnaire script (Study 2)

End of Block
Block 6.9.2 (Distractor Task Handedness)
Q92_Dist3_Hand
Are you left or right handed?
  o Left (1)
  o Right (2)
  o Both (3)

End of Block
Block 6.3.0 (V Scenario)
M6_Scenario_V
Imagine you are on a holiday overseas...
You are in a rush to catch a tour bus.
You need a sugar boost, but you won't be able to buy anything once your trip starts.
Luckily, there is a vending machine right next to the bus stop, so you decide to buy something.
The sugar boost you are looking for is the original flavor of a new and unusual brand.
Suddenly, your tour bus arrives and people start boarding.
You notice the vending machine has two choices of the same brand.
You only have a few seconds to make your choice.

End of Block
Block 6.3.1 (V Identical Exposure)
IMG37_Stim_V_Id

T16_Stim_V_Id Timing
First Click  (1)
Last Click  (2)
Page Submit  (3)
Click Count  (4)
Page Break
Appendix 6: Questionnaire script (Study 2)

Q44_Choice_V_Id Which one is the original flavor?
   o 1 (1)
   o 2 (2)

Q45_Conf_V_Id Please indicate the extent to which you agree/disagree with the following statements. Click and drag the sliding bar.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>The decision was confusing to make.</td>
<td></td>
</tr>
<tr>
<td>It was difficult for me to choose the answer I wanted.</td>
<td></td>
</tr>
<tr>
<td>I felt confused while making my decision.</td>
<td></td>
</tr>
<tr>
<td>The task was difficult.</td>
<td></td>
</tr>
<tr>
<td>The task was hard.</td>
<td></td>
</tr>
<tr>
<td>The task was easy.</td>
<td></td>
</tr>
<tr>
<td>I felt bothered making the decision.</td>
<td></td>
</tr>
<tr>
<td>I was frustrated when making the choice.</td>
<td></td>
</tr>
<tr>
<td>I felt stressed when I evaluated the options.</td>
<td></td>
</tr>
<tr>
<td>I am sure about the decision I made.</td>
<td></td>
</tr>
<tr>
<td>I am confident about the decision I made.</td>
<td></td>
</tr>
</tbody>
</table>
Appendix 6: Questionnaire script (Study 2)

I was certain about my decision. (12)

End of Block
Block 6.3.2 (V Similar BLLeft)
IMG39_Stim_V_SimLeft

T17_Stim_V_SimLeft Timing
First Click (1)
Last Click (2)
Page Submit (3)
Click Count (4)
Page Break
IMG40_Resp_V_SimLeft

Q46Choice_V_SimLeft Which one is the original flavor?
  ○ 1 (1)
  ○ 2 (2)
Page Break

Q47Conf_V_SimLeft
Please indicate the extent to which you agree/disagree with the following statements. Click and drag the sliding bar.
Appendix 6: Questionnaire script (Study 2)

| The decision was confusing to make. (1) | 1 | 7 |
| It was difficult for me to choose the answer I wanted. (2) | 1 | 7 |
| I felt confused while making my decision. (3) | 1 | 7 |
| The task was difficult. (4) | 1 | 7 |
| The task was hard. (5) | 1 | 7 |
| The task was easy. (6) | 1 | 7 |
| I felt bothered making the decision. (7) | 1 | 7 |
| I was frustrated when making the choice. (8) | 1 | 7 |
| I felt stressed when I evaluated the options. (9) | 1 | 7 |
| I am sure about the decision I made. (10) | 1 | 7 |
| I am confident about the decision I made. (11) | 1 | 7 |
| I was certain about my decision. (12) | 1 | 7 |

End of Block
Block 6.3.3 (V Similar BLRight)
IMG41_Stim_V_SimRig
Appendix 6: Questionnaire script (Study 2)

Q48_Choice_V_SimRig Which one is the original flavor?
  □ 1 (1)
  □ 2 (2)

Page Break

Q49_Conf_V_SimRig Please indicate the extent to which you agree/disagree with the following statements. Click and drag the sliding bar.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>The decision was confusing to make.</td>
<td></td>
</tr>
<tr>
<td>It was difficult for me to choose the answer I wanted.</td>
<td></td>
</tr>
<tr>
<td>I felt confused while making my decision.</td>
<td></td>
</tr>
<tr>
<td>The task was difficult.</td>
<td></td>
</tr>
<tr>
<td>The task was hard.</td>
<td></td>
</tr>
<tr>
<td>The task was easy.</td>
<td></td>
</tr>
<tr>
<td>I felt bothered making the decision.</td>
<td></td>
</tr>
<tr>
<td>I was frustrated when making the choice.</td>
<td></td>
</tr>
<tr>
<td>I felt stressed when I evaluated the options.</td>
<td></td>
</tr>
<tr>
<td>I am sure about the decision I made.</td>
<td></td>
</tr>
<tr>
<td>I am confident about the decision I made.</td>
<td></td>
</tr>
</tbody>
</table>
Appendix 6: Questionnaire script (Study 2)

I was certain about my decision. (12)

End of Block
Block 6.3.4 (V Different BLLeft)

IMG43_Stim_V_DifLeft

T19_Stim_V_DifLeft Timing
First Click (1)
Last Click (2)
Page Submit (3)
Click Count (4)
Page Break
IMG44_Resp_V_DifLeft

Q50_Choice_V_DifLeft Which one is the original flavor?
   o 1 (1)
   o 2 (2)
Page Break

Q51_Conf_V_DifLeft
Please indicate the extent to which you agree/disagree with the following statements.
Click and drag the sliding bar.
## Appendix 6: Questionnaire script (Study 2)

<table>
<thead>
<tr>
<th>Statement</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>The decision was confusing to make. (1)</td>
<td>1 [ ]</td>
</tr>
<tr>
<td>It was difficult for me to choose the answer I wanted. (2)</td>
<td>1 [ ]</td>
</tr>
<tr>
<td>I felt confused while making my decision. (3)</td>
<td>1 [ ]</td>
</tr>
<tr>
<td>The task was difficult. (4)</td>
<td>1 [ ]</td>
</tr>
<tr>
<td>The task was hard. (5)</td>
<td>1 [ ]</td>
</tr>
<tr>
<td>The task was easy. (6)</td>
<td>1 [ ]</td>
</tr>
<tr>
<td>I felt bothered making the decision. (7)</td>
<td>1 [ ]</td>
</tr>
<tr>
<td>I was frustrated when making the choice. (8)</td>
<td>1 [ ]</td>
</tr>
<tr>
<td>I felt stressed when I evaluated the options. (9)</td>
<td>1 [ ]</td>
</tr>
<tr>
<td>I am sure about the decision I made. (10)</td>
<td>1 [ ]</td>
</tr>
<tr>
<td>I am confident about the decision I made. (11)</td>
<td>1 [ ]</td>
</tr>
<tr>
<td>I was certain about my decision. (12)</td>
<td>1 [ ]</td>
</tr>
</tbody>
</table>

*End of Block*

**Block 6.3.5 (V Different BLRight)**

IMG45_Stim_V_DifRig

![Image of two cans](image)

T20_Stim_V_DifRig Timing
- First Click (1)
- Last Click (2)
- Page Submit (3)
- Click Count (4)
- Page Break
Appendix 6: Questionnaire script (Study 2)

Q52_Choice_V_DifRig Which one is the original flavor?
- 1 (1)
- 2 (2)

Page Break

Q53_Conf_V_DifRig Please indicate the extent to which you agree/disagree with the following statements. Click and drag the sliding bar.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>The decision was confusing to make. (1)</td>
<td></td>
</tr>
<tr>
<td>It was difficult for me to choose the answer I wanted. (2)</td>
<td></td>
</tr>
<tr>
<td>I felt confused while making my decision. (3)</td>
<td></td>
</tr>
<tr>
<td>The task was difficult. (4)</td>
<td></td>
</tr>
<tr>
<td>The task was hard. (5)</td>
<td></td>
</tr>
<tr>
<td>The task was easy. (6)</td>
<td></td>
</tr>
<tr>
<td>I felt bothered making the decision. (7)</td>
<td></td>
</tr>
<tr>
<td>I was frustrated when making the choice. (8)</td>
<td></td>
</tr>
<tr>
<td>I felt stressed when I evaluated the options. (9)</td>
<td></td>
</tr>
<tr>
<td>I am sure about the decision I made. (10)</td>
<td></td>
</tr>
<tr>
<td>I am confident about the decision I made. (11)</td>
<td></td>
</tr>
</tbody>
</table>
Appendix 6: Questionnaire script (Study 2)

I was certain about my decision. (12)

End of Block

Block 6.9.3 (Distractor Task Frequency)

Q93_Dist4_Freq
How frequently do you purchase chocolate and/or carbonated drinks (including energy drinks)?
- Daily (1)
- A few times a week (2)
- Once a week (3)
- A few times a month (4)
- Once a month (5)
- A few times a year (6)
- Once a year (7)
- Never (8)

End of Block

Block 7.0 (Milk Chocolate Purchase Decision Involvement)

Q93.0_Choc_Inv_Care
In selecting from the many brands of milk chocolate, would you say that:
- I would not care at all as to which one I buy (1)
- I would care a great deal as to which one I buy (7)

Q93.1_Choc_Inv_Alike
Do you think that the brands of milk chocolate are all very alike or all very different?
- They are all very alike (1)
- They are all very different (7)

Q93.2_Choc_Inv_Impt
How important would it be to you to make the right choice of milk chocolate?
- Not at all important (1)
- Extremely important (7)

Q93.3_Choc_Inv_Conc
How concerned would you be if you accidentally purchased a different brand of milk chocolate?
- Not at all concerned (1)
- Very concerned (7)

End of Block

Block 7.1 (Energy Drink Purchase Decision Involvement)

Q93.4_EneD_Inv_Care
Appendix 6: Questionnaire script (Study 2)

In selecting from the many brands of energy drink, would you say that:

<table>
<thead>
<tr>
<th>I would not care at all as to which one I buy (1)</th>
<th>I would care a great deal as to which one I buy (7)</th>
</tr>
</thead>
</table>

Q93.5_EneD_Inv_Alike
Do you think that the brands of energy drink are all very alike or all very different?

<table>
<thead>
<tr>
<th>They are all very alike (1)</th>
<th>They are all very different (7)</th>
</tr>
</thead>
</table>

Q93.6_EneD_Inv_Impt
How important would it be to you to make the right choice of energy drink?

<table>
<thead>
<tr>
<th>Not at all important (1)</th>
<th>Extremely important (7)</th>
</tr>
</thead>
</table>

Q93.7_EneD_Inv_Conc
How concerned would you be if you accidentally purchased a different brand of energy drink?

<table>
<thead>
<tr>
<th>Not at all concerned (1)</th>
<th>Very concerned (7)</th>
</tr>
</thead>
</table>

End of Block

Block 7.2 (Situation-Specific Thinking Style/Task Effort)

Q94_ThinkStyle
Thinking of the tasks you completed, would you say that:

Click and drag the sliding bar.

<table>
<thead>
<tr>
<th>I approached this task analytically. (1)</th>
<th>1</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>I was very aware of my thinking process. (2)</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>I applied precise rules to deduce the answers. (3)</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>I used my gut feelings. (4)</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>I went by what felt good to me. (5)</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>I relied on my impressions. (6)</td>
<td>1</td>
<td>7</td>
</tr>
</tbody>
</table>

Q95_TaskEffort
Lastly, reflecting on the effort you put into the tasks you completed, would you say that:

Click and drag the sliding bar.
I tried my best at each of the questions in this questionnaire.

Skip To: End of Block if Q95_TaskEffort < I tried my best at each of the questions in this questionnaire. (1)

End of Block
Block 8 (End/Thanks)
M7_EndThanks
You have reached the end of the questionnaire. We would like to thank you for taking the time to participate in our research. Your responses are gratefully received and are extremely important to us. Your responses to this questionnaire will be used at an aggregate level only, meaning that your responses will not be identifiable to you, and you will remain anonymous. In addition, your responses will not be passed on to any other party for any purpose other than that which it was intended.
If you wish to have a copy of the research findings, please email me at jane.choi@auckland.ac.nz.
Once again, thank you and have a great day.
Yours sincerely,
Jane (Jinyoung) Choi
Ph.D. Candidate
The University of Auckland
New Zealand
End of Block
Appendix 7: Statistical output (Study 2)

Support for H1

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
<th>Partial Eta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brand_Familiarity</td>
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6. Colour_Similarity

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Pairwise Comparisons

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* The mean difference is significant at the .05 level.

b. Adjustment for multiple comparisons: Bonferroni.
Appendix 7: Statistical output (Study 2)

Support for H3

12. Brand_Familiarity * Colour_Similarity * Product_Category

### Estimates

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### Pairwise Comparisons

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Based on estimated marginal means

\(^a\): The mean difference is significant at the .05 level.

\(^b\): Adjustment for multiple comparisons: Bonferroni.

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### Appendix 7: Statistical output (Study 2)

#### Pairwise Comparisons

**Measure:** Confusion_Score_Combined

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Based on estimated marginal means

* The mean difference is significant at the .05 level.

b. Adjustment for multiple comparisons: Bonferroni.

---

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<td>.269</td>
<td>.497</td>
<td>-.710, .345</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Based on estimated marginal means

* The mean difference is significant at the .05 level.

b. Adjustment for multiple comparisons: Bonferroni.
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