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Warm or cold colored product packaging?

The impact of color temperature on product preference and perceptions of warmth and competence

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BI Norwegian Business School

**Warm or cold colored product packaging?  
The impact of color temperature on  
product preference and perceptions of  
warmth and competence**

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*This thesis is a part of the MSc programme at BI Norwegian Business School. The school takes no responsibility for the methods used, results found and conclusions drawn.*

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## Abstract

Careful color selection is an inevitable part when it comes to packaging design. Research within the field of social psychology suggests that nonverbal cues such as colors can activate warmth and competence perceptions of brands and products. Further, it is indicated that stimuli other than the physical experience of warmth and coldness can exert similar priming effects to those when one's physical temperature is modified in some way. Building on extant research, the present research wishes to examine whether temperature nuances within colors on product packaging activate perceptions of warmth and competence, and if so, whether it affects consumers' product preference and attitude towards products. In addition, the present research investigates whether consumers' product preference and attitudes towards products are affected by non-physical warmth and competence priming through written contexts. A series of two studies demonstrate that color temperature indeed impacts warmth and competence perceptions of products. Congruent with the hypotheses, results show that warmth cues (i.e., warm color temperature nuances) increase a product's perceived warmth. However, contrary to the hypotheses, similar effects on perceived competence are not present for products conveying competence cues (i.e., cold color temperature nuances). Finally, the findings indicate that contextual priming of warmth and competence does not significantly impact product preference or attitude towards the product. This paper carries notable implications for marketing managers, marketers, scholars, and designers, especially within the field of packaging development and design, where one can utilize color temperature nuances to communicate the desired brand perception.

*Keywords: color temperature, product packaging, competence, warmth, brand perception, product preference, priming*

## 1. Introduction

A product's packaging plays a crucial role in its success (Simms & Trott, 2010). Color is found to be the first package cue noticed by consumers (Danger, 1987a), and as much as 90 percent of product assessments are based on colors alone (Singh, 2006). This makes careful color selection an inevitable part of any marketing strategy when it comes to packaging design (Kauppinen-Räsänen & Luomala, 2010). In addition, most consumers make their purchase decisions by the store shelf (Underwood & Ozanne, 1998). Packaging thus becomes a critical factor in the consumer decision-making process, as it communicates to consumers at the actual decision-making point (Silayoi & Speece, 2007). Research further suggests that consumer responses to packaging color are converted into brand preference, implying that the decision to opt for a brand relates to its packaging aesthetics (Kauppinen-Räsänen, 2014; Mohebbi, 2014).

It is common practice amongst marketing managers to use color cues on product packaging to communicate a brand's personality. For instance, Gillette and Visa use blue to highlight competence, while Dunkin' Donuts use pink, and Coca-Cola use red to highlight warmth. Still, research on the dimensions of warmth and competence within marketing remains scarce, and consumer psychologists only recently began examining it in a consumer context. Their research thus far indicate that people not only perceive each other on the dimensions of warmth and competence, but that consumers also perceive companies and brands on these dimensions (Aaker, Vohs, & Mogilner, 2010; Kervyn, Fiske, & Malone, 2012).

Building on previous research, we define warmth as the brand personality dimension reflecting perceived intent, such as friendliness, helpfulness, trustworthiness, sincerity and morality. We define competence as the brand personality dimension indicating perceived ability, including intelligence, skill, efficacy and knowledge (e.g., Aaker, et al., 2010; Fiske, Cuddy, & Glick, 2007; Grandey, Fisk, Mattila, Jansen, & Sideman, 2005; Judd, James-Hawkins, Yzerbyt, & Kashima, 2005; Wojciszke, Bazinska, & Jaworski, 1998; Aaker, 1997).



## **1.1 Research questions**

Previous research has established that distinct color (i.e., pink and blue) and shape cues (i.e., circles and squares) activate brand personality perceptions of warmth and competence in a consumer environment (Hess & Melnyk, 2016). We wish to examine whether different color temperature nuances within single colors provide the same effect. Consequently, the first research question is:

*Do temperature nuances within colors provide warmth and competence cues, and if so, how do these cues on product packaging affect consumers' product preference and attitude?*

Research also suggests that stimuli other than the physical experience of warmth and coldness (e.g., reading temperature-related words) can exert similar priming effects to those that have been documented when one's physical temperature is modified in some way (Dimmock, Jackson, & Clarke, 2013). Williams and Bargh (2008) found that participants who held a cup of hot (versus iced) coffee judged a target person as having a warmer personality. Similarly, Zhong and Leonardelli (2008) found that people made to feel socially excluded judged their physical surroundings as colder and expressed a preference for warmer products. Initial evidence thus indicates that the physical experience of temperature is not necessary (Dimmock et al., 2013). We wish to further examine the non-physical priming effect of warmth and coldness as suggested by Dimmock et al. (2013). Consequently, the second research question is:

*Are consumers' product preference and attitudes towards products affected by non-physical warmth and competence priming (i.e., written contexts)?*

## **1.2 Contribution and structure**

To the authors' current knowledge, this paper is the first to systematically investigate for which colors consumers find it easy or difficult to distinguish between warm and cold nuances. Additionally, color temperature's effect on product preference and attitude, and whether contextual priming of warmth and competence impacts this relationship, has yet to be established. Hence, this paper contributes to both the color and product packaging literature within the field of

marketing, as well as within the field of consumer behavior and social psychology on the dimensions of warmth and competence. Thus, this paper carries notable implications for marketing managers, marketers, scholars and designers. The results are especially relevant for managers in the field of packaging development and design, where one can utilize color temperature nuances to communicate warmth and competence cues.

The remaining part of our paper is structured as follows: We start by investigating previous literature and identifying potential gaps related to the subject. Based on the literature review, we present an overview of our research questions, hypotheses, and studies. For each study, we present the methodology used, the results obtained and a short discussion. We end our paper with a general discussion of the overall findings, theoretical and managerial implications, as well as limitations and directions for future research.

## **2. Literature review**

This section reviews previous literature regarding the visual appearance of product packaging, the role of colors and color temperature within the fields of marketing and psychology, and the link between these aspects and perceptions of warmth and competence.

### **2.1 The visual appearance of product packaging influence purchase decisions**

In order to gain notice and consideration at the point of purchase, brands must be able to break through the clutter of competitor brands (Garber, Burke, & Jones, 2000). Product packaging is shown to be a critical tool for gaining such notice (Raphael, 1975). By attracting the consumers' attention, communicating a brand's personality, differentiating the brand from competitors, and enhancing the product's functionality, product packaging can have a substantial impact on consumer decision-making (Garber et al., 2000). Packaging is especially important when consumers have little or no prior knowledge of a product category or brand. For new or infrequently purchased products, the package may be the only source of information about the brands under consideration (Garber et al., 2000). For instance, Becker, Van Rompay, Schifferstein, and Galetzka (2011)

argue that the shape and color saturation of a package design is transferred to the subsequent taste experience of that product.

A substantial amount of research has found that the visual appearance of product packaging influence consumers' purchase decisions (Bloch, 1995; Crilly, Moultrie, & Clarkson, 2004; Fenko, Schifferstein, & Hekkert, 2010). Similarly, a product packaging's symbolic or esthetic qualities can steer consumers' decisions (Creusen & Schoormans, 2005; Van Rompay, Pruyn, & Tieke, 2009). The influential aspect of single packaging elements such as color, shapes, letter fonts, pictures and materials are also well established (Funk & Ndubisi, 2006; McDaniel & Baker, 1977; Schoormans & Robben, 1997). A product's packaging has changed from what used to be a cost-of-sale element to being a way to communicate a brand's personality (Underwood, 2003) and a way to infer product meaning and quality (Funk & Ndubisi, 2006). In this regard, changing the color of a product packaging do not prompt any additional costs like changing the characteristics, size or shape of a product. This makes color an attractive feature to alter from an economic point of view.

While most research on product packaging is focused on the general importance of the packaging with regards to the overall distribution of elements and design, significantly less is done specifically on the color properties of the packaging design. Additionally, most research is focused on influencing factors in packaging design, without many specific marketing implications. Garber et al. (2000) suggest that changing the color of a packaging design will enhance the likelihood of the item being considered by a non-loyal consumer. On the contrary, it would be best to keep the existing product packaging design when dealing with a large, loyal customer base. Furthermore, Ahmad, Billoo and Lakhan (2012) found that out of all the features related to the product packaging, color was the most important factor in the consumer decision-making process. Extant research also shows that the package color should be dependent of the product's desired positioning (Ampuero & Vila, 2006). They argue that cold, dark and black colors are required for high-priced products based on elegance and refined esthetics targeted towards the upper classes, while light (mainly white) colored packaging should be used in accessible products for more price sensitive consumers.

Similarly, Kauppinen-Räsänen and Luomala (2010) suggest that package colors serve as cues, not only for brand and product quality (Funk & Ndubisi, 2006; Garber et al., 2000), but also for product related information (i.e., attributes, such as taste and ingredients) and consumption related information (i.e., consequences, such as quality, trustworthiness and bodily imagery).

Consumers embrace product packaging colors as stimulus based information (Kauppinen-Räsänen, 2014). Thus, it can be used to capture consumers' attention, affect their preferential judgments, and communicate information about the product at the point of purchase. Consequently, it is observed that consumers in a hurry rely more on product packaging color and design when making purchasing decisions. Therefore, it is of our interest to investigate whether a product's packaging color, and more specifically its color temperature nuance, affects consumers' product preference and attitude.

## **2.2 Colors play a pivotal role within the field of marketing**

Within the field of marketing, color is typically used to grab consumers' attention, offer product cues, and differentiate brands from their competitors (Labrecque, Patrick, & Milne, 2013), for instance through packaging design. Similar to a brand's name, color carries intrinsic meaning that is central to the brand's identity (Simonson & Schmitt, 1997), enabling consumers to use color cues to assess products and make decisions. As such, the color becomes an important component of a brand's visual equity and contributes to brand recognition and image (Lightfoot & Gerstman, 1998).

Despite the pivotal role of color across various areas of marketing, marketing research dealing with color is scarce (Mohebbi, 2014; Labrecque et al., 2013). Much of the color research in marketing focus solely on a color's hue (e.g., red, green, and blue) and neglects to investigate its other two dimensions: saturation and value. Saturation refers to the intensity or amount of pigment in color, while value refers to its lightness or darkness (Labrecque et al., 2013). Practitioners are also often hesitant to explore using different colors (Labrecque et al., 2013), and many confess that they lack updated theoretical knowledge upon which to base their decisions (Gorn, Chattopadhyay, Yi, & Dahl, 1997).

Technically, different colors have different distributions of wavelengths of light. The color appearance of light of a given wavelength depends on the viewing conditions and varies slightly from one observer to another. Thus, color is also a sensation experienced by the individual (Hunt & Pointer, 2011). It is argued that "the perception and application of color is strongly influenced by one's innate physiological and psychological predisposition, personal experiences, age, gender, personality, income, ethnographic and demographic factors" (Singh & Srivastava, 2011, p. 199). Hence, color carries meaning and the ability to influence consumers' individual thoughts, feelings, and behaviors (Labrecque et al., 2013).

Despite the number of empirical color studies within the field of marketing being limited, it has been studied extensively in the field of psychology (Bellizzi & Hite, 1992) with a focus on color associations (Taft, 1997). Within this field, color is defined as the personal perception of the object (Camgöz, Yener, & Güvenc, 2004), which is closely linked to an individual's subjective color preference and learned associations. As associations are a result of learning, culture and context is thought to play an essential role in their formation (Hoegg & Alba, 2007). This also applies to the formation of color associations. While some evidence suggests that cultural differences exist for many color associations (Block & Kramer, 2009; Madden, Hewett, & Roth, 2000), other evidence indicates that intrinsic color associations are shared across cultures (Fraser & Banks, 2004). Further, globalization is thought to have had a crucial influence on cultural color meanings in today's society. It seems cultural lines are getting blurry when considering colors, supporting research suggesting that cultural norms only influence color preferences when salient (Chattopadhyay, Gorn, & Darke, 2010).

Furthermore, research shows that colors may have different associations dependent on the context in which they are displayed. For instance, one might experience excitement and arousal when seeing someone in a red dress at a dinner party. On the other hand, red streetlights serve as a signal for stopping, and provokes danger. The contextual setting (i.e., dinner party versus intersection) thus determines the activated associations, despite red being the critical color in both situations (Labrecque et al., 2013). Elliot and Maier (2007) support this notion by suggesting that dependent on the context of use, colors can trigger

completely different associations. Additionally, they argue that color associations mostly occur without conscious awareness or intention (Elliot & Maier, 2007). Thus, color has the ability to affect attitudes and behaviors unconsciously (Dijksterhuis, Smith, Van Baaren, & Wigboldus, 2005).

### **2.3 The distinction between warm and cold colors is relative**

A specific context in which color associations are relatively stable is with regards to temperature. People gather information regarding temperature by utilizing colors, for instance associating red with warm temperatures and blue with cold temperatures (Morgan, Goodson, & Jones, 1975). Technically, color temperature is a characteristic of visible light. It is measured in Kelvin on a scale from 1,000 to 10,000, where lower color temperature values are considered as warm light (e.g., yellow and red), and higher color temperature values are considered as cold light (e.g., blue). The fact that warm light has a lower color temperature than cold light, often leads to confusion. Consequently, graphical representations of the range of color temperatures in Kelvin normally ranges from cold in terms of blue to warm in terms of red (Hand & Middleditch, 2013).

Similarly, researchers in the field of psychology have classified colors as either warm or cold (Goldstein, 1942; Ho, Van Doorn, Kawabe, Watanabe, & Spence, 2014; Michael, Galich, Relland, & Prud'hon, 2010; Singh, 2006; Valdez & Mehrabian, 1994). For instance, red and orange are classified as warm colors, while blue and green are classified as cold colors. This can be explained by the association between colors and temperature in actual objects in everyday life. For instance, the most common sources of heat (e.g., a fire or the sun) are associated with red and orange. On the other hand, blue and green are associated with cold objects such as leaves, the ocean, and the sky. The cognitive association between color and temperature is thus learned and reinforced with increasing exposure to objects over time (Morgan et al., 1975). Therefore, it is only natural that people respond to colors in that way, even though it is the opposite of how color temperature is measured in terms of Kelvin. In support of this view, Morgan et al. (1975) reported that the ability to associate temperature with colors increases with age. From the age of 12, people could entirely associate temperatures with specific colors.

However, the distinction between warm and cold colors is relative. For instance, one color might be perceived as warmer than another color in one pairing, but colder than the other when paired with a different color. Besides, as color experiences vary between individuals, one person's perception of a color, or color nuance, can be different from that of another person (Singh, 2006). For the purpose of our research, we define cold color nuances as color nuances containing more blue as opposed to the chosen neutral color nuance. In the same way, we define warm color nuances as color nuances containing more yellow as opposed to the selected neutral color nuance (Hand & Middleditch, 2013). This serves as the backdrop of our pretest.

#### **2.4 Nonverbal cues influence perceptions of warmth and competence**

Recently, perceptions of warmth and competence have been tied to product packaging attributes such as color and shapes (Hess & Melnyk, 2016). Warmth and competence are known as the two fundamental dimensions of social perception, on which people instantly base their evaluation of others (Cuddy, Fiske, & Glick, 2008). This process goes back to evolution, as humans possess an inherent need to evaluate other people's intentions (i.e., warmth) and their ability to act on those intentions (i.e., competence). For instance, Wojciszke et al. (1998) found that warmth and competence together account for 82 percent of the variance in perceptions of how people characterize others when making first impressions. Similarly, research suggests that consumers perceive brands and companies in the same way by assigning personality traits to brands and products (Aaker et al., 2010; Aaker, 1997).

Building on previous research, we define the warmth dimension as reflecting traits related to perceived intent, such as friendliness, helpfulness, trustworthiness, sincerity and morality. The competence dimension reflects qualities related to perceived ability, including intelligence, skill, efficacy and knowledge (e.g., Aaker, et al., 2010; Fiske et al., 2007; Grandey et al., 2005; Judd et al., 2005; Wojciszke, Bazinska, & Jaworski, 1998; Aaker, 1997).

A growing body of literature suggests consumers are cautious regarding the effects of advertising and consequently try to resist persuasion attempts (Friestad and

Wright, 1995). Additionally, warm behavior is considered easy to fake (Reeder, Kumar, Hesson-McInnis, & Trafimow, 2002). As a consequence, verbal cues often fail in translating into perceptions of warmth (Grandey et al., 2005). Research within the field of psychology suggests that nonverbal cues could be an alternative and more effective way to influence perceptions of warmth and competence (DePaulo, 1992), as the effects of nonverbal cues are seen as less controllable than verbal and direct actions (Fox & Spector, 2000). Two streams of research suggest that it is possible to activate warmth and competence perceptions with nonverbal cues. The first stream of literature indicates that it is possible to create such judgments by enabling the corresponding brand-knowledge associations (e.g., through existing brand names and top-level internet domains). The second stream of literature suggests that subliminal priming of consumers with the concept of money (e.g., dollar signs) enhance their perception of a company's competence (Kervyn et al., 2012; Aaker et al., 2010). However, as these cues are primarily outside of the company's control, and due to their explicit nature, such ways of activating warmth and competence may evoke reactance. Subsequently, and similarly to verbal cues, they may not enable the desired perception (Hess & Melnyk, 2016).

Hess and Melnyk (2016) further adds to this literature by providing evidence that product packaging cues in terms of colors (i.e., pink versus blue) and shapes (i.e., round versus angular) activate gender stereotypical knowledge of warmth and competence, which consequently spills over to the brand. Furthermore, they suggest that the effect is dependent on the presence of other competence cues in a consumer's environment. When a reputable brand (representing a high competence cue) is present, feminine gender cues (i.e., a warm color such as pink) enhance purchase likelihood. Similarly, when a new company (representing a low competence cue) is present, masculine gender cues (i.e., a cold color such as blue) increase purchase likelihood. Specifically, warm colors are associated with warmth, and cold colors are associated with competence.

Not surprisingly, physical experiences of warmth are found to have the same effect as the reported verbal and nonverbal cues. For instance, Williams and Bargh (2008) found that participants who physically experienced warmth by holding a cup of hot (versus iced) coffee judged a target person as having a warmer personality.



Likewise, Dimmock et al. (2013) suggest that stimuli other than the actual physical experience of warmth and coldness (e.g., observing temperature-related images or reading temperature related words) can exert the same priming effects as those that have been documented when one's physical temperature is modified in some way. For instance, Zhong and Leonardelli (2008) found that people made to feel socially excluded judged their physical surroundings as colder and expressed a preference for warmer products. While initial evidence indicates that the physical experience of temperature is not necessary, the extent of it is yet to be determined.

Consequently, we wish to examine whether temperature nuances within colors activate warmth and competence perceptions of products. We assume that a product packaging conveying a warm color temperature (i.e., a warmth cue) activates feelings associated with warmth towards the product. Likewise, a product packaging conveying a cold color temperature (i.e., a competence cue) activates feelings associated with competence towards the product. This is expected to impact consumers' product preference and attitude towards the product. Furthermore, the potential effects of stimuli other than the actual physical experience of warmth and coldness have yet to be explored with priming through contextual cues. By examining whether product preference and attitude towards the product is affected by context, and building on Hess and Melnyk's (2016) potentially more powerful way of activating nonverbal warmth and competence perceptions through colors, we opt to use color temperature to manipulate warmth and competence perceptions in our stimuli.

### **3. Overview of research questions, hypotheses and studies**

Based on the literature review, the objective of this paper was to examine whether temperature nuances within colors on product packaging activate perceptions warmth and competence, and how these cues affect consumers' product preference and attitude towards products. In addition, we looked into whether these effects are influenced by non-physical warmth and competence priming (i.e., written contexts). Thus, we wish to replicate some of the findings of Hess and Melnyk (2016) and examine the suggested non-physical temperature priming effect by Dimmock et al. (2013). The following section presents an overview of the research questions, hypotheses, studies and the corresponding methods used.

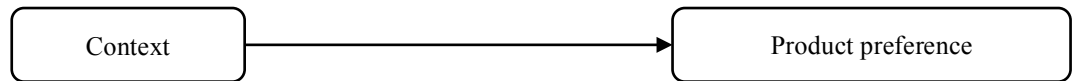
### 3.1 Research questions

**RQ1:** Do temperature nuances within colors provide warmth and competence cues, and if so, how do these cues on product packaging affect consumers' product preference and attitude?

**RQ2:** Are consumers' product preference and attitudes towards products affected by non-physical warmth and competence priming (i.e., written contexts)?

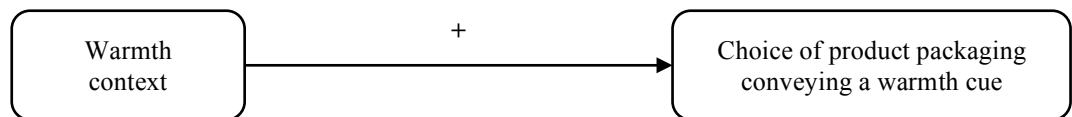
### 3.2 Hypotheses

**H1:** The context a participant is exposed to (i.e., warmth context, competence context, or control context), will impact his/her product preference.



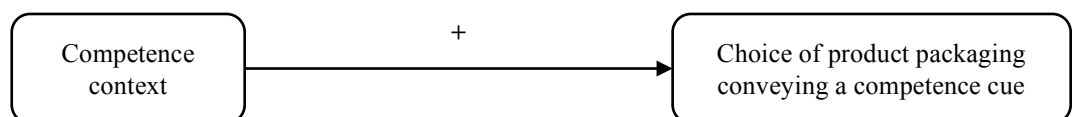
*Figure 1: Conceptual model of H1*

**H2<sub>A</sub>:** Participants exposed to the warmth context will choose the product packaging conveying a warmth cue (i.e., having a warm color temperature) over the product packaging conveying a competence cue (i.e., having a cold color temperature).



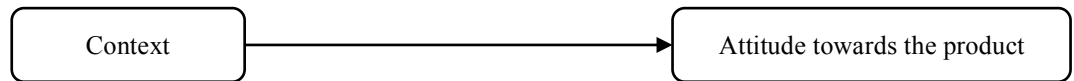
*Figure 2: Conceptual model of H2<sub>A</sub>*

**H2<sub>B</sub>:** Participants exposed to the competence context will choose the product packaging conveying a competence cue over the product packaging conveying a warmth cue.



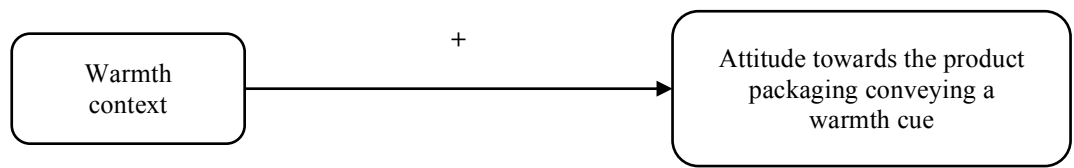
*Figure 3: Conceptual model of H2<sub>B</sub>*

**H3:** The context a participant is exposed to will impact his/her attitude towards the product.



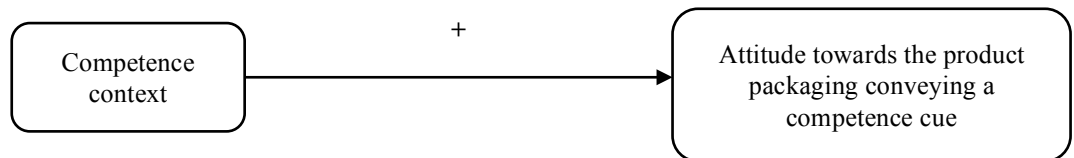
*Figure 4: Conceptual model of H3*

**H4<sub>A</sub>:** Participants exposed to the warmth context will show a higher attitude towards the product packaging conveying a warmth cue versus the product packaging conveying a competence cue.



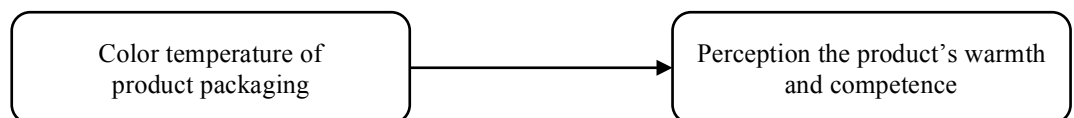
*Figure 5: Conceptual model of H4<sub>A</sub>*

**H4<sub>B</sub>:** Participants exposed to the competence context will show a higher attitude towards the product packaging conveying a competence cue versus the product packaging conveying a warmth cue.



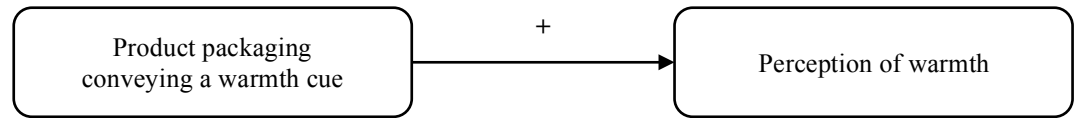
*Figure 6: Conceptual model of H4<sub>B</sub>*

**H5:** The color temperature of a product packaging (i.e., warm or cold) will impact how participants perceive the product on the dimensions of warmth and competence.



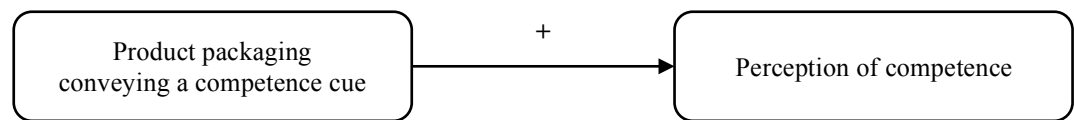
*Figure 7: Conceptual model of H5*

**H6<sub>A</sub>:** The product packaging conveying a warmth cue will be perceived as warmer than the product packaging conveying a competence cue.



*Figure 8: Conceptual model of H6<sub>A</sub>*

**H6<sub>B</sub>:** The product packaging conveying a competence cue will be perceived as more competent than the product packaging conveying a warmth cue.



*Figure 9: Conceptual model of H6<sub>B</sub>*

### 3.3 Studies

To test our proposed hypotheses, we conducted a pretest followed by a series of two main studies. The pretest was designed to validate whether warm and cold color nuances in fact were perceived as warm or cold, and to ensure that the distinction between them were clear. Through a drag and drop ranking task, participants were asked to rank the color nuances from coldest to warmest. Based on the results, the color carrying the most apparent distinction between warm and cold were applied to the stimuli of the main studies.

Subsequently, two main studies tested the proposed hypotheses. Study 1 sought to replicate some of the findings from Hess and Melnyk (2016), although considering cues within a single color (i.e., the color determined by the pretest) instead of across colors (i.e., pink versus blue). In addition, it sought to investigate whether the participants' product preference and attitude was significantly influenced by a non-physical warmth or competence context priming. Study 2 sought to further strengthen the findings from study 1, although within a new product category. Logistic regression was used to answer H1, H2<sub>A</sub> and H2<sub>B</sub>. A repeated measures ANOVA was performed to answer H3, H4<sub>A</sub> and H4<sub>B</sub>. Finally, both paired sample and one sample t-tests were conducted to answer H5, H6<sub>A</sub> and H6<sub>B</sub>.

## **4. Pretest**

### **4.1 Design**

The pretest was designed to validate whether warm and cold color nuances in fact were perceived as warm or cold, and to ensure that the distinction between them were clear. The colors used in the pretest are the colors reported as the main regions of the spectrum (Hunt & Pointer, 2011): violet, blue, green, yellow, orange and red. Within each color, five different nuances ranging from warm to cold was generated in Adobe Camera Raw by manipulating temperature. The temperature scale for jpeg-files in Adobe Camera Raw range from -100 to +100 (i.e., cold to warm). This is an alternative scale of the traditional Kelvin scale, based on the amount of blue (i.e., coldness) versus yellow (i.e., warmth). For all colors, each value represents a nuance. For violet, blue, green and red, the values -60, -30, 0, +30, and +60 were used. For colors yellow and orange, the values -45, -22, 0, +30, and +60 were used to get a clearer distinction between nuances (see appendix 1).

### **4.2 Sample**

89 participants were recruited through convenience sampling on Facebook. While the age spectrum ranged from 15 to 67 years old ( $M = 27.28$ ,  $SD = 7.244$ ), the majority of the participants were under the age of 30. 72 percent of the participants were female. Two participants reported being under the age of 18 and were thus excluded from further analysis.

### **4.3 Procedure**

An online survey was conducted to define which color nuances were most applicable to serve as warmth and competence cues in the main study. Participants were exposed to five different nuances of the colors violet, blue, green, yellow, orange and red, respectively. One color at a time, participants were asked to evaluate five color nuances with regards to perceived color temperature. By using a drag and drop ranking task, participants ranked the color nuances from one to five, where one was the coldest and five the warmest. Previous research has revealed that order response errors are common, meaning the order in which questions are structured in surveys matter. However, there are vague answers related to what direction the effects go. While McFarland (1981) found support the primacy effect (i.e., participants are biased to choose the first available

option), some have found support for a recency effect (i.e., selecting the last available option), while others have found no support of impact at all (Krosnick, 1999). To reduce possible order effects, the order in which the colors were presented, as well as the particular nuances, was randomized. Additionally, participants were asked about gender and age, to see if significant differences between groups exist. The questionnaire of the study is included in appendix 2.

#### 4.4 Results

As shown in table 1, the results indicate that the participants found it easiest to distinguish between nuances for the color violet. The total percentage of participants who managed to rank the different color temperature nuances of violet correctly was 61.2 percent. On the other hand, red turned out to be the most challenging color to differentiate between color temperatures. The total percentage of participants who managed to rank the different color temperature nuances of red correctly was 31.7 percent.

In addition, results show that participants found it easier to identify cold nuances rather than warm nuances. Participants also had a hard time distinguishing between the neutral and warmest nuances. For instance, the percentage of participants who managed to give correct nuance rankings for the cold nuance of yellow were 83.9 percent, while the percentage for the warm nuance of yellow were 23 percent. Controlling for gender and age showed no significant differences between groups. Hence, we proceed by using warm violet for warmth cues and cold violet for competence cues in further studies.

	1	2	3	4	5	Total
	<i>Coldest</i>			<i>Warmest</i>		
<i>Violet</i>	78.2 %	66.7 %	55.2 %	64.4 %	41.4 %	61.2 %
<i>Blue</i>	52.9 %	51.7 %	52.9 %	46.0 %	33.3 %	47.4 %
<i>Green</i>	62.1 %	40.2 %	29.9 %	40.2 %	35.6 %	41.6 %
<i>Yellow</i>	83.9 %	63.2 %	11.5 %	62.1 %	23.0 %	48.7 %
<i>Orange</i>	70.1 %	58.6 %	42.5 %	47.1 %	27.6 %	49.2 %
<i>Red</i>	33.3 %	23.0 %	36.8 %	33.3 %	32.2 %	31.7 %

*Table 1: Percentage of participants who managed to correctly rank the different color temperature nuances, in which one was the coldest and five the warmest*

## 5. Study 1

### 5.1 Design

The goal of study 1 was to demonstrate that warmth and competence cues activate warmth and competence perceptions of the product, which subsequently enhances product preference and attitude towards the product. Thus, study 1 sought to replicate some of the findings from Hess and Melnyk (2016), although considering warmth and competence cues within a single color (i.e., violet as determined by the pretest) instead of across colors (i.e., pink versus blue). Additionally, the study sought to investigate whether participants' product preference and attitude was significantly influenced when primed with a non-physical warmth or competence context.

Study 1 is a 3 (warmth context, competence context, control context) x 2 (warm product packaging, cold product packaging) design (see figure 10). The three contexts were manipulated between-subjects, while all participants were exposed to the two product packages with different color temperature nuances (i.e., warm violet and cold violet). Hence, they were asked within-subjects to separately rate the two products on several measures, representing their attitude towards the product packaging. To reduce order effect bias, the order in which the products were presented was randomized.

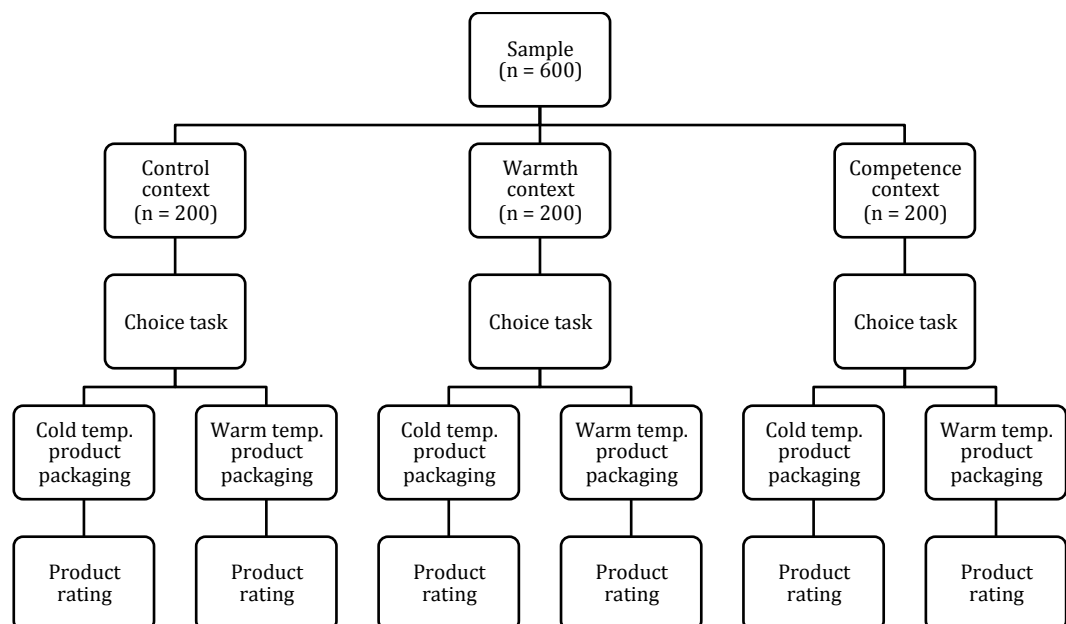


Figure 10: Schematic overview of study 1

Context was manipulated by giving each participant a scenario in which they are hosting a dinner party, and are to purchase wine (i.e., the product). In the competence context, they have recently been employed by a large financial firm and wish to appear as a competent person (see appendix 3). For the friendly context, they are looking to create new relationships and want to appear as a friendly person (see appendix 4). In the control context, no specific situation was described (see appendix 5).

## 5.2 Sample

615 participants (approximately 200 per condition) were recruited through Prolific, receiving a small reward for their participation. Participants recruited through an online panel cover a broader base of demographics, hence providing a more representative sample. Consequently, it contributes to a higher degree of external validity of the study (Shaughnessy, Zechmeister, & Zechmeister, 2012). While the age spectrum ranged from 18 to 73 years old ( $M = 32.88$ ,  $SD = 10.94$ ), 80 percent were 40 years or younger. Approximately 59 percent of the participants were female. 88 participants were excluded from the analysis due to some reported form of color blindness, completing the survey in less than 100 seconds, reporting not having a vivid imagination, or having missing values. This left a total of 527 participants to be analyzed. Filtering out these observations did not impact or change any statistical conclusions or significant effects.

## 5.3 Procedure

Participants were randomly assigned to one of the three contexts. They were told to read a short introduction (i.e., the context), and afterwards answer a series of questions regarding product preference. After reading one of the three contexts (warmth, competence or control), the participants were asked to choose between two products (see figure 11), where the only difference was the color temperature of the product packaging. A wine bottle was chosen as the product to be used in the manipulation because it usually represents a vital part of any dinner party. In addition, it is a product that people spend some time to evaluate before purchasing, in contrast to milk, bread and other daily purchases that consumers tend to purchase on autopilot.



After making their choice, participants were asked to answer a series of questions regarding each of the two products. Previous research has revealed that order response errors are common, meaning the order in which questions are structured in surveys matter. However, there are ambiguous answers related to what direction the effects go. While McFarland (1981) found support the primacy effect (i.e., participants are biased to choose the first available option), some have seen support for a recency effect (i.e., selecting the last available option), while others have found no support of impact at all (Krosnick, 1999). Thus, to reduce possible order effects, the order in which the two products were presented in the choice task, as well as their corresponding questions, was randomized. To reduce suspicion of the study's purpose, questions not central to the study were included.



*Figure 11: Product packaging stimuli of study 1*

The question regarding product liking was answered through a seven-point bipolar Likert scale (i.e., dislike it very much versus like it very much), while the question regarding product purpose was responded to through a seven-point unipolar Likert scale (i.e., does not fit at all versus fits perfectly). Questions regarding product attitude, some of them not central to the study, were answered through a seven-point bipolar Likert scale (e.g., unattractive versus attractive, bad versus good), based on the scale presented by Cian, Krishna and Elder (2013). Questions regarding warmth and competence perceptions were answered through a seven-point unipolar Likert scale (1 = not at all, 7 = very much), based on the scale presented by Aaker, Garbinsky, and Vohs (2012). In addition to warmth and competence perceptions of the

product, participants were asked to rate warmth and competence perceptions of themselves. Finally, to check whether participants were able to imagine being in their given scenario (i.e., the context), participants were asked about the vividness of their imagination through a seven-point unipolar Likert scale (1 = not vivid at all, 7 = very vivid).

Controlling for visual impairments is particularly crucial due to a vast number of people worldwide suffering from color blindness. Symptoms of color blindness vary from mere color confusion to complete color blindness. Complete color blindness means seeing only in black, white and shades of gray (Singh, 2006). In addition, variables controlling for participants' wine consumption, wine expertise, age, and gender were included.

#### **5.4 Independent, dependent, and moderating variables**

The dependent variables were: product choice (two-level dichotomous variable where 1 = warm color temperature product packaging and 2 = cold color temperature product packaging), attitude towards the cold color temperature product packaging (average rating of seven attitude measures along a seven-point scale), attitude towards the warm color temperature product packaging (average rating of seven attitude measures along a seven-point scale), perceived warmth (combined average rating of warmth and friendliness), and perceived competence (combined average rating of capability and competence).

The independent variable was: context (a three-level categorical variable indicating which context the participant was exposed to). Finally, objective independent variables such as wine behavior (average rating of drinking frequency, wine purchasing frequency and wine expertise along a seven-point scale), self-perception of warmth (average rating of the participant's self-reported friendliness and warmth along a seven-point scale), self-perception of competence (average rating of the participant's self-reported capability and competence), age and gender, were included to test if they had moderating effects. The questionnaire of the study is included in appendix 6.

## 5.5 Results

### 5.5.1 The effect of context on product preference (H1, H2<sub>A</sub>, H2<sub>B</sub>)

To statistically calculate the significance of the three contexts (IV) on product choice (DV), a logistic regression was conducted. Because both product choice (DV) and context (IV) are categorical variables, logistic regression is a suited statistical method to use (Janssens, De Pelsmacker, Wijnen, & Van Kenhove, 2008). The control context was included without the nonphysical contextual priming of warmth or competence such that any potential effects or significant differences between the contexts could be correctly ascribed to the corresponding context. Leaving the control context as the reference category, neither the warmth context ( $\chi^2 = .042$ ,  $p = .837$ ) nor the competence context ( $\chi^2 = .450$ ,  $p = .502$ ) displayed any significant impact on product preference (see table 2). Hence, the results provide no support for H1, H2<sub>A</sub>, and H2<sub>B</sub>.

	<b>B</b>	<b>S.E.</b>	<b>Wald</b>	<b>Df</b>	<b>Sig.</b>	<b>Exp.(B)</b>
Context (control)	-	-	.471	2	.790	-
Context (warmth)	-.047	.229	.042	1	.837	.954
Context (competence)	-.151	.226	.450	1	.502	.860
Constant	.793	.160	24.694	1	.000	2.211

$R^2 = .001$

Table 2: Logistic regression for study 1 (DV = Product choice, IV = Context)

To test for moderating effects, new regression models including age, gender, wine behavior, and self-perceived warmth and competence were created. The results showed a significant interaction effect between gender and context ( $\chi^2 = 7.593$ ,  $p = .022$ ), while the remaining variables showed no significant impact.

### 5.5.2 The effect of context on product attitude (H3, H4<sub>A</sub>, H4<sub>B</sub>)

To examine the impact of context on participants' attitudes towards the two products, a repeated-measures (two-way) analysis of variance (ANOVA) was conducted. Because the attitude ratings were measured within-subjects (i.e., all participants rated both products) under three or more different conditions (warmth context, competence context, and control context), a repeated measures ANOVA is the preferable method to use when studying differences in means (Janssens et al., 2008). Similar to other ANOVA methods, the assumption of normality is also relevant when conducting a repeated measures ANOVA. Despite showing

tendencies of normality, results from Kolmogorov-Smirnov and Shapiro Wilk tests showed that attitude towards the product variables were not normally distributed ( $p < .005$ ). However, because the normality assumption is less important when analyzing means and test comparisons on transformed data found no meaningful differences (e.g., changes in statistical conclusions), the test was continued. A Levene's test of Equality of Error Variances was conducted to see that the error variances across groups were homogeneous. The analysis showed that this was the case ( $p > .005$ ). The assumption of sphericity does not apply in this case, as the within-subjects factor only has two levels (Janssens et al., 2008). The results showed that neither of the contexts had any significant effect on attitude towards the products,  $F(2, 525) = 2.361, p = .095$  (see figure 12). Hence, the results provide no support for H3, H4<sub>A</sub>, and H4<sub>B</sub>.

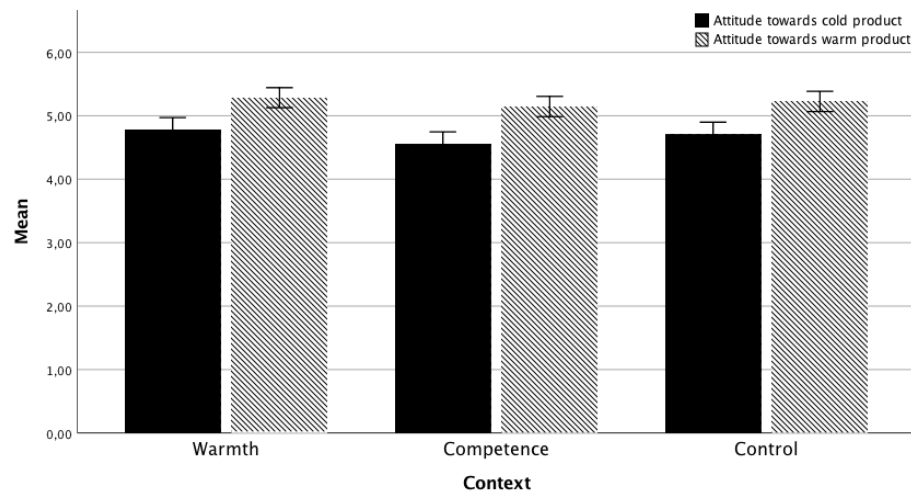


Figure 12: Product packaging attitude scores by context (study 1)

To test for moderating effects, new analyses including age, gender, wine behavior, and self-perceived warmth and competence were created. Neither showed any significant results ( $p > .05$ ).

### 5.5.3 The effect of context on perceived warmth and competence (H5, H6<sub>A</sub>, H6<sub>B</sub>)

To statistically test whether the color temperature of a product packaging impacts perceived warmth and competence, a paired sample t-test was conducted. Kolmogorov-Smirnov and Shapiro Wilk tests showed that perceived warmth and perceived competence were not normally distributed ( $p < .005$ ). However, because the normality assumption is less important when analyzing means, and

test comparisons on the transformed data found no meaningful differences (e.g., changes in statistical conclusions), the test was continued. The results showed that differences between the warm and cold products on both the warmth dimension,  $t(527) = 12.100$ ,  $p = .000$ , and the competence dimension,  $t(527) = 6.843$ ,  $p = .000$ , was significant.

To test whether the perceived warmth was higher for the product packaging conveying a warmth cue ( $M = 5.06$ ,  $SD = 1.24$ ) than the one conveying a competence cue ( $M = 4.16$ ,  $SD = 1.51$ ), a one-sample t-test was conducted. Results showed that perceived warmth was higher for the product packaging conveying a warmth cue than the one conveying a competence cue,  $t(527) = 16.787$ ,  $p < .000$ .

A similar test was conducted to calculate whether the perceived competence was higher for the product packaging conveying a competence cue ( $M = 4.56$ ,  $SD = 1.43$ ) than the product packaging conveying a warmth cue ( $M = 4.99$ ,  $SD = 1.24$ ). The test showed that there was a statistically significant difference between means,  $t(527) = -6.803$ ,  $p < .000$ . However, the warm product packaging is perceived as significantly more competent than the cold product packaging (see figure 13). Hence, the results provide support for both H5 and H6<sub>A</sub>, but not for H6<sub>B</sub>.

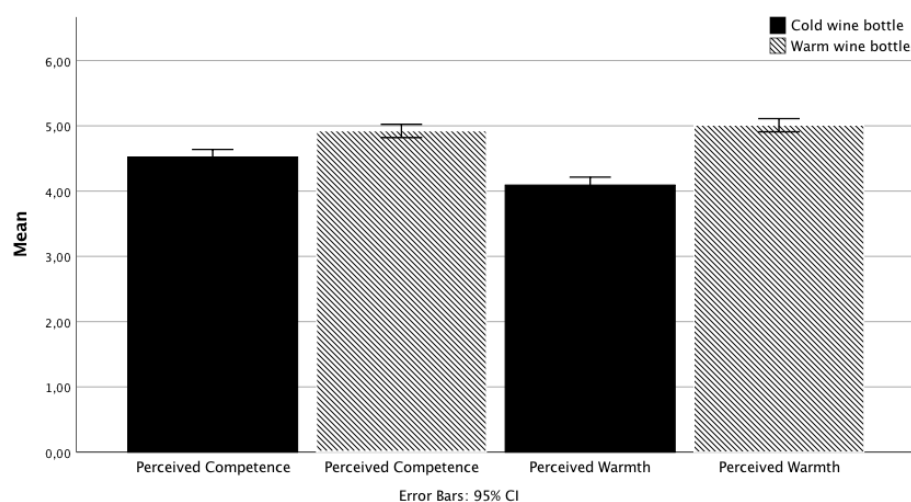


Figure 13: Perceived warmth and competence (study 1)

To test for moderating effects, new analyses controlling for age, gender, wine behavior, and self-perceived warmth and competence were conducted. Neither showed any significant results ( $p > .05$ ).

## **5.6 Discussion**

The purpose of study 1 was to investigate whether warmth and competence cues on product packaging, in addition to contexts, activate warmth and competence perceptions about the product, and consequentially influence participants' product preference and attitude towards the product.

A logistic regression showed that neither of the contexts had any significant impact on consumers' product preference or attitude towards the products. However, the study found support that the color temperature of a product packaging significantly influences perceived warmth and competence. The results showed that the product conveying a warmth cue enhances the perceived warmth and friendliness of that product (versus the product conveying a competence cue). Past research indicates that such perceptions of products spill over to perceptions of the brand (Hess & Melnyk, 2016), implying that warmth cues on product packaging can influence consumers' warmth perceptions of brands. The study's results do not, however, suggest that similar effects are present for competence cues. The results indicate that warm color temperature nuances can function as a warmth cue, while cold color temperature nuances does not work as a competence cue. Hence, the results are partly inconsistent with previous research (Hess & Melnyk, 2016), as the study found support for effects through warmth manipulation, but not for competence manipulation.

A factor that might have impacted the results is the color temperature manipulation itself. The choice of violet was based on it being an easy color for consumers to distinguish between warm and cold nuances. However, because of the easy distinction, the warm violet becomes close to pink, and the cold violet becomes close to blue, which quite possibly could bias the results. In addition, both products revealed higher perceived warmth than competence. This might be solely due to the choice of product, as red wine carries warmth associations by the

fact that it is red. Hence, to further strengthen the validity of the results, a similar study was conducted using another product category.

## 6. Study 2

### 6.1 Design

Study 2 was conducted using another product category, as we suspected that the previous product category could have impacted the lack of significant findings in study 1. The goal was to further demonstrate that warmth and competence cues (i.e., warm violet for warmth cues and cold violet for competence cues) activate warmth and competence perceptions of the product, and whether this effect is constant across product categories.

Study 2 is a 3 (warmth context, competence context, control context) x 2 (warm product packaging, cold product packaging) design (see figure 14). The three contexts were manipulated between-subjects, while all participants were exposed to the two product packages with different color temperature nuances (i.e., warm violet and cold violet). Hence, they were asked within-subjects to separately rate the two products on several measures, representing their attitude towards the product packaging. To reduce order effect bias, the order in which the products were presented got randomized.

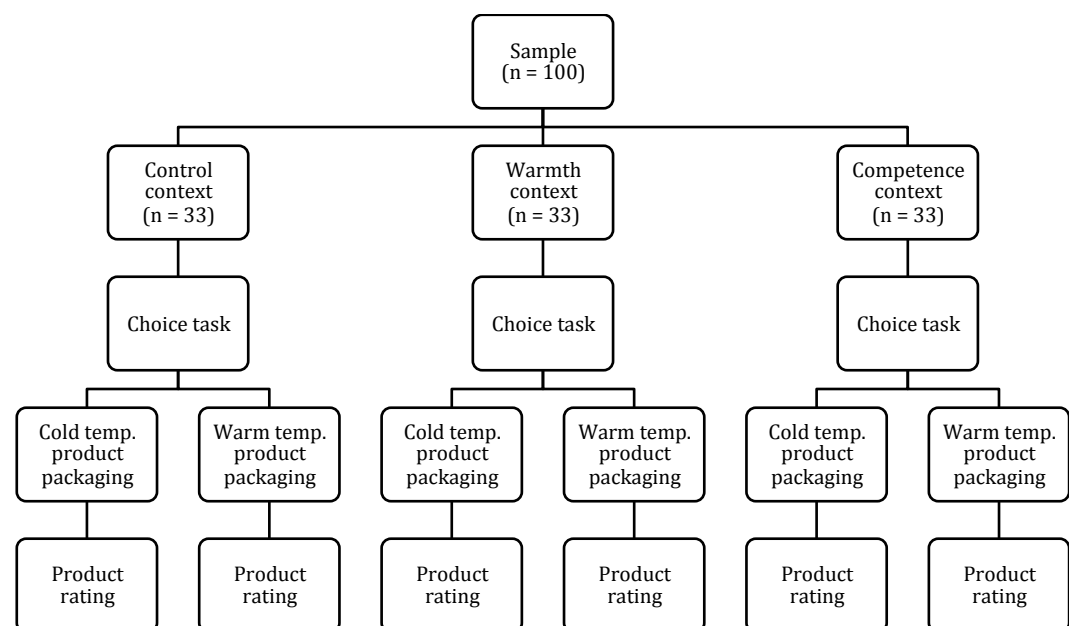


Figure 14: Schematic overview of study 2

The context was manipulated by giving each participant a scenario in which they are hosting a dinner party, and are to purchase pasta (i.e., the product). In the competence context, they have recently been employed by a large financial firm and wish to appear as a competent person (see appendix 3). For the friendly context, they are looking to create new relationships and want to appear as a friendly person (see appendix 4). In the control context, no specific situation was described (see appendix 5).

## **6.2 Sample**

110 participants (approximately 33 per condition) were recruited through Prolific, receiving a small reward for their participation. Participants recruited through an online panel cover a broader base of demographics, hence providing a more representative sample. Consequently, it contributes to a higher degree of external validity of the study (Shaughnessy et al., 2012). While the age spectrum ranged from 18 to 71 years old ( $M = 30.76$ ,  $SD = 9.5$ ), 86.4 percent were 40 years or younger. Approximately 46 percent of the participants were female. 13 participants were excluded from the analysis due to some reported form of color blindness, completing the survey in less than 100 seconds, reporting not having a vivid imagination, or having missing values. This left a total of 97 participants to be analyzed. Filtering out these observations did not impact or change any statistical conclusions or significant effects.

## **6.3 Procedure**

Participants were randomly assigned to one of the three contexts. They were told to read a short introduction (i.e., the context), and afterwards answer a series of questions regarding product preference. After reading one of the three contexts (warmth, competence or control), the participants were asked to choose between two products (see figure 15), in which the only difference was the color temperature of the product packaging. A package of penne pasta was chosen as the product to be used in the manipulation, because we suspected that the red wine used in study 1 could potentially have influenced and skewed the results of in favor of the product conveying a warmth cue, because of the red wine exerting warmth associations. Additionally, using another product category will strengthen the results of our paper and provide insights on how the results vary across product categories.



After making their choice, participants were asked to answer a series of questions regarding each of the two products. Previous research has revealed that order response errors are common, meaning the order in which questions are structured in surveys matter. However, there are ambiguous answers related to what direction the effects go. While McFarland (1981) found support the primacy effect (i.e., participants are biased to choose the first available option), some have seen support for a recency effect (i.e., selecting the last available option), while others have found no support of impact at all (Krosnick, 1999). Thus, to reduce possible order effects, the order in which the two products were presented in the choice task, as well as the corresponding questions, were randomized. To reduce suspicion of the study purpose, questions that were not central to the study were included.



*Figure 15: Product packaging stimuli of study 2*

The question regarding product liking was answered through a seven-point bipolar Likert scale (i.e., dislike it very much versus like it very much), while the question regarding product purpose was responded to through a seven-point unipolar Likert scale (e.g., does not fit at all versus fits perfectly). Questions regarding product attitude, some of them not central to the study, were answered through a seven-point bipolar Likert scale (i.e., unattractive versus attractive, bad versus good), based on the scale presented by Cian et al. (2013). Questions regarding warmth and competence perceptions were answered through a seven-point unipolar Likert scale (1 = not at all, 7 = very much), based on the scale presented by Aaker et al. (2012). Finally, to check whether participants were able to imagine being in their

given scenario (i.e., context), the participants were asked about the vividness of their imagination through a seven-point unipolar Likert scale (1 = not vivid at all, 7 = very vivid).

Controlling for visual impairments is particularly crucial due to a vast number of people worldwide suffering from color blindness. Symptoms of color blindness vary from mere color confusion to complete color blindness. Complete color blindness means seeing only in black, white and shades of gray (Singh, 2006).

#### **6.4 Independent, dependent, and moderating variables**

The dependent variables were: product choice (two-level dichotomous variable where 1 = warm color temperature product packaging and 2 = cold color temperature product packaging), attitude towards the cold color temperature product packaging (average rating of seven attitude measures along a seven-point scale), attitude towards the warm color temperature product packaging (average rating of seven attitude measures along a seven-point scale), perceived warmth (combined average rating of warmth and friendliness), and perceived competence (combined average rating of capability and competence).

The independent variable was: context (a three-level categorical variable indicating which context the participant was exposed to). Finally, objective independent variables such as age and gender were included to test if they had moderating effects. The questionnaire of the study is included in appendix 7.

#### **6.5 Results**

##### ***6.5.1 The effect of context on product preference (H1, H2<sub>A</sub>, H2<sub>B</sub>)***

To statistically calculate the significance of the three contexts (IV) on product choice (DV), a logistic regression was conducted. Because both product choice (DV) and context (IV) are categorical variables, logistic regression is a suited statistical method to use (Janssens et al., 2008). The control context was included without the nonphysical contextual priming of warmth or competence such that any potential effects or significant differences between the contexts could be correctly ascribed to the corresponding context. Leaving the control context as the reference category, neither the warmth context ( $\chi^2 = 1.000$ ,  $p = .317$ ) nor the

competence context ( $\chi^2 = .064$ ,  $p = .800$ ) displayed any significant impact on product preference (see table 3). Hence, the results provide no support for H1, H2<sub>A</sub>, and H2<sub>B</sub>.

	<b>B</b>	<b>S.E.</b>	<b>Wald</b>	<b>Df</b>	<b>Sig.</b>	<b>Exp.(B)</b>
Context (control)	-	-	1.043	2	.593	-
Context (warmth)	-.485	.485	1.000	1	.317	.616
Context (competence)	-.128	.506	.064	1	.800	.880
Constant	.054	.329	.027	1	.800	.1056

$R^2 = .014$

*Table 3: Logistic regression for study 2 (DV = Product choice, IV = Context)*

To test for moderating effects, new regression models including age and gender were created. Neither showed any significant results ( $p > .05$ ).

### **6.5.2 The effect of context on product attitude (H3, H4<sub>A</sub>, H4<sub>B</sub>)**

To examine the impact of context on participants' attitudes towards the two products, a repeated-measures (two-way) analysis of variance (ANOVA) was conducted. Because the attitude ratings were measured within-subjects (i.e., all participants rated both products) under three or more different conditions (warmth context, competence context, and control context), a repeated measures ANOVA is the preferable method to use when studying differences in means (Janssens et al., 2008). Similar to other ANOVA methods, the assumption of normality is also relevant when conducting a repeated measures ANOVA. Despite showing tendencies of normality, results from Kolmogorov-Smirnov and Shapiro Wilk tests showed that attitude towards the product variables were not normally distributed ( $p < .005$ ). However, because the normality assumption is less important when analyzing means and test comparisons on transformed data found no meaningful differences (e.g., changes in statistical conclusions), the test was continued. A Levene's test of Equality of Error Variances was conducted to see that the error variances across groups were homogeneous. The analysis showed that this was the case ( $p > .005$ ). The assumption of sphericity does not apply in this case, as the within-subjects factor only has two levels (Janssens et al., 2008). The results showed that neither of the contexts had any significant effect on attitude towards the products,  $F(2, 94) = .233$ ,  $p = .793$  (see figure 15). Hence, the results provide no support for H3, H4<sub>A</sub>, and H4<sub>B</sub>.

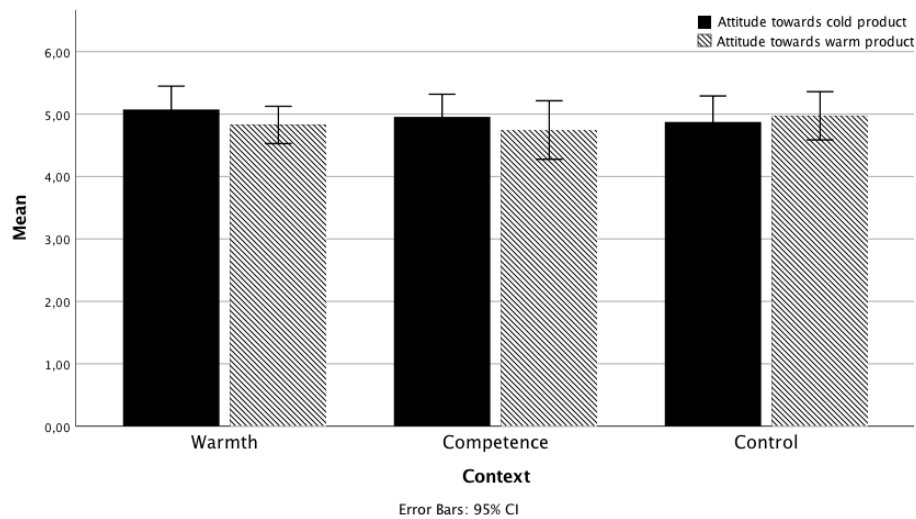


Figure 16: Product packaging attitude scores by context (study 2)

To test for moderating effects, new analyses including age and gender were conducted. Neither showed any significant results ( $p > .05$ ).

### 6.5.3 The effect of context on perceived warmth and competence (H5, H6<sub>A</sub>, H6<sub>B</sub>)

To statistically test whether the color temperature of a product packaging impacts perceived warmth and competence, a paired sample t-test was conducted. Kolmogorov-Smirnov and Shapiro Wilk tests showed that perceived warmth and perceived competence were not normally distributed ( $p < .005$ ). However, because the normality assumption is less important when analyzing means and test comparisons on the transformed data found no meaningful differences (e.g., changes in statistical conclusions), the test was continued. The results showed that differences between the warm and cold product on both the warmth dimension  $t(96) = 1.100$ ,  $p = .274$ , and the competence dimension,  $t(96) = -1.941$ ,  $p = .055$ , was significant.

To test whether perceived warmth was higher for the product packaging conveying a warmth cue ( $M = 4.55$ ,  $SD = 1.49$ ) than the one conveying a competence cue ( $M = 4.36$ ,  $SD = 1.49$ ), a one-sample t-test was conducted. Results did not provide a significant difference in means,  $t(96) = 1.264$ ,  $p = .206$ .

A similar test was conducted to calculate whether the perceived competence was higher for the product packaging conveying a competence cue ( $M = 4.77$ ,  $SD =$

1.42) than the product packaging conveying a warmth cue ( $M = 4.49$ ,  $SD = 1.55$ ). The test showed that there was no statistically significant difference between means,  $t(96) = 1.926$ ,  $p = .057$  (see figure 17). Hence, the results provide no support for H5, H6<sub>A</sub> and H6<sub>B</sub>.

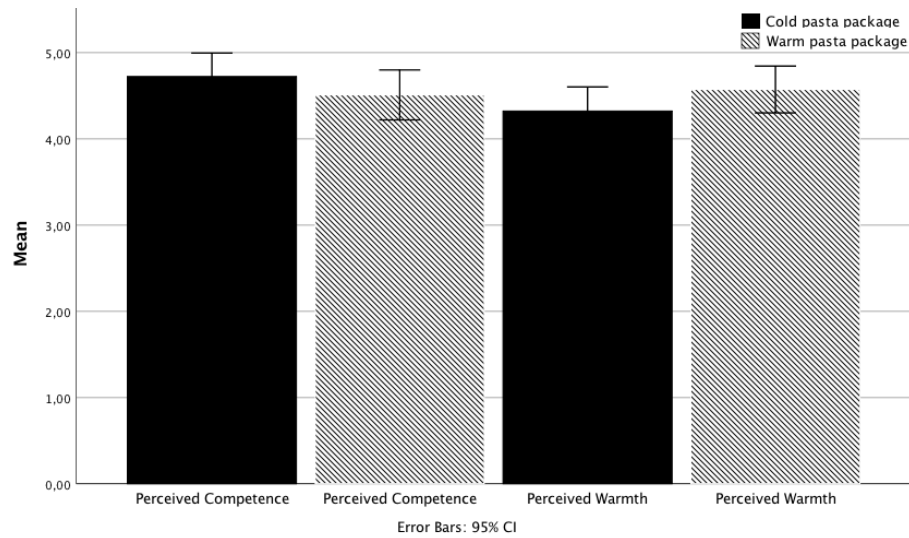


Figure 17: Perceived warmth and competence (study 2)

To test for moderating effects, new analyses controlling for age and gender were conducted. Neither showed any significant results ( $p > .05$ ).

## 6.6 Discussion

The aim of study 2 was to strengthen the results of study 1 and investigate whether changing the product category would provide any significant effects that were not present in study 1.

The logistic regression showed that neither of the contexts had any significant impact on consumers' product preference or attitude towards the products. In contrast to study 1, the present study did not find significant support for H5, H6<sub>A</sub>, and H6<sub>B</sub>. However, even though the results in study 2 contradict the results of study 1, they suggest that the warmth and competence cues indeed enhances the products' perceived warmth and competence, respectively. This may be an indication that the product category used in study 1 could be the reason the results were skewed so heavily in favor of the product conveying a warmth cue (i.e., the warm wine bottle).

Another element of relevance is that the product packaging in study 2 exerts a circle in its design (the transparent hole in the middle of the package), which in previous research is found to activate warmth perceptions about the brand (Hess & Melnyk, 2016). One could argue that this would enhance the overall warmth perception of the penne pasta packaging ( $M = 4.45$ ,  $SD = 1.22$ ). However, the results show that the wine bottle ( $M = 4.61$ ,  $SD = 1.08$ ) on average is perceived significantly warmer than the penne pasta packaging,  $t(527) = 3.425$ ,  $p = .001$ . This confirms the findings of Hess and Melnyk (2016), where the presence of a warmth cue (i.e., a circle) increase the desire to seek competence cues (versus warmth cues) and vice versa.

Further, despite suspecting that the warmth and competence color temperature manipulation might have been too strong (i.e., the warm nuance being close to pink and the cold nuance being close to blue), the color temperature manipulation was kept constant in study 2. This way any potential differences in results could more easily be ascribed to the only changed variable (i.e., product category). While the results from study 2 did not find support for any hypotheses, the results from H6<sub>A</sub> and H6<sub>B</sub> shifted in the direction of the proposed hypotheses compared with the results from study 1. This implies that the change in product category did, in fact, strengthen the results.

## 7. General discussion

This research aimed to establish whether the color temperature nuance of a product packaging activate perceptions of warmth and competence towards the product, and if so, whether it affects consumers' product preference and attitude. In addition, we looked into whether this was affected by non-physical warmth and competence priming through written contexts. This topic was explored by conducting a pretest and two studies. The pretest was conducted to determine for which colors consumers find it easier to distinguish between warm and cold color temperatures. The results of the pretest were used in study 1 and 2, thus ensuring that the stimuli were grounded on valid temperature manipulations. The following section will clarify the overall findings, theoretical and managerial implications, limitations and recommendations for future research.

## 7.1 Overall findings

The findings provide support for some of the proposed hypotheses. The results from study 1 indicate that the product conveying a warmth cue was heavily favored. The reason might be that the product used to manipulate color temperature in study 1 (i.e., red wine) carries warmth associations in both its nature (i.e., having a deep red color) and its name. This could potentially assert a non-intentional priming of warmth, which again influences the effectiveness of the manipulation. Hence, study 2 was conducted using a penne pasta packaging to eliminate any potential bias regarding product category. The results contributed with a more holistic view of how differences between product categories help determine the impact of esthetics in product packaging. While much stronger results were found for the product conveying a warmth cue (versus competence cue) in study 1, the results were much more aligned and in accordance with the proposed hypotheses in study 2. No support was found in neither of the studies of contextual influence on either product preference or attitude towards the product. Consequently, the present paper failed to find evidence that non-physical priming of warmth and competence (i.e., reading a text with competence and warmth related cues) activates and exerts the same priming effects to those that have been documented when one's physical temperature is modified in some way.

While finding support for H6<sub>A</sub> (i.e., that the product packaging conveying a warmth cue will be perceived as warmer than the product packaging conveying a competence cue) in study 1, study 2 showed no significant results for the same hypothesis. The significant results in H6<sub>A</sub> in study 1 could likely be a consequence of the results being skewed in favor of the product conveying a warmth cue (i.e., the warm wine bottle). This is further emphasized as the same product (i.e., the warm wine bottle) was perceived as more competent than the product conveying a competence cue (i.e., the cold wine bottle). Similarly, we hypothesized that perceived competence should be higher for the product conveying a competence cue than for the one conveying a warmth cue (H6<sub>B</sub>). These tendencies are present in study 2 and in line with the proposed hypotheses (see figure 17). However, in study 1 both the perceived warmth and competence are significantly higher for the product conveying a warmth cue (see figure 13).

There could be several reasons as to why the proposed hypotheses received a lack of significant results. As discussed earlier, the violet color temperature manipulation might have been too strong. Despite initially being the same color (i.e., having the same RGB code), the two violet nuances vary enough in temperature to make it look like two completely different colors. If this were the case, the study could have suffered from a validity bias, where the study unintentionally measures something it is not intended to measure (Malhotra, 2010).

Finally, Hess and Melnyk (2016) found that feminine cues, such as circles, on product packaging activate warmth perceptions towards the brand. Further, they argue that in the presence of a low-competence cue (i.e., newly started company), masculine gender cues would enhance purchase intention. Applying their findings to our results would mean significantly more participants should have chosen the product conveying a competence cue than the one conveying a warmth cue, which they did not ( $p = .543$ ). However, despite this not being significant, it is possible that the circular hole on the penne pasta product packaging in study 2 may have influenced the results in some way.

## **7.2 Theoretical implications**

To the best of our knowledge, the present paper is the first to establish a color temperature ranking scheme based on consumer perceptions. The colors included in the pretest were violet, blue, green, yellow, orange and red, representing the main regions of the color spectrum (Hunt & Pointer, 2011). Consumers experienced most trouble differing between warm and cold nuances in traditional warm colors (red, orange and yellow). In contrast, they found it easiest to make color temperature distinctions between conventional cold colors (violet, blue, green). Thus, this paper is the first to establish which colors consumers perceive as easy or difficult to make warm and cold nuance distinctions between. This carries theoretical implications for scholars associated with color temperature research, as well as designers, marketers, and managers related to color temperature manipulation.

The present studies further identified evidence that color temperature impacts the perception of a product on the dimensions of warmth and competence. Despite



only obtaining significant results in study 1, the results from study 2 display the same tendencies. The studies further demonstrate that this effect is heavily due to the warm color temperature influencing participants' perception along the warmth dimension. On the contrary, perceived competence is not as easily primed through competence cues based on cold color temperature. Hence, this paper contributes to both the color and product packaging literature within the field of marketing, as well as within the field of consumer behavior and social psychology on the dimensions of warmth and competence.

Labrecque et al. (2013) found support for the notion suggesting that colors trigger different associations dependent on the context in which they are presented. Because the activation of color associations mostly occurs without conscious awareness or intention (Elliot & Maier, 2007), Dijksterhuis et al. (2005) argue that color can unconsciously affect attitudes and behaviors. Despite these arguments, the contexts used in this paper did not provide significant results with regards to product preference and warmth or competence perceptions. However, while the temperature manipulation in the present paper may have accustomed consumers with different associations, these did not impact in any significant manner. Hence, the present paper has provided the literature with insight related to color associations in a product preference context, where the respective associations on a violet color temperature spectrum did not significantly influence product attitudes and preference.

### **7.3 Managerial implications**

This paper demonstrates that the color temperature used on product packaging influence consumers' perception of the product, and thus potentially the brand (Hess & Melnyk, 2016), on the dimensions of warmth and competence. The results indicate that managers who wish to position their product or brand as competent should use cold color temperatures on their product packaging. Similarly, managers who want to position their product or brand as warm should use warm color temperatures on their product packaging. This is not in compliance with what Hess & Melnyk (2016) found in their research. However, they used two different colors (i.e., pink and blue) and shapes (i.e., squares and circles) as cues when priming warmth and competence, in contrast to different

temperature nuances within the same color. Hence, the results signal an emphasis to take other factors (like figures, text, other esthetic elements on product packaging) into account when making managerial decisions, as they might overrun or nullify the effects and associations created by the color temperature.

#### **7.4 Limitations and future research**

In this section, possible limitations of the research will be presented together with suggestions for further research. Firstly, one potential limitation of the study is that it only tested different temperature nuances in one color (i.e., violet). It would be of interest in future research to see whether the results are consistent across colors and whether differences are found using colors on both sides of the color spectrum (i.e., both warm and cold colors). The choice of using violet was based on the pretest, which indicated that participants found it easier to distinguish between warm and cold nuances of violet than nuances of other colors. However, because of the easy distinction, the warm violet becomes close to pink, and cold violet becomes close to blue, which could quite possibly be a limitation of the study. Hence, another element worth investigating in future research would be to establish a potential benchmark on the level of Kelvin (K) consumers start to perceive differences in color temperature, such that manipulation in color temperature does not resemble a manipulation in color, but solely the temperature.

Secondly, the product used in study 1 (i.e., red wine) carries immediate warmth associations that have not been controlled for and could be the reason for the discrepancy in results with study 2. While the results from study 2 gave slight indications congruent with H5, H6<sub>A</sub>, and H6<sub>B</sub>, the authors suspect that the rather small sample size ( $n = 110$ ) in study 2 versus study 1 ( $n = 615$ ) could be a reason for the non-significant results in the second study. The different sample sizes in study 1 and study 2 are due to budget constraints, and could quite possibly be another limitation of this study.

Lastly, and as discussed in study 2, another potential limitation could be that the penne pasta product packaging displays a circle in its design. In this regard, Hess and Melnyk (2016) found that circular (square) shapes activate warmth (competence) perceptions towards the brand when presented together with a warm

(cold) color. They further argue that in the presence of a low competence cue (e.g., a new brand), warmth cues would lower purchase likelihood (versus competence cues, which would increase purchase likelihood). However, and despite that no previously known brand was communicated in the present paper's stimuli, the results did not display any significant effects of this relationship. Future research should thus look into whether shapes (e.g., circles and squares) and other warmth and competence cues carry such associations when manipulated exclusively. Mapping whether such elements serve as warmth and competence cues on packaging design both alone and in interaction with one another would be intriguing for both scholars from the field of marketing and social psychology.

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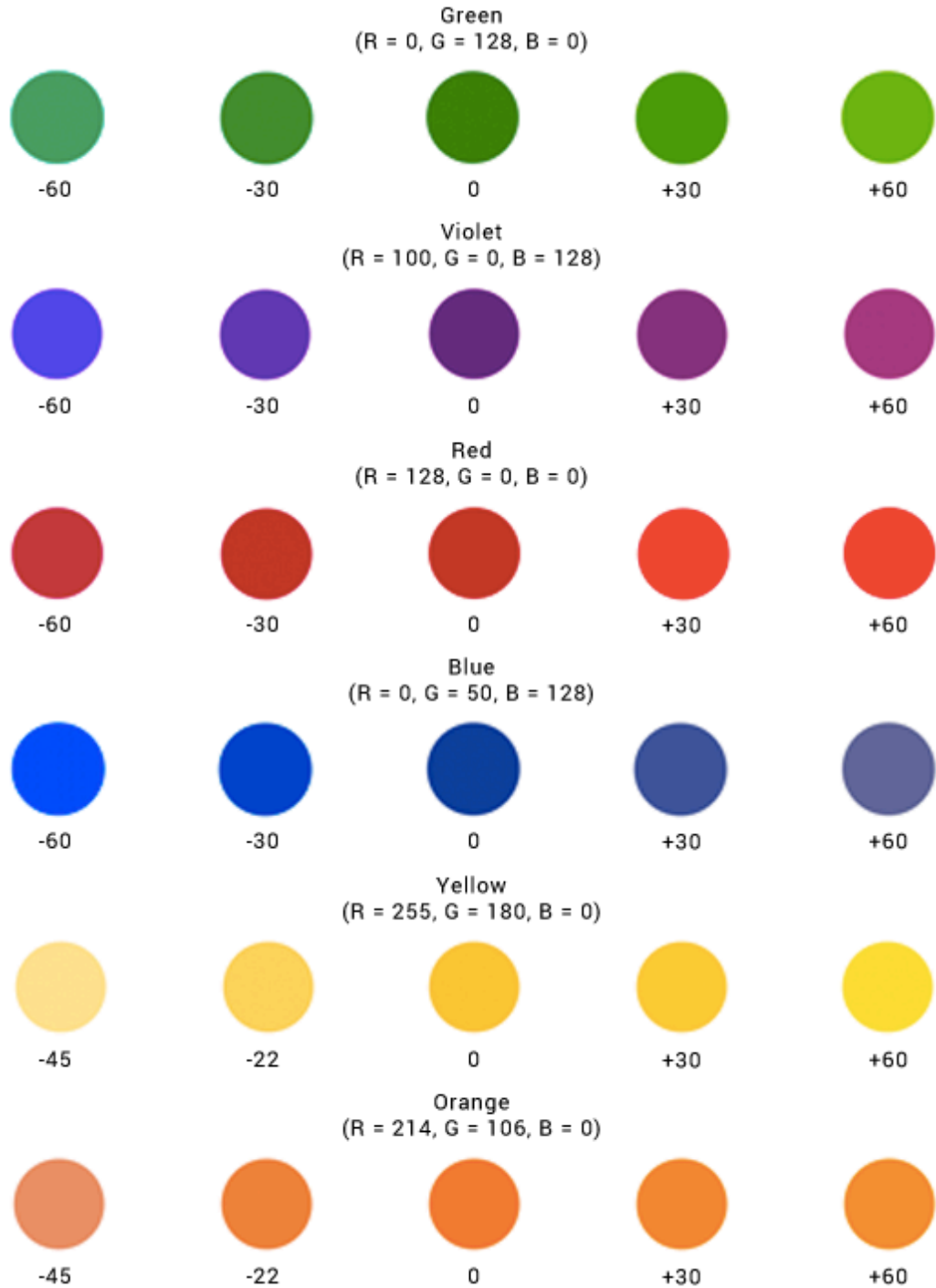
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## Appendices

### Appendix 1: Color temperature manipulation (pretest)

For each color, five different nuances ranging from warm to cold were generated in Adobe Camera Raw by manipulating temperature. Temperatures were set to values show below. Red's exposure was set to +1, and the exposure of blue, yellow and orange were set to +0,5. The exposure of violet and green were left unchanged.



## Appendix 2: Survey (pretest)

**Dear participant,**

In this study, we are interested in how you perceive the color temperature of specific colors.

Filling out the survey takes approximately 3 minutes. You have to answer all questions.

All your answers are treated strictly confidential. They are used exclusively for research purposes. All data is completely anonymized.

By clicking the button below, you acknowledge that your participation is voluntary and that you are at least 18 years old.

**Thank you for participating in this study.**

Yes, I would like to participate in this study

---

**Please read carefully.**

In this study, we are interested in how you perceive the color temperature of specific colors. Thus, your task will be to rank a series of color nuances with regards to color temperature.

You will see a series of colors in five different nuances, differing only by color temperature.

By color temperature, we mean your individual perception of a color's warmth or coolness (compared to the other nuances).

By using the drag and drop function, we want you to rank the color nuances from 1 to 5, where 1 is the coolest and 5 is the warmest.

Please take your time for the ranking.

After each ranking, a new color in five different nuances will appear. You will evaluate six colors in total.

**Go to the next page when you are ready to start.**

---

Below you can see five nuances of the color blue, differing only by color temperature.

**By using the drag and drop function, please rank the color nuances from 1 to 5, where 1 is the coolest and 5 is the warmest.**



---

Below you can see five nuances of the color violet, differing only by color temperature.

**By using the drag and drop function, please rank the color nuances from 1 to 5, where 1 is the coolest and 5 is the warmest.**



---

Below you can see five nuances of the color red, differing only by color temperature.

**By using the drag and drop function, please rank the color nuances from 1 to 5, where 1 is the coolest and 5 is the warmest.**



---

Below you can see five nuances of the color yellow, differing only by color temperature.

**By using the drag and drop function, please rank the color nuances from 1 to 5, where 1 is the coolest and 5 is the warmest.**



Below you can see five nuances of the color green, differing only by color temperature.

**By using the drag and drop function, please rank the color nuances from 1 to 5, where 1 is the coolest and 5 is the warmest.**



---

Below you can see five nuances of the color orange, differing only by color temperature.

**By using the drag and drop function, please rank the color nuances from 1 to 5, where 1 is the coolest and 5 is the warmest.**



---

Do you have any kind of vision impairment?

- No
- Yes, but it is fully corrected (e.g., by using glasses)
- Yes, and it is not fully corrected

---

Age:

---

Gender:

- Male
- Female
- Other

**Appendix 3: Competence context (study 1 and 2)**

Imagine that you just moved to a new town, and recently got hired by a large financial institution. Your division is rather small, and consists of only eight people in total. The organization's competence level is unquestionably high, and being fresh out of school you feel lucky, but a bit nervous to not be accepted by the group. As a social measure, your manager implemented a monthly happening where one of the employees in your division is randomly drawn to host a dinner party. After only two weeks of working there, you got randomly selected to host the party. The dinner party is only a week away, and you feel the pressure and desire to appear capable and competent.

**Appendix 4: Warmth context (study 1 and 2)**

Imagine that you just moved to a new town, and recently joined a local hiking club to get to know more people. The club is rather small, and consists of only eight people in total. The other club members already appear to be very good friends, and being the newest member you feel lucky, but a bit nervous to not be accepted by the group. As a social measure, the club has implemented a monthly happening where one of the club members is randomly drawn to host a dinner party. After only two weeks of being a member, you got randomly selected to host the party. The dinner party is only a week away, and you feel the pressure and desire to appear friendly and warm.

**Appendix 5: Control context (study 1 and 2)**

Imagine that you just moved to a new town, and would like to learn more about the local culture. You go for a walk around the town to look at the architecture. The buildings and streets are not particularly interesting, but the people are nice. You encounter your neighbors on your way home, and ask them about the local cuisine. Based on their recommendations, you have decided to make a traditional local dish for yourself this weekend. Weekend is here, and you have bought all the necessary ingredients at the local market. Despite having no prior knowledge about the local cuisine, you look forward to tasting it.

## Appendix 6: Survey (study 1)

Before you start, please enter your Prolific ID below (it can be found in your account info):

---

Dear participant,

**Thank you for taking part in this study.**

In this study, we are interested in how people choose between products.

First, you will read a short introduction. Afterwards, you will answer a series of questions.

The survey takes approximately 5 minutes to finish. There are no right or wrong answers, we just want your honest opinion.

By clicking the button below, you acknowledge that your participation is voluntary and that you are at least 18 years old.

Yes, I would like to participate in this study

**Please read carefully.**

Imagine that you just moved to a new town, and recently joined a local hiking club to get to know more people.

The club is rather small, and consists of only eight people in total. The other club members already appear to be very good friends, and being the newest member you feel lucky, but a bit nervous to not be accepted by the group.

As a social measure, the club has implemented a monthly happening where one of the club members is randomly drawn to host a dinner party.

After only two weeks of being a member, you got randomly selected to host the party. The dinner party is only a week away, and you feel the pressure and desire to appear friendly and warm.

---

You want to purchase wine for the dinner.

After researching, you have found two products that are supposed to fit perfectly for its purpose. From what you can tell, they have identical attributes except from the packaging.

Which one would you choose?





You will now answer a couple of questions regarding each of the two products.

Click next when you are ready.



To what extent do you like this product and its design?

dislike it very much               like it very much

To what extent do you think this product and its design fits the purpose (as described at the start of this survey)?

does not fit at all               fits perfectly

Please rate this product on the following dimensions:

unattractive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	attractive
bad	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	good
dull	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	bright
depressing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	cheerful
uncomfortable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	comfortable
low quality	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	high quality
unpleasant	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	pleasant
uninteresting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	interesting

To what extent do you perceive this product as:

	Not at all 1	2	3	4	5	6	Very much 7
warm	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
friendly	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
competent	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
capable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please rate how it felt to form an opinion about the product:

difficult         easy



To what extent do you like this product and its design?

dislike it very much        like it very much

To what extent do you think this product and its design fits the purpose (as described at the start of this survey)?

does not fit at all        fits perfectly

Please rate this product on the following dimensions:

low quality	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	high quality
uninteresting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	interesting
dull	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	bright
unpleasant	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	pleasant
bad	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	good
unattractive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	attractive
uncomfortable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	comfortable
depressing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	cheerful

To what extent do you perceive this product as:

	Not at all 1	2	3	4	5	6	Very much 7
warm	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
friendly	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
competent	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
capable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please rate how it felt to form an opinion about the product:

difficult ○ ○ ○ ○ ○ ○ ○ ○ easy

To what extent do you perceive yourself as:

	Not at all 1	2	3	4	5	6	Very much 7
warm	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
friendly	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
competent	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
capable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How often do you drink wine?

never ○ ○ ○ ○ ○ ○ ○ ○ very frequently

How often do you purchase wine?

never ○ ○ ○ ○ ○ ○ ○ ○ very frequently

How would you rate your wine expertise?

novice ○ ○ ○ ○ ○ ○ ○ ○ expert

How vivid was your imagination when you imagined the scenario at the beginning of this study?

Not vivid at all	1	2	3	4	5	6	Very vivid
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

What do you think is the purpose of this study?

Do you have any kind of color blindness?

- No
- Yes (please specify):

Age:

Gender:

- Male
- Female
- Other

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Do you have any comments about this study?

## Appendix 7: Survey (study 2)

Before you start, please enter your Prolific ID below (it can be found in your account info):

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Dear participant,

**Thank you for taking part in this study.**

In this study, we are interested in how people choose between products.

First, you will read a short introduction. Afterwards, you will answer a series of questions.

The survey takes approximately 3 minutes to finish. There are no right or wrong answers, we just want your honest opinion.

By clicking the button below, you acknowledge that your participation is voluntary and that you are at least 18 years old.

- Yes, I would like to participate in this study

---

**Please read carefully.**

Imagine that you just moved to a new town, and would like to learn more about the local culture.

You go for a walk around the town to look at the architecture. The buildings and streets are not particularly interesting, but the people are nice. You encounter your neighbours on your way home, and ask them about the local cuisine.

Based on their recommendations, you have decided to make a traditional local dish for yourself this weekend.

Weekend is here, and you have bought all the necessary ingredients at the local market. Despite having no prior knowledge about the local cuisine, you look forward to tasting it.

---

You want to purchase pasta for the dinner.

After researching, you have found two products that are supposed to fit perfectly for its purpose. From what you can tell, they have identical attributes except from the packaging.

Which one would you choose?



You will now answer a couple of questions regarding each of the two products.

Click next when you are ready.



To what extent do you like this product and its design?

dislike it very much        like it very much

To what extent do you think this product and its design fits the purpose (as described at the start of this survey)?

does not fit at all        fits perfectly

Please rate this product on the following dimensions:

depressing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	cheerful
low quality	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	high quality
unpleasant	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	pleasant
dull	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	bright
uncomfortable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	comfortable
uninteresting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	interesting
unattractive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	attractive
bad	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	good

To what extent do you perceive this product as:

	Not at all 1	2	3	4	5	6	Very much 7
warm	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
friendly	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
competent	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
capable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please rate how it felt to form an opinion about the product:

difficult        easy



To what extent do you like this product and its design?

dislike it very much        like it very much

To what extent do you think this product and its design fits the purpose (as described at the start of this survey)?

does not fit at all        fits perfectly

Please rate this product on the following dimensions:

depressing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	cheerful
low quality	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	high quality
unpleasant	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	pleasant
dull	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	bright
uncomfortable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	comfortable
uninteresting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	interesting
unattractive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	attractive
bad	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	good

To what extent do you perceive this product as:

	Not at all 1	2	3	4	5	6	Very much 7
warm	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
friendly	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
competent	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
capable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please rate how it felt to form an opinion about the product:

difficult         easy

How vivid was your imagination when you imagined the scenario at the beginning of this study?

Not vivid at all							Very vivid
1	2	3	4	5	6	7	
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	

What do you think is the purpose of this study?

Do you have any kind of color blindness?

No  
 Yes (please specify):

Age:

Gender:

- Male
- Female
- Other

---

Do you have any comments about this study?