

OF SNAKES, GUNS, AND INNOVATIVE PRODUCTS: THE ROLE OF THREAT CUES ON
CONSUMER PREFERENCE

NÜKHET AGAR

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Abstract

Across two empirical essays, the current dissertation documents how design elements that connote potential threats can impact subsequent consumption preferences. Essay 1 focuses on product form, and elaborates on the notion of meaning threats. Meaning threats refer to objects that undermine consumers' ability to confirm expected relationships in a category. This essay shows that product forms that are extremely incongruent with the product category tend to violate expectations to such an extent that they can constitute meaning threats, and thus elicit arousal-induced anxiety. Furthermore, this essay documents that consumers will engage in a passive coping strategy after experiencing meaning threats, such that they will prefer objects that can affirm expected relationships in unrelated schemas to alleviate the tension that originates from the inability to confirm expected relationships in product form.

Essay 2 focuses on brand logo design, and elaborates on the notion of physical threats. Physical threats refer to objects that can pose bodily harm to the observer. This essay shows that incorporating motion in the visual design of a brand logo can connote physical threats if the motion appears to be animate, which refers to the perceived ability of the object to move on its own volition. Furthermore, this essay documents that animate motion creates the inference of unsafe conditions in the broad environment, which consumers respond to by engaging in an active coping strategy which elevates the preference of products that can serve to protect consumers, and their valuable resources, from potential negative outcomes.

Overall, the current dissertation suggests that using threat cues in visual design can elevate the preference of objects that satisfy the need to resolve the tension associated with threats, and that by pinpointing the exact nature of the threat, marketers can benefit from using threat cues in visual design.

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Chapter 1

Introduction and Theoretical Background

1.1 Introduction

In 2005, Procter and Gamble argued that brands have five to seven seconds to form an impression on the consumer. P&G called this ‘the first moment of truth,’ a moment wherein visual cues, such as the product design, packaging, and the brand logo, take the center stage to impact consumption preferences. A decade later, Microsoft showed this to hold true in the digital age, with online shoppers assessing products in under eight seconds, primarily relying on visuals (Consumer Insights, 2015). The old adage “*A picture is worth a thousand words*” explains the power of visuals in the consumer decision making process. Indeed, though visuals of a product or a brand logo should obviously hold aesthetic appeal, companies often spend a great deal of time and money crafting designs that can ‘say something important’ to consumers. This intuition is not without merit. Recent reports show that the majority of consumers perceive images to be more important than product descriptions in impacting their ultimate choices (Scalco, 2017).

Although the power of design may be apparent to many, what is perhaps less obvious is the notion that design elements often trigger non-conscious processes that ultimately shape consumption preferences. In fact, Gerald Zaltman (2003) famously made the claim that 95% of consumers’ purchase decisions are predicated not on conscious thoughts, but on the non-conscious reactions that are imbued by the visuals in a context. This claim is consistent with research which shows that seeing an image even for one millisecond can have a robust impact on physiological arousal, affective states, and ultimately preferences—without the consumer ever

being consciously aware of the image (e.g., Bornstein, Leone, & Galley, 1987; Kunst-Winston & Zajonc, 1980; Linaard, Fernandes, & Brown, 2011). This view holds that, above and beyond its technical properties, the design of a product, or a brand logo, can rapidly convey meaning to consumers, which, in turn, can impact preferences.

In marketing, it is often encouraged to use design elements which can convey connotations that ultimately elicit positive affect (Henderson, Cote, Leong, & Schmidt, 2006; Janiszewski & Meyvis, 2001; Schechter, 1993; Luffarelli, Stamatogiannakis, & Yang, 2019; Sundar & Noseworthy, 2014; 2016). This emphasis is not misguided, because research shows that the incidental affect produced by design elements can be attributed to the object they are attached to (Henderson et al., 2006; Janiszewski & Meyvis, 2001; Noseworthy, Di Muro, & Murray, 2014). The valence of the affective state attributed to the object, in turn, shapes preferences, such that positive affect often elevates preference, whereas negative affect tends to reduce preference (Jhang, Grant, & Campbell, 2012; Ma, Gill & Jiang, 2015; Noseworthy et al., 2014). As a consequence, marketers are often cautioned against using design elements that can produce negative affective states, with considerable research effort being devoted to how marketers can ameliorate the negative affect produced by certain visual design elements (e.g., Jhang et al., 2012; Silvia & Barona, 2009; Westerman, Sutherland, & Gardner et al., 2013).

The strong research focus on the link between the valence of the affective state elicited by a design element and preference for the object that the design is attached to has largely precluded attention to the possibility that, in certain cases, companies may be able to benefit from design elements that elicit negative affective states. The broad premise of the current dissertation is that the negative affective states produced by design elements can trigger the motivation to solve the problem associated with the aversive state. When combined with products that help satiate this

motivation, design elements that elicit negative affect can be more beneficial in spurring consumption than design elements that elicit positive affect. Thus, I argue that it is not that negative (vs. positive) affect produced by design always reduces preference, but that it just tends to do so in the absence of the ability to satiate the motivation to alleviate the aversive state.

Of course, the notion of negative affect can cover a variety of specific emotional states such as anger, sadness, disgust, fear, and anxiety, with each distinct emotion endowing consumers with different motivational states geared towards solving a specific problem (Batson, Fultz, & Schoenrade, 1987; Niedenthal & Brauer, 2012). In examining the broad premise of how marketers can harness design elements which convey connotations that elicit negative affect, the current dissertation focuses on threat cues, which have been documented to be particularly strong in their ability to produce physiological tension that can manifest as anxiety (essay 1), and fear (essay 2). The concept of threat is broadly defined as an object or an event that signals potential loss of valuable resources (Nesse, 1994; Staw, Sandelands, & Dutton, 1981), however the term is not specific to *physical threats*, but also covers what are referred to as *meaning threats*—events and objects that threaten consumers’ ability to confirm expected relationships in the world (e.g., Proulx & Inzlicht, 2012).

Across two empirical essays, I investigate the impact of threat cues on subsequent consumption preferences. Both essays illustrate that design elements that connote threats, which tend to elevate physiological arousal to aversive levels, increases consumers’ preference for products that can help resolve the tension associated with the threat cue. Essay 1 explores threat cues in product design, and focuses on the concept of meaning threats in relation to novel product forms. This essay theorizes that product design elements which violate consumers’ expectations of the product category (e.g., the color black used in facial tissues) can constitute a

meaning threat, because they undermine consumers' ability to confirm expected relationships in the category. Furthermore, this essay shows that being exposed to meaning threats in product design produces arousal-induced anxiety, which consumers compensate for by affirming expected relationships in unrelated schemas (e.g., affirming their ethicality by preferring green products). In so doing, essay 1 bridges two disparate literatures, namely the *schema congruity literature*, which examines how the incidental affect elicited by product attributes that violate expectations impacts preferences (e.g., Mandler, 1982; Meyers-Levy & Tybout, 1989), and the *meaning maintenance literature*, which examines how people tend to compensate for the anxiety that arises from being exposed to objects that their violate expectations (Heine, Proulx, & Vohs, 2006; Randles, Proulx, & Heine, 2011). This research has important implications for the schema congruity literature, which has yet to consider whether extremely incongruent product form may have implications that go beyond the object in question. This research also makes important contributions for the meaning maintenance literature by providing the first empirical evidence that compensating in unrelated schemas can help reduce the tension produced by extremely incongruent product forms.

Essay 2 explores threat cues in brand logo design, and focuses on the concept of physical threats in relation to animated brand logos. This essay examines the role that motion plays as a visual design element for brand logos, and distinguishes between animate motion, which refers to motion properties that give the appearance of self-propulsion; and inanimate motion, which refers to motion properties that give the appearance of external sources of energy (Di Giorgio, Lunghi, Simion, & Vallortigara, 2017; Rakison, 2006). This essay theorizes that using animate motion as a visual design element can connote the existence of potential physical threats in the vicinity, which tends to heighten physiological tension (cf., Griskevicius, Goldstein, &

Mortensen et al., 2009). Furthermore, this essay shows that being exposed to animate motion in brand logos leads consumers to prefer products that can protect them, and their valuable resources, from negative events (e.g., cybersecurity software). In so doing, essay 2 contributes to two literatures, namely the *animacy literature*, which explores the cognitive and emotional consequences of being exposed to animate (vs. inanimate) motion (e.g., Altman, Khislavsky, Coverdale, & Gilger, 2016; Meyerhoff, Huff, & Schwan, 2013), and the growing body of work in *visual design*, which explores the impact of symbolic connotations of design elements in shaping preferences (Fajardo, Zhang & Tsiros, 2016; Jiang, Gorn, Galli, & Chattopadhyay, 2016; Henderson & Cote, 1998). This research has important implications for the animacy literature, which has yet to explore whether the perception of animate motion may have implications that go beyond the brand. Furthermore, this work contributes to research in brand logo design, which often focuses on the ability of design to spur consumption by activating meanings that can elicit positive affect.

Although each essay makes contributions to distinct literatures, they are brought together in their ability to illustrate how marketers can strategically use threat cues in visual design, including in product form (essay 1), and the brand logo (essay 2). The broad takeaway from these essays is that design elements that produce negative connotations, such as a meaning threat (essay 1), or a physical threat (essay 2), can nevertheless spur consumption in ways that help resolve the tension associated with the design element.

1.2 Theoretical Background

In marketing, a common research focus is in identifying what a design element (e.g., the color black) can mean for the object in question (e.g., the preference for a facial tissue that incorporates the color). Not surprisingly, the bulk of this work suggests that design elements can spur consumption when they elicit optimal levels of physiological arousal (Berlyne, 1960; 1978; Derryberry & Rothbart, 1988; Eysenck, 1967; Mehrabian & Russell, 1973), which tends to correspond with positive affective states (e.g., curiosity; Noseworthy, Di Muro, & Murray, 2014). I argue that what this specific focus misses is the possibility that design elements which convey connotations that elicit negative affect can increase consumers' preference for products that can help combat the ultimate problem associated with the connotation. In exploring this broad premise, two essays document the impact of threat cues in product form (essay 1), and brand logo design (essay 2), on subsequent consumption preferences. These essays are brought together in that (1) they both illustrate how threat cues can, under certain circumstances, spur consumption, and that (2) both threat cues elicit physical tension which can manifest as a negative affective state. Although the two forms of threat are similar in many respects, it is important to highlight what can be differentiated between the two types of threats in terms of the coping mechanisms that follow, which is a critical determinant of how these cues should ultimately impact subsequent consumption preferences.

The first essay focuses on meaning threats, which are defined as objects that undermine consumers' ability to confirm expected relationships in a category (Heine & Proulx, 2008; Proulx & Inzlicht, 2012). Extant work suggests that the urge to maintain a sense of meaning is a powerful motivation (e.g., Bruner, 1990), so much so that seeing objects that violate expectations can elevate physical tension, and elicit the emotional state of *anxiety* (Heine & Proulx, 2008; Proulx & Inzlicht, 2012). The second essay focuses on physical threats, which refer to objects

that are perceived to have capacity of inflicting physical harm on the observer (Esteves, Dumber & Ohman, 1994). Researchers suggest that the ability to maintain personal safety is biologically more urgent than either reproduction or finding nutrition, and as such, maintaining personal safety is perhaps the strongest adaptive motivation people possess (e.g., Hediger, 1955). Seeing objects that represent threats to personal safety elevates physical tension, which corresponds with the emotional state of *fear* (LaTour & Rotfeld, 1997).

Both threats coincide with heightened levels of physiological tension which can elicit negatively valenced emotional states. This combination often serves as an alerting signal for potential dangers, however anxiety tends to symbolize internal conflict, whereas fear tends to symbolize external danger (Craig, Brown, & Baum, 1995). In fact, some researchers broadly refer to anxiety as an emotional state that denotes threats which are not easily identifiable, controllable, or escapable (e.g., internal conflicts), whereas they refer to fear as an emotional state that denotes threats that people can potentially identify, escape, or otherwise neutralize (e.g., a predatory animal; Steimer, 2002). As a consequence, visual cues associated with the emotional state of fear tend to activate *active coping* strategies (or proactive coping; Steimer, 2002), such that objects that correspond with physical threats should increase the tendency to engage in behaviours that can reduce the likelihood of negative events from occurring (cf., Griskevicius & Kenrick, 2013; Koolhaas, Korte, & De Boer et al., 1999). In contrast, the emotional state of anxiety often activates *passive coping* strategies (or reactive coping; Steimer, 2002), such that objects that correspond with meaning threats should increase the tendency to engage in behaviours that can alleviate the anxiety that results from being exposed to the violation (e.g., Heine & Proulx, 2008).

The distinction between coping strategies for threats that are associated with anxiety and fear serve as a roadmap for the empirical essays. Specifically, in exploring meaning threats in product form, essay 1 focuses on how being exposed to product forms that violate expectations can increase consumers' tendency to prefer objects that can alleviate the anxiety that arises from the violation. Thus, this essay elaborates on a reactive coping strategy geared towards resolving the anxiety that arises from a visual expectancy violation. Building on extant work on meaning maintenance (e.g., Heine & Proulx, 2008; Proulx & Inzlicht, 2012), this essay illustrates such a coping mechanism can elevate preference for a variety of objects that can allow consumers to affirm existing belief systems to alleviate the tension, including ethical beliefs (e.g., green products), cultural connections (e.g., products that originate from one's own country), and semantic associations (e.g., preference of dominant brands in a product category).

In contrast, in exploring the notion of physical threats in brand logo design, essay 2 focuses on how being exposed to brand logos that move in an animate (vs. inanimate) way can increase consumers' tendency to prefer objects that reduce the likelihood of negative events from occurring. Thus, this essay elaborates on a proactive coping strategy geared towards eliminating potential negative outcomes to personal safety. Building on extant work in evolutionary psychology (e.g., Griskevicius & Kenrick, 2013), this essay illustrates that such a coping mechanism can elevate preference for a variety of objects that can protect consumers and their valuable resources from negative events, including products that cater to physical security (e.g., decay prevention toothpastes), cyber security (e.g., security software that stops webcam spies from watching you in your home), and the security of valuable resources (e.g., a backpack with blocking material that protects IDs and credit cards from hacker scanning).

1.3 Summary

The current dissertation sets out to explore the impact of threat cues in product design (essay 1) and brand logo (essay 2) on subsequent consumption preferences. Two essays illustrate that threat cues in visual design, which tend to coincide with heightened physical tension that elicits negative affective states, can motivate consumers to resolve the tension elicited by the threat cue. Essay 1 explores meaning threats in relation to product design, and documents that consumers prefer objects that affirm their salient belief systems more after being exposed to product forms that constitute a non-conscious meaning threat. This essay documents a passive coping strategy, such that affirming salient beliefs in unrelated domains alleviates the arousal-induced anxiety that is elicited by the meaning threat. Essay 2 explores physical threats in relation to brand logo design, and documents that people prefer objects that can protect them, and their valuable resources, more after being exposed to brand logo elements that are associated with physical threats. This essay documents an active coping strategy, such that the preference of protective products allows consumers to combat unsafe conditions in their broad environment. Overall, this dissertation shows that threat cues can serve to increase consumers' interest in products that can help them cope with the consequences of the meanings embodied by the design elements.

Chapter 2

Compensating for Innovation: Extreme Product Incongruity Encourages Consumers to Affirm Unrelated Consumption Schemas

2.1 Abstract

New products are often extremely incongruent with expectations. The inability to make sense of these products elevates anxiety and leads to negative evaluations. Although scholars have predominantly focused on combatting the negative response to extreme incongruity, I propose that extreme incongruity may have implications that extend beyond the category. I base my predictions on the concept of fluid compensation, which suggests that when people struggle to make sense of something, they will non-consciously reinforce highly accessible schemas in unrelated domains. Four studies confirm that extreme incongruity encourages fluid compensation, such that it elevates preference for *dominant brands* (study 1), *green consumption* (studies 2 and 4), and *ethnocentric products* (study 3). I isolate the causal role of anxiety using moderation tasks and biometric feedback. Furthermore, I demonstrate that compensation has an immediate dampening effect on arousal intensity. Thus, if consumers can compensate before explicitly evaluating an extremely incongruent product, their evaluations tend not to be negative. Taken together, this essay documents that extreme innovations encourage compensation, and in compensating, consumers can become more receptive to extreme innovations.

2.2 Introduction

New products often challenge consumers' existing beliefs about a product concept. For example, Heinz's purple ketchup violated consumers' expectations for the category given that people have only ever known ketchup to be red, and the color red relates to schematic expectations for the primary ingredient in ketchup. The consequence of violating product schemas has been well-documented. A general finding is that new products can stimulate a favorable response in consumers, but only if consumers do not have to abandon or reconfigure their existing beliefs for the product category (Campbell & Goodstein, 2001; Jhang, Grant, & Campbell, 2012; Meyers-Levy & Tybout, 1989; Noseworthy, Cotte, & Lee, 2011; Noseworthy & Trudel, 2011; Peracchio & Tybout, 1996). If a new product is extremely incongruent with existing set of beliefs, evaluations tend to suffer. This non-monotonic relationship between the severity of incongruity and product evaluations sets the basis for the well-documented *schema congruity effect* (Meyers-Levy & Tybout, 1989).

At its core, the schema congruity effect is built on the general notion that people actively seek meaning (Bruner 1990). Meanings are beliefs that shape expectations and allow people to predict and make sense of their experiences (Proulx & Inzlicht, 2012). However, sometimes—as with Heinz purple ketchup—experiences conflict with these expectations, and thus threaten one's sense of meaning. The growing body of literature on meaning maintenance suggests that the human motivation to maintain a sense of meaning is so compelling that when a schema is sufficiently threatened, people will often compensate by affirming other beliefs in memory (Heine, Proulx, & Vohs, 2006; Randles, Proulx, & Heine, 2011). Such beliefs may reside within the same domain, or even across domains—referred to as *fluid compensation* (Heine et al., 2006; Randles et al., 2011). For example, having a person do something as benign as read semantically incoherent word pairings can lead them to double down on their belief in morality (Randles et

al., 2011). Thus, if extreme incongruity indeed threatens existing beliefs, extremely incongruent products may have unintended consequences that extend beyond the product category.

In testing this possibility, I make several important advances. First, I unify schema congruity and meaning maintenance literatures under a common emotional mechanism: arousal-induced anxiety. Specifically, schema congruity literature suggests that extreme incongruity lends itself to a heightened physiological arousal state which manifests as anxiety (Noseworthy, Di Muro, & Murray, 2014), and meaning maintenance literature posits that arousal-induced anxiety encourages consumers to compensate by affirming unrelated belief systems (Proulx & Heine, 2008). In bridging these disparate literatures, I demonstrate that consumers may cope with the anxiety that stems from extreme incongruity by affirming established beliefs in unrelated consumption domains. Furthermore, using actual biometric feedback, I add to meaning maintenance literature by providing the first empirical evidence that the act of fluid compensation results in an immediate dampening of physiological arousal. Finally, I bring the lens back to the schema congruity effect, and explore what compensation means for consumers' product evaluations. Given that the negative reaction to extremely incongruent products is the result of arousal-induced anxiety (Noseworthy et al., 2014), and that compensation alleviates this tension, I demonstrate that allowing consumers to compensate in unrelated domains can mitigate the well-documented negative response to extreme incongruity. Taken as a whole, I document that extreme incongruity encourages compensation in unrelated consumption domains, and compensation, in return, makes consumers more open to extremely incongruent products.

2.3 Conceptual Development

2.3.1 The Schema Congruity Effect

The schema congruity effect was originally proposed as a dynamic relationship between arousal and affective judgment (Mandler, 1982). Mandler posited that incidental affect can result from an autonomic physiological response to seeing an object that violates existing beliefs. His thesis centered on the notion that although people generally like things that match their expectations, moderate incongruity can be arousing and thus intriguing. Furthermore, because moderate incongruity can be resolved with minimal effort, it tends to result in favorable evaluations (Mandler, 1982; Meyers-Levy & Tybout, 1989). In instances of extreme incongruity, expectations can be violated to such an extent that the object cannot be resolved without reconstructing the existing schema, or forming an entirely new schema (Mandler, 1982). This tends to coincide with anxiety, which often results in unfavorable evaluations (Mandler, 1982; Noseworthy et al., 2014). It is in this sense that extreme product incongruity can threaten a product concept, and may even render it meaningless. While extant work has explored several boundary conditions to the schema congruity effect (Campbell & Goodstein, 2001; Galli & Gorn, 2011; Maoz & Tybout, 2002; Meyers-Levy & Tybout, 1989; Noseworthy, Di Muro, & Murray, 2014; Noseworthy, Finlay, & Islam, 2010; Noseworthy, Lee, & Cotte, 2010; Noseworthy, Murray, & Di Muro, 2018; Peracchio & Tybout, 1996; Priester et al., 2004), the core dependent variable has invariably been the evaluations of the target product. Researchers have yet to consider that there may be more to extreme incongruity than what it means for the product in question.

A critical insight from the schema congruity literature is that the affective response to product incongruity is determined by the consumer's ability to resolve the product within an existing set of beliefs. The positive affect that results from successful resolution not only

increases task satisfaction (Maoz & Tybout, 2002), but also elevates evaluations for incongruent products (Jhang et al., 2012). The inability to resolve a product elevates autonomic arousal to the point of anxiety, resulting in a negative affective response (Noseworthy et al., 2014). These findings are best characterized as *within-domain* compensation, whereby a consumer resolves an incongruent product within their beliefs about the category. This view holds, for example, that consumers who see a smartphone that challenges their preconceptions will either update their beliefs or develop an entirely new set of beliefs by subtyping the phone as a special case.

The within-domain focus of schema congruity theory predominantly stems from Mandler's (1982) adoption of classic notions of *assimilation* and *accommodation* (Piaget, 1960). Assimilation in the sense that people try to resolve the source of incongruity within an activated schema (e.g., trying to reconcile the first generation tablet within a laptop schema); accommodation in the sense that when the former fails, people will then modify the schema or develop a new schema (e.g., looking at a tablet as a laptop without a keyboard, and then later galvanizing the tablet concept once marketers coin a name for the category). It was Piaget (1960) who originally proposed that things that do not make sense cause tension, and that effort to regain a sense of meaning constitutes a fundamental developmental motive. That is, people generally have a sense-making impulse. This can operate at the extremes as a need for coherence (Antonovsky, 1979) or a need for closure (Kruglanski & Webster, 1996), but in general, it is a basic human motivation to retain a sense of meaning when faced with information that is inconsistent with a given set of beliefs. The importance of understanding that the within-domain focus is more a by-product of Mandler's (1982) theoretical lens than a necessary parameter of his model comes from an entirely different, but related stream of research on meaning maintenance.

2.3.2 Meaning Maintenance Model

The meaning maintenance model (MMM) expands on the notion of a sense-making impulse by proposing that when a person's beliefs are sufficiently violated, they will non-consciously attempt to regain a sense of meaning. Meaning, in this context, refers to the ability to confirm expected relationships (Proulx & Inzlicht, 2012). Building on Piaget's (1960) concepts of assimilation and accommodation, the MMM posits a third way in which people can deal with expectancy violations: *fluid compensation* (McGregor, Prentice, & Nash, 2012; Proulx & Heine, 2008; Steele, 1988). Fluid compensation is predicated on the assumption that schemas are functionally interchangeable, such that affirming one schema (e.g., one's culture or morality) can satisfy the inability to resolve another (e.g., a perceptual anomaly; Proulx & Heine, 2008). Researchers have shown that this can occur without conscious activation (Proulx et al., 2010). For example, Proulx and Heine (2008) found that people tend to affirm cultural norms after they witness a perceptual anomaly, even without them consciously noticing the anomaly. In keeping with the smartphone example, this view holds that American consumers who see something that challenges their preconceptions for the smartphone category may instead choose to affirm their cultural identity and "buy American" as a way of reinforcing something that does make sense.

The above example relates to a second premise of the MMM, which is that fluid compensation is instigated by an autonomic physiological response to things that are difficult to make sense of, which manifests broadly as non-conscious anxiety (Heine & Proulx, 2008; Proulx & Inzlicht, 2012). This is consistent with evidence that anxiety can impact people's judgments in unrelated domains, but only when they are not consciously aware of the source of tension (Raghunathan, Pham, & Corfman, 2006). Conscious awareness of the source dampens the reparative nature of affirming in unrelated domains—unless these domains have some strong

resemblance to the original source of the anxiety-ridden experience (Tritt, Inzlicht, & Harmon-Jones, 2012). Thus, it is not that people are resolving the expectancy violation by compensating in unrelated domains, but rather are engaging in a non-conscious strategy aimed at reducing the aversive tension that stems from expectancy violations (Major & Townsend, 2012). Further to this point, research confirms that arousal-induced anxiety predicts a specific need to affirm meaning, which cannot be satisfied with positively valenced stimuli decoupled from the process of regaining meaning (McGregor et al., 2012). Collectively, these findings point to the possibility that consumers may attempt to alleviate the tension that stems from extreme incongruity by affirming belief systems in unrelated domains.

2.3.3 Hypotheses

To recap, extant work on schema congruity documents that extreme incongruity elicits an autonomic physiological response that manifests as anxiety (Noseworthy et al., 2014). Meaning maintenance literature suggests the arousal-induced anxiety that originates from expectancy violations engenders a non-conscious need to regain meaning, which can be accomplished by affirming schemas unrelated to the violation—coined as *fluid compensation* (Heine & Proulx, 2008). Both theories rely on the motivational aspects of the aversive tension (Proulx & Inzlicht, 2012; Noseworthy et al., 2014). However, it is not that people can only resolve incongruent products within a product schema, but that they just tend to do so when the violation is moderate enough to make sense of (Noseworthy et al., 2014). In the case of extreme product incongruity, the violation cannot be resolved within preexisting beliefs. It is my contention that consumers will use different strategies to alleviate this tension, such as fluid compensation. Stated formally,

H1: Consumers will compensate by affirming existing beliefs in unrelated domains after viewing an extremely incongruent, as opposed to a congruent, product.

H2: The effect of extreme product incongruity on compensation is mediated by state anxiety, such that viewing an extremely incongruent (vs. congruent) product elevates state anxiety, which in turn, leads to compensation in unrelated domains.

My final step was to explore what the act of compensation may mean for extremely incongruent products. Indeed, consumers are not forced to explicitly evaluate products, so there is the question of whether they would naturally compensate if given the chance, and if so, whether the act of compensation would have any lasting effects on preference. There is reason to believe that it would. Recent evidence suggests that alleviating the autonomic response to extremely incongruent products can lower anxiety, and thus elevate evaluations (Noseworthy et al., 2014). Given that fluid compensation is believed to be a non-conscious strategy to alleviate the tension that arises from expectancy violations (Heine & Proulx, 2008), it follows that consumers who engage in compensatory behavior prior to explicitly evaluating the product would respond more favorably. Stated formally,

H3: The time at which consumers compensate moderates the impact of schema congruity on product evaluations, such that consumers will evaluate extremely incongruent products more favorably after (vs. before) they can compensate in unrelated domains. In contrast, time of compensation will have no impact on the evaluation of congruent products.

In sum, if extreme product incongruity violates expectations to such an extent that it instigates anxiety (Noseworthy et al., 2014), and if the anxiety caused by expectancy violations creates a non-conscious need to regain meaning by affirming pre-existing beliefs (Proulx & Heine, 2008), then extremely incongruent products may elevate consumers' preferences for products that can affirm unrelated beliefs. Furthermore, if compensatory behaviors indeed have an immediate dampening effect on arousal-induced anxiety, then the act of compensation should ameliorate the negative response to extreme product incongruity. Researchers exploring fluid compensation have yet to examine the impact of compensation on the expectancy violation. The following studies were designed to test these predictions.

2.4 Overview of the Studies

In focusing on the compensation process, I crossed distinct dependent variables which unite under the notion that they are highly accessible belief systems. Some of the more notable beliefs explored as compensatory domains are strong semantic associations (Randles et al., 2011), ethicality (Proulx & Heine, 2008), and cultural identity (Proulx et al., 2010). In adapting these paradigms, I focus on brand dominance (study 1), green consumerism (studies 2 and 4), and ethnocentric preference (study 3). Each study shows the underlying role of anxiety in eliciting compensatory acts. Study 2 elaborates on the mechanism by having consumers attribute their arousal to a salient source. Study 3 directly moderates anxiety using a relaxation task, and further shows that compensation has an immediate dampening effect on psychological arousal. Study 4 brings the inquiry full circle by showing that because compensation can immediately

dampen arousal intensity, allowing consumers to compensate prior to making an explicit evaluative judgment eliminates the negative response to extreme incongruity.

All studies validate that the extremely incongruent products are indeed extreme (i.e., less typical, less likely to be resolved, receive less favorable evaluations than congruent and moderately incongruent products)¹. However, unlike traditional work in this area, the contribution is not in empirically demonstrating consumers' perceptions of extreme incongruity, but more so to isolate that the studies are truly tapping extreme product incongruity and then to test for downstream compensatory effects. Nevertheless, these measures allowed me to confirm that compensatory acts are the result of arousal-induced anxiety that originates from extreme incongruity. Specifically, given that variations in state anxiety do not alter perceived typicality and resolution (Noseworthy et al., 2014), I expected these measures to not be impacted by anxiety-relevant factors throughout. In contrast, the negative evaluations of extremely incongruent products have a direct relationship with felt anxiety (Mandler, 1982; Noseworthy et al., 2014). Thus, in studies that expand on the role of anxiety, I further elaborate on the impact of these manipulations on product evaluations.

2.5 Study 1

Fluid compensation occurs at a non-conscious level, such that consumers can double down on semantic associations in unrelated schemas after experiencing an expectancy violation

¹ To simplify the experimental design, I focus exclusively on extreme product incongruity relative to congruent products. Pilot tests, which are included in the corresponding appendices for each study, confirmed prior work which suggests that moderately incongruent products do not correspond with elevated anxiety because they can be easily resolved within existing beliefs. These same tests also confirmed that when a schema violation is not severe enough to induce arousal, people tend not to compensate.

(Randles et al., 2011). To this point, one of the strongest semantic associations to a given product category is the most dominant brand (e.g., Campbell's in soup category; Herr, Farquhar, & Fazio, 1996). Brand dominance is defined as “the strength of the directional association between the parent category and the branded product” (Herr et al., 1996, 135). As such, *category dominant brands* are often named earlier, recalled more frequently, classified faster, and recognized sooner upon the presentation of the product category (Bagga, Noseworthy, & Dawar, 2016; Herr et al., 1996). In what follows, study 1 thus sets the stage for the current investigation by exploring an important, yet previously unanticipated, downstream consequence of extreme incongruity: enhancing the choice of category dominant brands in unrelated domains.

2.5.1 Method

2.5.1.1 Participants and Design

An a priori sample was estimated based on the standard Type 1 error rate ($\alpha = .05$), estimated power ($1 - \beta = .80$), and the ability to identify a medium to small effect should one exist ($d = .35$; Cohen, 1988). The end result was a sample (N) of two hundred and ten participants (45% females; $M_{\text{age}} = 37.5$), recruited through Amazon's Mechanical Turk, and paid \$1 for their participation. Participants were randomly assigned to one of two conditions in a 2 (product congruity: congruent vs. extremely incongruent) between-subjects factorial design.

2.5.1.2 Pretest—Brand Dominance

A pretest ($N = 198$) was conducted to determine product categories with a single category dominant brand. The pretest included nine product categories (soup, cola, smartphone, battery, fast food, digital camera, car tire, vacuum cleaner, and coffee), with each category containing ten

brand alternatives. The selected brands were adopted from online brand rankings (Top Tens, 2019). In line with prior work (Fazio, 1987; 1990), participants took part in this pretest through individual computers, and were instructed that they would see a number of pairs of words. The first word in each pair was a product category (e.g., Soup) which appeared on the screen for 750 milliseconds (ms) and then was immediately replaced with a brand name (e.g., Campbell's). Participants were instructed to click "Yes" as fast as possible without making mistakes if the product was sold under the name appearing immediately after it, and to click "No" if the product was sold under a different name. A product category was deemed appropriate for the current study if one specific brand was identified significantly faster than the rest of the brands from the same category (c.f., Fazio 1990; Herr et al. 1996). The end result was five categories with an identifiable dominant brand (dominant brands in parentheses): soup (Campbell's), smartphone (Apple), battery (Duracell), vacuum cleaner (Dyson), and coffee (Starbucks). These categories were selected for the compensation task. The remainder of the product categories were excluded from the main study, as the pretest revealed multiple brands that were identified equal on category dominance, in that they were identified as quickly, and faster than the rest of the brands in the category (e.g., Coca Cola and Pepsi in cola category).

2.5.1.3 Stimuli—Product Congruity

The product category chosen for the congruity manipulation was facial tissues. This category is not only familiar to consumers, but also has a strong perceptual prototypicality in that the standard color of the category (i.e., white) has varied little over time. This gave me an opportunity to incorporate a classic schema congruity manipulation (i.e., non-normative color)

into the design (Jhang et al., 2012), which, notably, was also used by prior work to explore the impact of product congruity on state anxiety (Noseworthy et al., 2014).

2.5.1.4 Procedures

Participants took part in the study through their individual computers. All participants were informed that they were participating in a consumer survey designed to explore consumers' opinions about a new facial tissue product. The facial tissue category was explicitly conveyed to evoke the necessary schema (Meyers-Levy & Tybout, 1989). Participants were then directed to the next page, where they were presented with the picture of the facial tissue which was either congruent (i.e., white) or extremely incongruent (i.e., black) with the category.

Participants began the questionnaire by responding to 10 randomized items (anchored: 1 = *not at all*, 7 = *very much*), seven of which capturing overall evaluations (e.g., "*is likeable*," "*is appealing*"), and the remaining three capturing the perceived typicality of the facial tissue (e.g., "*is common*;" Campbell & Goodstein, 2001). Participants then responded to 20 randomized items, 10 indicating their trait anxiety (e.g., "*I am nervous and restless*," "*I am a steady person*;" anchored: 1 = *almost never*; 4 = *almost always*), and 10 indicating their current state of anxiety (e.g., "*tense*," "*nervous*;" anchored: 1 = *not at all*; 4 = *very much so*, Spielberger & Reheiser, 2009). Consistent with prior work, the basic idea was to control for participants' trait anxiety levels while testing state changes (Noseworthy et al., 2014). Resolution was captured with two 7-point scale items that indicated participants' ability to make sense ("*makes no sense/makes sense*"), and understand the rationale of the facial tissue ("*disagree/agree*;" Jhang et al., 2012). Participants also typed their open-ended opinions about the product, which served to reinforce the explicit measure of resolution (Jhang et al., 2012).

Participants were then thanked for reviewing the facial tissue, and read that the survey would now focus on generating a general consumption profile on them. In reality, this served as the main compensation task. Specifically, participants responded to the following question for five unrelated product categories: “*Consider if you were going to buy a product from [Insert product category name] today. Which brand would be your top choice (please select “Other” if your preferred brand does not appear in the list)?*” In accordance with the brand dominance pretest, the product categories piped into the text were soup, battery, vacuum cleaner, smartphone, and coffee categories. For each category, participants were presented with a choice set consisting of 10 brand names and their logos (taken from the brand dominance pretest), plus an “Other” option (see Appendix A). The order in which product categories and brand options appeared was randomized. For each category, participants merely clicked their brand of preference.

2.5.2 Results

2.5.2.1 Manipulation Checks—Product Congruity

Independent samples t-tests confirmed that compared to the white facial tissue, the black facial tissue was perceived as less typical ($\alpha = .95$, $M_{ext.inc.} = 2.54$ vs. $M_{cong.} = 6.20$; $t(208) = 19.61$, $p < .001$), was less likely to be resolved ($r = .85$; $M_{ext.inc.} = 3.28$ vs. $M_{cong.} = 6.31$; $t(208) = 14.73$, $p < .001$), and was evaluated less favorably ($\alpha = .96$; $M_{ext.inc.} = 3.18$ vs. $M_{cong.} = 5.10$; $t(208) = 10.11$, $p < .001$).

To reinforce the resolution ratings above, open-ended responses were coded by two independent coders who were blind to the hypotheses (cf., Jhang et al., 2012). All responses showing successful resolution were coded as 1 (e.g., “*It is just a tissue colored black*”),

responses showing unsuccessful resolution were coded as -1 (e.g., “*Why ‘black’ tissue? That literally makes no sense to me.*”), and any responses that did not pertain to the resolution process were coded as 0 (e.g., “*No comments*”). All outstanding disagreements between the two independent coders (IRR: %84.7) were resolved through a third independent coder. An independent samples t-test confirmed that participants’ open-ended responses aligned with the two-item resolution ratings, such that the black facial tissue was far less likely to be resolved ($M = -.40$) than the white facial tissue ($M = .62$; $t(208) = 10.01, p < .001$).

2.5.2.2 State Anxiety

Controlling for trait anxiety ($F(1, 207) = 12.02, p < .001$), an ANCOVA on state anxiety ($\alpha = .88$) confirmed that participants were more anxious after evaluating the extremely incongruent facial tissue ($M = 1.86$) than the congruent facial tissue ($M = 1.64$; $F(1, 207) = 7.42, p < .01$).

2.5.2.3 Compensation Test—Dominant Brand Choice

The typicality, resolution, evaluation, and state anxiety measures reflect previous work on schema congruity (Noseworthy et al., 2014). Where I now diverge from existing research is in exploring beyond what this means for the target product. To reiterate, the current study tested the prediction that being exposed to extreme incongruity would enhance the choice of dominant brands in unrelated categories.

A multilevel binary logistic regression was conducted on participants’ brand choices. This analysis was deemed appropriate, as it permits the use of repeatedly measured categorical dependent variables (Sommet & Morseli, 2017). The model was specified such that product category served as a within-subject variable, and the product congruity served as the between-

subject variable. The brand choice dependent variable was coded as binary (coded: 1 = dominant), as the only constant across product categories was the existence of a dominant brand, and it would be inappropriate to statistically equate the remaining brands across categories (however, see Table 1 for multinomial logistic regression analyses, which included all brands). The analysis confirmed that participants were more likely to select dominant brands after being exposed extremely incongruent facial tissue (50.4%) than after being exposed to the congruent facial tissue (34%; $\beta = .68$, $SE = .12$, $p < .001$). Critically, the effect of product category was not significant ($p = .77$), suggesting that the impact of product congruity on brand selection did not vary between different product categories used in the compensation task.

Table 1: Means, Standard Deviations, Choice Percentages, and Cell Sizes for Study 1

	Congruent	Extremely Incongruent	Δ of Dominant Brand Choice ^{†††}
Typicality	6.20 (.92)	2.54 (1.66)	
Resolution	6.31 (.93)	3.28 (1.87)	
Evaluations	5.10 (1.13)	3.18 (1.56)	
State Anxiety [†]	1.64 (.56)	1.86 (.64)	
<i>Coding for Resolution</i> ^{**}	.62 (.66)	-.40 (.81)	
	9.7%	60.7%	
Dominant Brand Choice^{††}	34%	50.4%	+16.4% ($\beta = .68$, $SE = .12$, $p < .001$)
Soup (Campbell's)	35.9%	52.3%	+16.4% ($\beta = 1.71$, $SE = .69$, $p = .01$)
Battery (Duracell)	38.8%	57%	+18.2% ($\beta = 2.36$, $SE = 1.08$, $p = .03$)
Vacuum (Dyson)	33%	46.7%	+13.7% ($\beta = .88$, $SE = .44$, $p = .05$)
Smartphone (Apple)	33%	49.5%	+16.5% ($\beta = .79$, $SE = .44$, $p = .055$)
Coffee (Starbuck's)	29.1%	46.7%	+17.6% ($\beta = 1.16$, $SE = .45$, $p = .01$)
Cell Sizes	103	107	

Note: Standard deviations are reported in parentheses; ^{**} = percent of *unsuccessful* resolution (-1); [†] = means with adjusted covariate for trait anxiety ($M = 1.83$). ^{††} = Results based on a multilevel logistic regression analysis that included all categories (coded: 0 = non-dominant brands, 1 = dominant brands); ^{†††} Reported statistics for each product category based on separate multinomial regressions (i.e., with all brand options included in the model) as a function of product congruity (all $ps < .06$, see above).

2.5.2.4 Mediation

To explore whether state anxiety accounted for the observed variations in dominant brand choice, I tested for multilevel mediation (10,000 simulations; Mediation Package for R; Tingley et al., 2014). This analysis was deemed appropriate, as it allows the clustering of separate binary dependent variables for each participant. The analysis confirmed a significant indirect effect of product congruity (coded: 1 = Extremely Incongruent) through state anxiety on dominant brand choice, 95% CI: .01, .10. Thus, viewing extreme incongruity elevated state anxiety, which enhanced the choice of dominant brands.

2.5.3 Discussion

The results of study 1 support the prediction that consumers will compensate for the anxiety caused by extreme product incongruity in unrelated product schemas (H1 and H2). Specifically, the experience of the black facial tissue, which was far less typical, resolvable, and favorable than the white facial tissue, coincided with an increase in the choice of category dominant brands in unrelated product categories.

Although compelling, one potential shortcoming of this study was that the mediator was only measured. Thus, other correlated factors may have contributed to the observed effects. One possibility is that because extreme incongruity is difficult to make sense of, it results in cognitive depletion (Muraven, Tice, & Baumeister, 1998). Thus, consumers may be affirming existing schemas because they feel cognitively depleted. One way in which depletion can be ruled out is by considering an important parameter of fluid compensation, which is that the anxiety elicited by expectancy violations non-consciously activates a need to seek meaning in unrelated domains

(Proulx et al., 2010). If the physiological tension is consciously attributed to a source, people tend not to compensate. Some of the classic examinations of this was done by having participants attribute their tension to a salient source—coined as a *misattribution task* (Proulx & Heine, 2008). Critically, attributing anxiety to a salient source neither alleviates tension nor assists in making sense of the original schematic violation (Tritt, Inzlicht, & Harmon-Jones, 2012). Thus, if this is depletion, people should still be depleted. However, if this is a non-conscious compensatory act (Proulx et al., 2010), then consciously attributing arousal to a salient source should alleviate the need to compensate. Study 2 tested this possibility.

2.6 Study 2

Study 2 was designed with two primary objectives in mind: First, I sought to further explore the underlying mechanism by employing a classic misattribution paradigm (cf., Proulx & Heine, 2008). This also afforded the opportunity to test a potential implication for schema congruity effect. Specifically, I tested the possibility that bringing the physiological tension to conscious awareness and attributing it to a different source may dampen the well-documented negative evaluations for extremely incongruent products (cf., Noseworthy et al., 2014). Second, I explored another important, and previously unanticipated, consequence of extreme incongruity. Specifically, extant research suggests that in addition to affirming semantic associations, people may attempt to alleviate the tension that originates from expectancy violations by affirming ethical beliefs (Heine & Proulx, 2008). Ethical beliefs often predict the preference for environmentally friendly (i.e., green) products, which are deemed to serve the betterment of society (Mazar & Zhong, 2010; Pancer, McShane, & Noseworthy, 2017). Thus, study 2 explored

the possibility that extreme product incongruity may be enhancing the preference of ‘green’ products.

2.6.1 Method

2.6.1.1 Participants and Design

Using the same parameters as study 1 (with the effect size parameter updated to $f = .18$; Cohen, 1988), two hundred and eight students (56% females; $M_{\text{age}} = 19.3$) were recruited in return for partial course credit. Participants were randomly assigned to one of four conditions in a 2 (product congruity: congruent vs. extremely incongruent) \times 2 (misattribution: yes vs. no) between-subjects factorial design.

2.6.1.2 Stimuli

The target product chosen for this study was running shoes. Following the procedures of prior research (Jhang et al., 2012), a pilot test confirmed the three-level operationalization of product congruity (Appendix B). I then adapted the two levels that were the focus of the hypotheses. The stimuli for the compensation task consisted of environmentally friendly (i.e., green) products (Griskevicius, Tybur, & Van den Bergh, 2010).

2.6.1.2 Procedures

Participants were brought into a behavioral lab and were informed that they would be taking part in a study on the effects of subliminal sounds on memory. They were told that the study consisted of participants examining a new running shoe, and recalling specific things about the shoe in a later task. The shoe was conveyed as a prototype designed by a major manufacturer,

which did not include any brand-related information on it. Participants were then instructed to put on a pair of headphones and to keep them on while viewing the shoe. This set the foundation for the misattribution manipulation (cf., Savitsky et al., 1998).

The task began with participants being directed to a computer screen where they read that they will be exposed to a high frequency sound (above 20 kHz). They were informed that while they cannot hear this sound, their subconscious would pick up on it. In actuality, participants were not exposed to any sound. Participants in the misattribution condition read that “*Subliminal sound has been found to cause individuals' heart rate to increase. People exposed to subliminal sound report feeling somewhat anxious and nervous. The heart rate increase, anxiety and nervousness can start almost instantly, but are not permanent, and will continue only while you are wearing the headset.*” In contrast, participants in the no misattribution condition read that “*Subliminal sound will have no discernible physical effects on you*” (manipulation directly taken from Savitsky et al., 1998, 531). After conveying the misattribution guise, the electronic instrument then transitioned to a photograph of a shoe (one of the two congruity conditions) and then to an electronic questionnaire. The questionnaire consisted of the same product evaluation, typicality, anxiety, and resolution measures described in study 1.

Participants were then informed that they would be taking a short break to give their brains time to process the subliminal sounds before moving on to the recollection task, and thus I was interested in taking this time to get to know their general consumption habits better. In reality, this served as the core compensation task. Specifically, participants were asked to state their preference for what was conveyed as random consumer goods. In fact, what they evaluated were three items from different categories (a dishwasher, a car, and a household cleaner) which

incorporated environmentally friendly attributes (Griskevicius et al., 2010; Appendix B).² For each, participants were asked to rate, “How attractive is this item to you?” (anchored: 1 = *not attractive at all*, 9 = *very attractive*; Griskevicius et al., 2010). The order of presentation of items were electronically randomized. The questionnaire concluded with basic demographic questions.

2.6.2 Results

2.6.2.1 Manipulation Checks—Product Congruity

Two-way ANOVAs confirmed that compared to the congruent running shoe, the extremely incongruent running shoe was perceived less typical ($\alpha = .93$; $M_{ext.inc.} = 2.04$ vs. $M_{cong.} = 5.18$; $F(1, 203) = 262.04, p < .001$), and was less likely to be resolved (ratings: $r = .68$; $M_{ext.inc.} = 2.54$ vs. $M_{cong.} = 4.25$; $F(1, 203) = 72.37, p < .001$; coded responses: $M_{ext.inc.} = -.52$ vs. $M_{cong.} = .51$; $F(1, 203) = 77.49, p < .001$). No other effects were significant ($ps > .15$). This supports the notion that misattribution does not alter typicality or resolution, but instead alters consumers’ reaction to the resolution process (Noseworthy et al., 2014). I expected that this would be reflected in product evaluations.

2.6.2.2 Product Evaluations

A two-way ANOVA on product evaluations ($\alpha = .93$) yielded a significant main effect of congruity, such that participants evaluated the extremely incongruent running shoe less favorably

² To ensure that I was not inadvertently tapping into a general increase in preference for unrelated products, I conducted a pilot study (see Appendix B). The pilot used the same stimuli, with the only difference being that the products in the pilot did not contain any environmentally friendly attributes. The results confirmed that preference of the three items were not significantly altered by whether participants were exposed to an extremely incongruity versus congruent product beforehand.

($M = 2.63$) than the congruent running shoe ($M = 3.23$; $F(1, 203) = 11.87, p < .001$). The main effect of misattribution was not significant ($p = .11$). Importantly, there was a significant misattribution \times product congruity interaction ($F(1, 203) = 5.09, p < .05$). As illustrated in Table 2, in the no misattribution condition, participants evaluated the extremely incongruent running shoe less favorably ($M = 2.30$) than the congruent running shoe ($M = 3.29, F(1, 203) = 16.50, p < .001$). This once again confirmed the operationalization of product congruity. Consistent with the notion that the negative response to extreme incongruity is the result of non-conscious arousal attribution (Noseworthy et al., 2014), having participants consciously attribute their arousal to a different source eliminated the negative evaluations for extreme incongruity ($M_{\text{ext.inc.}} = 2.97$ vs. $M_{\text{cong.}} = 3.18, p = .40$).

Table 2: Means, Standard Deviations, and Cell Sizes for Study 2

	No Misattribution		Misattribution	
	Congruent	Extremely Incongruent	Congruent	Extremely Incongruent
Typicality	5.90 (1.43)	1.92 (1.42)	5.27 (1.37)	2.18 (1.34)
Resolution	4.18 (1.58)	2.43 (1.33)	4.32 (1.48)	2.66 (1.34)
Evaluations	3.29 (1.35)	2.31 (1.19)	3.18 (1.21)	2.98 (1.29)
State Anxiety ^{††}	1.68 (.50)	1.90 (.76)	1.73 (.50)	1.82 (.53)
<i>Coding for Resolution</i> ^{**}	.42 (.90) 26.9%	-.60 (.79) 79.2%	.60 (.77) 17.3%	-.43 (.90) 70.6%
Green Preference [†]	5.27 (2.02)	6.39 (1.57)	5.64 (1.53)	5.58 (1.58)
Cell Sizes	52	53	52	51

Note: Standard deviations are reported in parentheses; ^{**} = percent of *unsuccessful* resolution (-1); [†] = preference of three environmentally friendly items combined into green preference composite; ^{††} = means with adjusted covariate for trait anxiety ($M = 2.25$).

2.6.2.3 State Anxiety

Controlling for trait anxiety ($F(1, 202) = 32.42, p < .001$), a two-way ANCOVA on state anxiety ($\alpha = .88$) revealed that participants were more anxious after viewing the extremely incongruent shoe ($M = 1.86$) than the congruent shoe ($M = 1.71; F(1, 202) = 4.37, p < .05$). No other effects were significant ($ps > .36$). This supports the notion that misattribution does not alter one's state anxiety (Proulx & Heine, 2008).

2.6.2.4 Compensation Test—Preference for “Green” Products

Once again, the typicality, resolution, anxiety, and evaluation measures aligned with the classic schema congruity literature, and the misattribution task varied evaluations in the predictable manner. Given this, I proceeded to investigating what this means beyond the target product. To reiterate, I predicted that extreme product incongruity would elevate preference for green products, but not when participants attributed their anxiety to a salience source. To assess green product preference, I averaged scores for the three environmentally friendly items³.

A two-way ANOVA yielded a main effect of product congruity, such that participants preferred green products more after viewing the extremely incongruent shoe ($M = 5.99$) than the congruent shoe ($M = 5.45; F(1, 203) = 5.13, p < .05$). The main effect of misattribution was not

³ A follow-up study investigated whether this pattern would persist even when the compensation task included an attractive alternative to the green products in the same category. The experimental design, the stimuli, and the procedures were the same as the main study. The only difference was that participants in the follow-up study were administered a comparative attractiveness measure for the compensation task, with one alternative representing a luxury item, and the other item representing an environmentally friendly item, from the same category. The products representing the luxury and the green alternatives were directly taken from Griskevicius et al. (2010). To accommodate the comparative nature of the compensation task, participants were asked to rate the relative attractiveness of the two products on a 9-point scale (anchored: 1 = *definitely Product A*, 9 = *definitely Product B*; Griskevicius et al. 2010). The same task was repeated across three product categories. The results revealed a pattern consistent with the main study, such that there was an elevated preference towards the green alternatives when participants were exposed to the extremely incongruent (vs. congruent) running shoe beforehand—a pattern which was predictably eliminated when participants attributed their tension to a salient source.

significant ($p = .35$). There was also a significant product congruity \times misattribution interaction ($F(1, 203) = 6.33, p < .05$). Specifically, participants in the no misattribution condition preferred green products more after viewing the extremely incongruent shoe ($M = 6.39$) than the congruent shoe ($M = 5.27; F(1, 203) = 11.54, p < .005$). Critically, this effect was eliminated in the misattribution condition ($M_{\text{ext.inc}} = 5.58$ vs. $M_{\text{cong}} = 5.64; p = .85$).

2.6.2.5 Mediated Moderation

To explore whether anxiety accounted for the observed variations in green preference, I tested for mediated moderation (Hayes, 2012; Model 15; bootstrapped with 10,000 draws). This model permits a back-ended moderator (“b” path) to an overall mediated effect. Theoretically this was appropriate given the misattribution task did not alter state anxiety, but it did interact with product congruity to alter green preference. As predicted, there was a conditional indirect effect of product congruity (1 = Extremely Incongruent) on green preference through state anxiety (95% CI: $-.42; -.01$). Specifically, state anxiety explained why viewing the extremely incongruent (vs. congruent) running shoe elevated green preference in the no misattribution condition (95% CI: $.01; .36$). This effect was eliminated when participants consciously attributed their arousal to a salient source (95% CI: $-.10; .18$).

2.6.3 Discussion

The results of study 2 conceptually replicated the core findings of study 1 and further demonstrated the process by using a classic misattribution task. Specifically, the results confirmed that having participants consciously attribute their arousal to a salient source reduced compensatory preference to levels consistent with the control (i.e., congruity condition).

Importantly, the misattribution task dampened green product preference without altering resolution or alleviating tension. This is consistent with the literature on fluid compensation, which suggest that although people may be no better at making sense of an expectancy violation, compensation in unrelated domains is unlikely if anxiety can be consciously attributed to a salient source (Proulx & Heine, 2008). The finding that the misattribution task elevated evaluations for extreme incongruity also corroborates with the notion that the negative response to extreme incongruity is the result of non-consciously experienced tension that manifests as anxiety (Noseworthy et al., 2014). Given this, study 3 aimed to directly manipulate the mechanism and explore the underlying role of physiological arousal.

2.7 Study 3

In addition to semantic associations and ethical beliefs, another well-established means of compensating for an expectancy violation is affirming one's culture. Specifically, extant research shows that people identify more with their culture after experiencing an expectancy violation (Proulx et al., 2010). To this point, people often affirm their cultural identity through 'ethnocentric' consumption, which is defined as consumption activities that show deferential preference for one's cultural in-group (Shimp & Sharma, 1987). One key example of ethnocentric consumption is in research on the country-of-origin effect (COE; Schooler, 1965), where people indicate a greater willingness to pay for products that originate from regions that they identify with (e.g., Wall & Heslop, 1988). Thus, if extreme incongruity indeed threatens beliefs, then extremely incongruent products may inadvertently have an impact on COE effect.

Furthermore, up to this point, I have adopted paradigms from the fluid compensation literature. However, there is a specific paradigm in schema congruity literature that may lend

important insights. Specifically, in testing Mandler's (1982) seminal prediction, Noseworthy and colleagues (2014) demonstrated that putting consumers in a relaxed state dampens the physiological response to extreme incongruity and thus reduces anxiety and increases preference. This finding is particularly relevant for two reasons: First, if fluid compensation is a means by which people cope with arousal-induced anxiety, then putting someone in a relaxed state should reduce compensation by dampening the aroused state. Second, researchers have yet to confirm what is actually accomplished by compensating through unrelated schemas. Does compensation allow people to manage the intensity of their emotional state? Indeed, the results from study 2 support this possibility. However, only by using actual physiological measures would it be possible to isolate the moment-to-moment changes in one's physiological state and thus test whether compensation has an immediate dampening effect on arousal intensity.

2.7.1 Method

2.7.1.1 Participants and Design

Using the same parameters as study 2 to determine our sample (N), two hundred participants (55% females; $M_{\text{age}} = 26.3$) were recruited through posters and public advertisements and paid \$20 for taking part in the study. Each participant was randomly assigned to one of four conditions in a 2 (product congruity: congruent vs. extremely incongruent) \times 2 (aroused state: low arousal vs. control) between-subjects factorial design.

2.7.1.2 Stimuli

The target product chosen for this study was soft drinks. Not only are soft drinks relevant to most consumers, but they are also featured extensively in the schema congruity literature (e.g.,

Campbell & Goodstein, 2001; Meyers-Levy & Tybout, 1989; Noseworthy et al., 2014). For this study, I took the congruent and extremely incongruent manipulations from Noseworthy et al.'s (2014) web appendix (appendix C [top]), which notably, were the same stimuli used to confirm the autonomic and emotional underpinnings of the schema congruity effect. This gave me an operationalization and a methodological template to test for the compensatory acts that follow the autonomic responses elicited by extreme incongruity.

The stimulus for the compensation task consisted of a basket of strawberries. I used this stimulus because strawberries are grown in many locales, and thus are not associated with a particular country-of-origin. This setting allowed me to explore ethnocentric preference through products from regions consumers could identify with (Wall & Herlop, 1986).

2.7.1.3 Procedures

Participants were brought into a behavioral lab where a lab tech administered a pre-screening questionnaire under the guise that of screening for physical and psychological health. The true intent was to capture the geographical region participants best identified with. The geographical regions were kept broad (e.g., "South America"), as more focused piloting led to several people being uncategorized or unfamiliar with precise regions. Specifically, the regions were broken down into twenty-two categories, directly taken from the United Nation's official geo-scheme list (United Nations Statistics Division, 2018). This variable served as a cultural identification marker which would later be piped into the compensation task.

After completing the pre-screening, participants were informed that the study would be measuring their physiological response to different products using a galvanic skin response (GSR) system. During the rest of the session, participants' GSR was monitored using a constant

voltage system (iWorx Four Channel Computer Interface with Two Built-In Isolated Biopotential Amplifiers and LabScribe2 Data Recording Software; IX-214). Skin Conductance Responses (SCRs) were recorded using Ag/AgCl electrodes (A-GC-7165; 0.8-cm diameter) attached to the volar surface of the third digit of the left hand and absolute measures of skin conductance were recorded (a procedure followed by Noseworthy et al., 2014; Taylor, Liberzon, & Koeppel, 2000). An electrode paste (Johnson & Johnson K-Y gel) was placed on the electrodes in order to increase skin conductance. The SCRs were sampled at a rate of 1,000 per second. GSR was selected as the measure of arousal following evidence that SCRs are a particularly good measure of physiological arousal (Krahé et al., 2011; Noseworthy et al., 2014).

After beginning the SCR recording, participants were told that before beginning the study, the lab tech needed to calibrate this equipment, during which time participants were to put on noise cancellation headphones. Participants in the low arousal condition were exposed to Albinoni's *Adagio in G Minor* through the headphones, and further instructed to relax during this time. Participants in the control condition were not exposed to any sounds. The calibration task ran for exactly 3 minutes. A pretest ($N = 63$) was conducted to ensure that the relaxation manipulation indeed led to lower arousal levels, while not impacting participants' affective state. This was important to ensure, given that cognitive flexibility from positive affect can alter how people process extreme incongruity (Jhang et al., 2012). Participants in the pretest were administered the same low arousal (vs. control) manipulation as the main study, and responded to the *Affect Grid* scale (Russell, Weiss, & Mendelsohn, 1989)—a graphical scale that simultaneously assesses mood valence on a horizontal axis and felt arousal on a vertical axis (both anchored: 1 = *low*; 9 = *high*). The results confirmed that the low arousal and the control

condition induced similar feelings of pleasantness ($M_{\text{low-arousal}} = 3.06$ vs. $M_{\text{control}} = 2.87$, $p = .59$), but different feelings of arousal ($M_{\text{low-arousal}} = 2.00$ vs. $M_{\text{control}} = 2.94$; $t(61) = -3.24$, $p < .005$).

Afterwards, participants were informed that they would be evaluating a soft drink concept. The study commenced with an image of the congruent (extremely incongruent) soft drink, followed by a questionnaire which consisted of the same items discussed in study 1 (i.e., typicality, evaluations, resolution, state and trait anxiety). Participants were then immediately administered what was conveyed as a brief consumer taste profile. They were told that several different produce, some from the same product category, will flash one at a time, and they would simply list what they would be willing to pay for each product as if they were shopping at their local grocery store. Willingness to pay (WTP) was captured on a single open-ended item (Wertenbroch & Skiera, 2002). Embedded in the product array were two identical pictures of a basket of strawberries, one with the statement “Grown in [piped in cultural-identification marker]!” and the other with “Grown in [piped in random non-cultural identification marker]!” These stimuli were presented in a counterbalanced order.

Skin conductance responses (SCRs) were sampled for the duration of the task. The key comparison was the 1 to 5 second window following the moment at which participants were exposed to the first basket of strawberries, which either did or did not correspond to participants’ cultural origin. Consistent with prior work (Noseworthy et al., 2014), the goal was to measure participants’ physiological reactions immediately following the onset of the stimulus (see Appendix C for a schematic representation of the procedures). Counterbalancing of the compensation task served two purposes. First, it allowed me to explore whether compensation indeed dampens the physical tension elicited by extreme incongruity. If true, then the results should show physiological arousal diminish immediately after someone is permitted to

compensate (i.e., if the basket of strawberries corresponds to their cultural origin) than otherwise (i.e., if the basket of strawberries does not correspond to their cultural origin). Second, counterbalancing allowed the current study to rule out temporal effects by testing whether physiological arousal is naturally diminishing, or diminishing only when someone can cope by compensating.

2.7.2 Results

2.7.2.1 Manipulation Checks—Product Congruity

Two-way ANOVAs confirmed that the extremely incongruent soft drink was perceived less typical ($\alpha = .85$; $M_{ext.inc.} = 2.77$ vs. $M_{cong.} = 5.69$; $F(1, 196) = 1482.11$, $p < .001$), and was less likely to be resolved (ratings: $r = .67$; $M_{ext.inc.} = 3.11$ vs. $M_{cong.} = 5.40$; $F(1, 196) = 209.84$, $p < .001$; coded responses: $M_{ext.inc.} = -.11$ vs. $M_{cong.} = .38$; $F(1, 196) = 19.00$, $p < .001$), than the congruent soft drink. No other effects were significant ($ps > .18$). Thus, consistent with prior work (Noseworthy et al., 2014), aroused state did not influence perceived typicality or resolution.

2.7.2.2 Product Evaluations

A two-way ANOVA on product evaluations ($\alpha = .92$) yielded a significant main effect of aroused state, such that participants liked the product more in the low arousal condition ($M = 3.61$) than in the control ($M = 3.26$; $F(1, 196) = 4.84$, $p < .05$). The main effect of product congruity was not significant ($p = .59$). The analysis also revealed a significant product congruity \times aroused state interaction ($F(1, 196) = 11.56$, $p < .001$). As illustrated in Table 3, participants in

the control condition liked the congruent soft drink ($M = 3.57$) more than the extremely incongruent soft drink ($M = 2.96$; $F(1, 196) = 7.79, p < .01$). However, participants in the low arousal condition liked the extremely incongruent soft drink ($M = 3.83$) more than the congruent soft drink ($M = 3.39$; $F(1, 196) = 4.08, p < .05$). Another way to look at this is that, consistent with prior work (Noseworthy et al., 2014), relaxation elevated evaluations for the extremely incongruent product ($M_{\text{low arousal}} = 3.83$ vs. $M_{\text{control}} = 2.96$; $F(1, 196) = 15.69, p < .001$), but not the congruent product ($p = .40$).

Table 3: Means, Standard Deviations and Cell Sizes for Study 3

	Low Arousal (Relaxed)		Moderate Arousal (Control)	
	Congruent	Extremely Incongruent	Congruent	Extremely Incongruent
Typicality	5.65 (.66)	2.20 (.69)	5.73 (.52)	2.37 (.72)
Resolution	5.47 (.68)	3.22 (1.69)	5.32 (.61)	2.99 (1.14)
Evaluations	3.39 (1.12)	3.83 (.93)	3.57 (.98)	2.96 (1.36)
State Anxiety ^{††}	2.04 (.47)	2.16 (.60)	2.13 (.55)	2.62 (.91)
SCRs Pre-Compensation	1.02 (1.36)	1.24 (1.01)	1.39 (1.00)	2.26 (1.49)
SCRs Post-Compensation	1.09 (1.05)	1.60 (.83)	1.50 (1.05)	1.60 (.57)
<i>Coding for Resolution</i> ^{**}	.34 (.75) 16%	-.08 (.85) 40%	.42 (.67) 10%	-.14 (.83) 42%
Ethnocentric Preference [†]	.18 (2.19)	.02 (1.27)	.25 (1.56)	1.20 (2.66)
Cell Size	50	50	50	50

Note: Standard deviations are reported in parentheses; ** = percent of *unsuccessful* resolution (-1); † = calculated as the difference in willingness-to-pay for the domestic versus international version of the same basket of strawberries; †† = means with adjusted covariate for trait anxiety ($M = 2.31$).

2.7.2.3 State Anxiety

Controlling for trait anxiety ($F(1, 195) = 5.65, p < .05$), a two-way ANCOVA on state anxiety ($\alpha = .90$) yielded a main effect of aroused state, such that participants were less anxious

in the low arousal condition ($M = 2.10$) than in the control ($M = 2.37$; $F(1, 195) = 10.90, p < .005$). There was also a main effect of product congruity, such that participants were more anxious after seeing the extremely incongruent soft drink ($M = 2.39$) than the congruent soft drink ($M = 2.08$; $F(1, 195) = 12.12, p < .005$). These effects were qualified by a significant product congruity \times aroused state interaction ($F(1, 195) = 4.18, p < .05$). Specifically, participants in the control condition were more anxious after seeing the extremely incongruent soft drink ($M = 2.62$) than the congruent soft drink ($M = 2.13$; $F(1, 195) = 15.26, p < .001$). This effect did not emerge in the low arousal condition ($M_{\text{ext.inc}} = 2.16$ vs. $M_{\text{cong}} = 2.04, p = .31$). Thus, relaxation dampened anxiety elicited by extreme incongruity by bringing it down to levels consistent with the congruent condition, as expected.

2.7.2.4 Compensation Test—Ethnocentric Preference

The anxiety and evaluation results aligned with the prior studies, and putting participants in a low aroused state altered these effects in a predictable way. I then focused on what this means beyond the focal product. The prediction was that dampening the severity of the autonomic response to product incongruity would inhibit compensation. Compensation was tested through ethnocentric preference, calculated by taking the average difference in WTP between the national and international versions of the same basket of strawberries. Thus, a positive number would indicate stronger ethnocentric preference, whereas a negative number would indicate stronger international preference.

A two-way ANOVA revealed a main effect of arousal, such that the low arousal condition dampened ethnocentric preference ($M = \$.11$) relative to the control condition ($M = \$.73$; $F(1, 196) = 4.86, p < .05$). The main effect of product congruity was not significant ($p = .16$). The

analysis also yielded a significant interaction ($F(1, 196) = 3.92, p < .05$). Although most participants were willing to pay more for the culturally consistent versions (denoted by positive means), the nature of the interaction came down to a single cell, which related directly to the core prediction. Specifically, participants in the control condition expressed greater ethnocentric preference after evaluating the extremely incongruent soft drink ($M = \$1.20$) than the congruent soft drink ($M = \$.25; F(1, 196) = 5.72, p < .05$). As predicted, putting consumers in a relaxed state eliminated this effect ($M_{\text{ext.inc}} = \$0.02$ vs. $M_{\text{cong}} = \$0.18, p = .68$). In fact, the only condition to positively differ from \$0 was the extremely incongruent control ($M = \$1.20; t(49) = 3.20, p < .005$; all other cells' $ps > .26$). Thus, putting participants in a relaxed state reduced compensatory preference in a predictable manner.

2.7.2.5 Mediated Moderation

To explore whether anxiety accounted for the observed variations in ethnocentric preference, I tested for mediated moderation (Hayes, 2012; Model 8; bootstrapped with 10,000 draws). Of notable distinction from study 2 is that this model incorporates a moderating effect of the mechanism (i.e. an “a” path moderator). As predicted, there was a conditional indirect effect of product congruity (1 = Extremely Incongruent) through state anxiety on ethnocentric preference (95% CI: .002; .37). Specifically, state anxiety explained why ethnocentric preference was elevated following the evaluation of the extremely incongruent soft drink in the control condition (95% CI: .03; .44), but not in the low arousal condition (95% CI: $-.02$; .16). As predicted, low arousal alleviated anxiety and subsequently dampened ethnocentric preference.

2.7.2.6 Physiological Arousal

The final goal was to answer the elusive question of whether compensation truly is a means by which a person can immediately regulate the intensity of the emotional response to extreme incongruity. To explore this, I used the counterbalance of the compensation task as a between-subjects condition and added it to the model. This allowed me to isolate whether physiological arousal varied when participants were able to compensate at t_1 (time point 1) in the taste profile task—in essence, whether the first exposure to the basket of strawberries was the one that corresponded to participants' cultural origin.

A three-way ANOVA on participants' SCRs yielded a significant main effect of aroused state, such that participants were less aroused in the low arousal condition ($M = 1.24$) than in the control ($M = 1.69$; $F(1, 196) = 8.55, p < .005$). This confirmed that the manipulation of arousal held for the duration of the task. There was also a main effect of product congruity, such that participants were more aroused after seeing the extremely incongruent soft drink ($M = 1.69$) than after seeing the congruent soft drink ($M = 1.25$; $F(1, 196) = 7.58, p < .01$). This is consistent with evidence of a direct physiological consequence to extreme incongruity (Noseworthy et al., 2014). These two effects were qualified by a marginally significant three-way interaction ($F(1, 196) = 2.97, p = .086$). The only significant simple effect was in the extremely incongruent control. As predicted, participants were less aroused immediately following t_1 when they could affirm ethnocentric preference ($M = 1.60$) than when they could not ($M = 2.26$; $F(1, 196) = 4.59, p < .05$). This did not occur in the low arousal condition ($M_{no-affirmation} = 1.24$ vs. $M_{affirmation} = 1.60, p = .24$). No other effects were significant ($ps > .73$). These results suggest that the diminishing SCRs when participants affirmed ethnocentric preference could not be the result of a natural decrease in aroused state over time, given that the conditions were counterbalanced. Thus, the

results confirmed that compensation had a dampening effect that was similar to that elicited by relaxation. This represent some of the first empirical evidence that compensation combats a heightened physiological response, which corresponds with anxiety.

2.7.3 Discussion

In further support of the core prediction, the instance of extreme product incongruity coincided with greater willingness to pay for a basket of strawberries from the consumers' self-identified cultural region (H1 and H2). Furthermore, relaxation inhibited compensatory preference in a predictable way by reducing state anxiety. Thus, building on study 2, I tested for the mechanism using direct moderation. Critically, the results also revealed that extreme incongruity elevates actual physiological arousal, and that this is immediately dampened after participants compensate in an unrelated domain. This represent some of the first definitive evidence that compensation indeed serves as a true coping mechanism for expectancy violations.

2.8 Study 4

One of the most important insights gleaned from study 3 was that compensation dampens the arousal intensity elicited by extreme incongruity. Importantly, arousal-induced anxiety is the driving factor for why evaluations of extremely incongruent products tend to be negative (Noseworthy et al., 2014). This raises the possibility that if a consumer can compensate prior to explicitly evaluating an extremely incongruent product, such a judgment may not be as negative as it would be otherwise (H3), as compensating in unrelated domains would alleviate the tension. The previous studies do not reflect this possibility, as I have exclusively collected product

evaluations and anxiety ratings before consumers compensated. In study 4, I thus sought to come full circle and bring the lens back to what compensation may mean for product evaluations.

2.8.1 Method

One hundred and ninety university students (49% females; $M_{\text{age}} = 21.9$) participated in the study in return for partial course credit. Participants were randomly assigned to one of four conditions in a 2 (product congruity: congruent vs. extremely incongruent) \times 2 (compensation: pre vs. post-evaluation) between-subjects factorial design. The study used the compensation task from study 2 (green consumption) to explore the implications of the core finding observed in study 3 (dampened arousal intensity) on product evaluations.

The product category chosen for this study was smartphones because smartphones are relevant to consumers, and there is strong prototypicality within the category in that the standard design of a smartphone (a black box) has varied little over time. This afforded the opportunity to develop an extremely incongruent product design that violates this prototype. As with prior studies, a pilot test confirmed the three-level operationalization of product congruity. I then adapted the two levels that were the focus of the hypotheses (Appendix D).

Participants were informed that they were going to examine a new smartphone. The questionnaire consisted of the same evaluation, typicality, anxiety (state and trait), and resolution measures used in prior studies. The compensation task followed the procedures outlined in study 2. Specifically, participants learned that in addition to examining a new smartphone, I sought to develop a general consumption profile. In reality, this served as the compensation task, wherein participants were asked their preference for three products with environmentally friendly attributes (Griskevicius et al., 2010). The compensation task was administered after participants

viewed the smartphone, but either before or after participants filled out the questionnaire about the smartphone. Specifically, in the post-evaluation condition, participants were administered the compensation task after viewing and providing their opinions on the smartphone (in line with prior studies). In contrast, and of specific interest to the current study, participants in the pre-evaluation condition were administered the compensation task after viewing, but before explicitly providing their opinions on, the smartphone.⁴ The session concluded with basic demographic questions.

2.8.2 Results

2.8.2.1 Manipulation Checks—Product Congruity

Two-way ANOVAs confirmed that the extremely incongruent smartphone was indeed perceived as less typical ($\alpha = .87$; $M_{ext.inc.} = 2.66$ vs. $M_{cong.} = 5.39$; $F(1, 186) = 174.78, p < .001$), and was less likely to be resolved (ratings: $r = .72$; $M_{ext.inc.} = 3.49$ vs. $M_{cong.} = 4.85$; $F(1, 186) = 42.81, p < .001$; coded responses: $M_{ext.inc.} = -.43$ vs. $M_{cong.} = .54, F(1, 186) = 78.31, p < .001$), than the congruent smartphone. No other effects were significant (all $ps > .15$). Thus, as expected, compensation task did not influence perceived typicality or the resolution process.

2.8.2.2 Compensation Test—Preference for “Green” Products

A two-way ANOVA on green preference yielded a main effect of product congruity, such that participants preferred the green product more after viewing the extremely incongruent phone

⁴ To ensure I was not inadvertently tapping temporal effects leading to differences in evaluations, this design was piloted using the pilot test products from study 2, which were not linked to compensation. The results showed evaluations for extreme incongruity did not alter by whether they were captured pre/post a standard preference task (see details in Appendix D).

($M = 6.24$) than the congruent phone ($M = 5.67$; $F(1, 186) = 4.81, p < .05$). No other effects were significant ($ps > .52$). Thus, regardless of when the compensation task took place, extreme incongruity elevated green preference. The critical question was, unlike study 2, whether the compensation task had a meaningful impact on consumers' product evaluations and state anxiety.

2.8.2.3 Product Evaluations

A two-way ANOVA on product evaluations ($\alpha = .95$) yielded a main effect of product congruity, such that participants liked the extremely incongruent phone less ($M = 3.96$) than the congruent phone ($M = 4.51$; $F(1, 186) = 13.11, p < .001$). The main effect of compensation was not significant ($p = .46$). The analysis also yielded a significant interaction ($F(1, 186) = 6.76, p < .05$). As illustrated in Table 4, and consistent with previous studies, participants who conveyed their evaluations before they compensated liked the extremely incongruent phone far less ($M = 3.59$) than the congruent phone ($M = 4.71$; $F(1, 186) = 13.11, p < .001$). This effect was eliminated when evaluations were captured after compensation ($M_{\text{ext.inc.}} = 4.31$ vs. $M_{\text{cong.}} = 4.30, p = .99$). Another way to look at this is that compensation task elevated the evaluations for the extremely incongruent phone ($M_{\text{pre-eval.}} = 4.31$ vs. $M_{\text{post-eval.}} = 3.59$; $F(1, 185) = 5.65, p < .05$), but not the congruent phone ($p = .20$).

Table 4: Means, Standard Deviations, and Cell Sizes for Study 4

	Post-Evaluation (Compensation after Evaluations)		Pre-Evaluation (Compensation before Evaluations)	
	Congruent	Extremely Incongruent	Congruent	Extremely Incongruent
Typicality	5.53 (1.30)	2.50 (1.49)	5.24 (1.26)	2.81 (1.60)
Resolution	5.01 (1.51)	3.37 (1.55)	4.69 (1.36)	3.42 (1.68)
Evaluations	4.71 (1.41)	3.59 (1.64)	4.30 (1.31)	4.31 (1.59)
State Anxiety ^{††}	1.66 (.48)	2.06 (.72)	1.80 (.55)	1.77 (.55)
<i>Coding for Resolution</i> ^{**}	.61 (.65) 8.7%	-.36 (.87) 61.7%	.48 (.77) 16.7%	-.49 (.71) 61.2%
Green Preference [†]	5.80 (2.02)	6.28 (1.66)	5.54 (1.91)	6.21 (1.56)
Cell Size	46	47	48	49

Note: Standard deviations are reported in parentheses; ** = percent of *unsuccessful* resolution (-1); † = preference of three environmentally friendly items combined into green preference composite; †† = means with adjusted covariate for trait anxiety ($M = 2.16$).

2.8.2.4 State Anxiety

Controlling for trait anxiety ($F(1, 185) = 33.51, p < .001$), an ANCOVA on state anxiety ($\alpha = .87$) yielded a significant main effect of product congruity, such that participants were more anxious after viewing the extremely incongruent phone ($M = 1.91$) than the congruent phone ($M = 1.76; F(1, 185) = 5.66, p < .05$). The main effect of compensation was not significant ($p = .33$). There was also a significant interaction ($F(1, 185) = 7.67, p < .01$). Specifically, before compensating, participants were more anxious upon viewing the extremely incongruent phone ($M = 2.06$) than the congruent phone ($M = 1.66; F(1, 185) = 13.01, p < .001$). Consistent with the results of study 3, this effect disappeared after compensation ($M_{\text{ext.inc.}} = 1.77$ vs. $M_{\text{cong.}} = 1.80, p = .78$). Another way to look at this is that, compensation reduced anxiety for participants exposed

to extremely incongruent phone ($M_{\text{pre-eval.}} = 1.77$ vs. $M_{\text{post-eval.}} = 2.06$; $F(1, 185) = 7.16$, $p < .01$), but not the congruent phone ($p = .21$).

2.8.2.5 Mediated Moderation

To determine whether state anxiety accounted for variations in product evaluations, I conducted a mediated moderation analysis (Model 8; Hayes, 2012; bootstrapped 10,000 draws). As predicted, there was a conditional indirect effect of product congruity (coded: 1 = Extremely Incongruent) on evaluations through anxiety (95% CI: .04, .56). Specifically, and replicating prior research (Noseworthy et al., 2014), state anxiety explained why evaluations of extremely incongruent phone suffered in the post-evaluation condition (95% CI: $-.49$, $-.05$). Critically, this pattern was eliminated for participants who could compensate before they explicitly provided their evaluations (95% CI: $-.11$, $.15$).

2.8.3 Discussion

Study 4 confirmed that because the unfavorable evaluations received by extreme incongruity is the result of arousal-induced anxiety (Noseworthy et al., 2014), and because compensation can alleviate this tension (study 3), if consumers can compensate after viewing extremely incongruent products, their evaluations may not be as negative as they would be otherwise (H3). Importantly, the compensation task altered neither the perceived typicality nor resolution, but nevertheless ameliorated evaluations by dampening the anxiety elicited by extreme incongruity. Thus, in bringing the investigation full circle, study 4 illustrated that by compensating in unrelated domains, consumers can become more open to extreme incongruity.

2.9 General Discussion

Evidence from four studies suggests that extremely incongruent products, which are inherently difficult to make sense of, can lead consumers to compensate by affirming other aspects of consumption, such as brand dominance (study 1), green consumption (studies 2-4), and ethnocentric preference (study 3). Importantly, I confirm that these effects are the result of arousal-induced anxiety. Specifically, all studies showed that anxiety mediates compensatory preference. Furthermore, study 2 illustrated that by allowing consumers to consciously attribute their tension to a salient source, I was able to attenuate compensatory preference. Further still, study 3 confirmed that compensatory preference did not occur when consumers were put in a relaxed state to begin with. This same study extracted actual physiological readings to show that the moment of compensation corresponds with an immediate reduction in arousal intensity. This represents some of the most conclusive evidence that compensation operates as a form of coping. Study 4 brought the inquiry full circle by documenting that because compensation dampens the tension elicited by extreme incongruity, having consumers compensate in unrelated domains can alleviate the negative response to extremely incongruent products.

From a theoretical perspective, this work contributes to the schema congruity literature by demonstrating that, in addition to the traditional predictions of *assimilation* and *accommodation* (Mandler, 1982), consumers can employ *fluid compensation* as a means of alleviating the tension that originates from schematic violations. This finding supports the notion that consumption schemas are functionally interchangeable in alleviating anxiety, such that the inability to resolve an inconsistency in one belief structure can be satiated by affirming another belief structure. Furthermore, the current work contributes to the fluid compensation literature by providing the

first empirical evidence that compensation indeed alleviates the physiological response elicited by an expectancy violation. Building on this, this work also shows that allowing consumers to compensate in unrelated domains may ameliorate the negative response to extreme incongruity. Thus, this work highlights how the literature on schema congruity may be narrowing itself by focusing solely on resolving the product within its respective schema. Rather than change or update a product schema, consumers can affirm other meaningful aspects of consumption.

From a managerial perspective, this work lends important insights for marketers. Past research has noted that extreme incongruity results in a product being irreconcilable within its broader category (Noseworthy & Trudel, 2011), which tends to make evaluations suffer (Meyers-Levy & Tybout, 1989). Thus, it is not surprising that marketers often caution against the introduction of radical innovation in the marketplace (Cornescu & Adam, 2013). The current work offers an alternate point of view by suggesting that consumers may quite adept at resolving the tension that originates from extreme incongruity through other consumption practices, and that this may even result in positive outcomes for companies that operate in completely unrelated categories. Notable beneficiaries of extreme product innovations covered in this work ranges from category dominant brands, to culturally relevant products, and to environmentally friendly items. The last point has important implications for public policy makers, as it suggests that the strategic use of extreme incongruity may indirectly have a positive impact on society.

Future research can benefit from investigating just how unrelated a belief system needs to be for compensatory acts to kick in. For instance, could a category dominant brand benefit from an extremely incongruent product introduced within its own category? Indeed, although the current essay explored compensatory acts in product categories that were unrelated to extreme incongruity, there is the possibility that extremely incongruent products may elevate consumers'

preference of objects that can alleviate the tension within the same product category. This possibility was explored in two follow-up studies, which suggested that this may indeed be the case. Specifically, the follow-up studies showed that consumers may become more likely to choose the dominant brand of a category (e.g., Kleenex in the facial tissue category) after seeing an extremely incongruent product from the same category (i.e., a black facial tissue). Similar findings were obtained in a second follow-up study, which used a different product category (smartphones) and a different dominant brand (Apple). Given these promising initial results, future work may systematically explore how dominant brands can benefit from the introduction of extremely incongruent products in their category. Examining this possibility would reveal the true boundaries of fluid compensation, while affording unique managerial insights. Furthermore, future work can expand on these implications in relation to recent research, which has shown that radical innovations in a product category are more likely to impact the schematic representations of the category when introduced by the dominant brand (Bagga, Noseworthy, & Dawar, 2016). Certainly, more research is needed in this area.

Chapter 3

Animate Motion Elevates the Preference of Personal Safety Products

3.1 Abstract

Animate motion refers to the perceived ability of objects to move in a self-propelled way. It has long been theorized that animate motion is associated with potential threats in the vicinity. However, despite the increasingly common use of animate motion in marketing communication elements such as the brand logo, researchers have yet to explore whether animate motion may be harnessed by marketers to shape consumption preferences. In exploring this, I build on the growing body of work in visual design, which suggests that visual elements of a logo can shape preferences through the symbolic meanings they embody. Three studies show that incorporating animate motion in the visual design of a brand logo generates the inference of unsafe conditions in the broad environment. This inference subsequently elevates the preference for personal safety products, including products that cater to physical security (study 1), cyber security (study 2), and the security of important resources (study 3). These studies isolate the causal role of the inference of unsafe conditions using moderation tasks. Furthermore, they lend important insights into the physiological responses that give rise to the inference of unsafe conditions. Taken together, I document that animate motion can generate the inference of unsafe conditions in the broad environment, which serves to elevate consumer preference for personal safety products.

3.2 Introduction

Throughout history, inanimate objects that appeared animate have had the ability to arouse the imagination, and incite fear. The fundamental divide between inanimate and animate entities being the capacity of self-propulsion (Aristotle, 2000), much of this fear originated from objects that seemingly moved on their own volition. In primitive societies, people were often frightened by trees that swayed, or the moon that moved in the skyline through the night—a reaction considered to be the origins of the deification of natural phenomena (Tylor, 1871). A critical observation is that the fear elicited by animate motion is not specific to our ancestral past, but persists across many species (Darwin, 1871; Vignoli, 1882). This led researchers to argue that animate motion, in the absence of the ability to identify whether object is a friend or foe, is rapidly interpreted as the existence of a potential threat to personal safety (Darwin, 1871).

For companies, motion is a critical visual design component of marketing communication elements, such as the brand logo. Knowing that the consumer interest in dynamic media is surging (Kim & Lakhshmanan, 2015), companies are spending a great deal of time and money to transform the static visual elements of their marketing communications into dynamic entities. The importance of motion in visual design is acknowledged by the United States and European laws, which allow companies to trademark the motion cues they use to animate their brand logos. A recent example is Toshiba, the first recipient of the European Union trademark for motion marks, which registered the animate motion of several triangles seemingly expanding and multiplying on their own around the static ‘Toshiba’ logo (Karanam, 2019). Despite the growing interest in motion in visual design, and despite the increasing use of animate motion in relation to inanimate marketing communication elements such as the brand logo, researchers have yet to systematically explore how animate motion can be harnessed by marketers to shape consumption preferences.

The growing body of work in visual design suggests that well-crafted brand logo design can be used to shape preferences, often through the symbolic meanings embodied by its design elements (Fajardo et al., 2016; Jiang et al., 2016; Henderson & Cote, 1998; Luffarelli et al., 2019, Rahinel & Nelson, 2016). Symbolic meanings convey important information to consumers, such as the brand identity (Luffarelli et al., 2019), the attributes of a product (Jiang et al., 2016), or—as is most relevant to inferences regarding personal safety—the conditions of one’s environment (cf., Fajardo et al., 2016; Rahinel & Nelson, 2016). For example, the simple act of adding a frame around a brand logo can lead consumers to generate the inference of being protected from potential risks, because frames hold the symbolic meaning of adding boundaries between the self and others (Fajardo et al., 2016). Thus, if animate motion is associated with threats to personal safety, incorporating animate motion cues in the visual design of a brand logo may have critical consequences for consumption preferences. Specifically, the current essay explores the possibility that incorporating animate (vs. inanimate) motion in the visual design of a brand logo elevates the perceived unsafety of the broad environment, which subsequently increases consumer preference for personal safety products.

In testing this possibility, the current essay makes important advances. First, I add to the marketing literature on motion as a visual design cue. Despite the common focus on motion as a low-level perceptual cue that captures attention (Cian, Krishna, & Elder, 2014; Simola, Kuisma, & Öörni et al., 2011; Yoo & Kim, 2005), the current essay shows that motion can be broadly categorized as animate and inanimate, and illustrates that using animate motion can have implications on consumption preferences by producing higher-level inferences about the conditions of one’s environment. Second, the current essay adds to the literature on animate motion by establishing a consumption-relevant downstream consequence of animate (vs.

inanimate) motion. Although the link between animate motion and inferences of safety has been a point of discussion for over a century (e.g., Darwin, 1871, Tylor, 1871, Vignoli, 1882), researchers have often focused on cognitive and emotional reactions associated with animate motion (e.g., Leding, 2018; 2019; 2020). The current work advances this stream of research by illustrating that because animate motion creates the inference of unsafe conditions, it can impact subsequent consumption preferences in predictable ways.

3.3 Conceptual Development

The link between animate motion and inferences of personal safety has been a point of inquiry for over a century, spanning areas including anthropology (Bird-David, 1999; Stringer, 1999; Hayward, 1997; Tylor, 1871; Papapetros, 2012), art (Gell, 1998), animal psychology (Greggor, McIvor, Clayton, & Thornton, 2018; Vignoli, 1882), and, more recently, social psychology (Leding, 2018; 2019; 2020). However, researchers in marketing have yet to consider the consumption-relevant consequences of animate motion.

Following extant work, I define animate motion as movement patterns that give the impression of self-propulsion (Di Giorgio et al., 2017; Rakison, 2006). In nature, only animate entities have the ability move in a self-propelled way, whereas inanimate objects move due to external sources of energy (Tremoulet & Feldman, 2000). This fundamental divide is represented in the human mind through primitive image schemas (Mandler, 1992), which consist of abstract images depicting the way in which objects tend to move. This innate knowledge allows people to rapidly discern animate motion, even when it originates from two-dimensional geometric shapes (Heider & Simmel, 1944; Michotte, 1946, Tremoulet & Feldman, 2000).

3.3.1 Animate Motion as a Non-Conscious Threat Cue

The study of animate motion originated with research on animals' reactions towards objects that seemingly moved on their own accord. In writing his observations of his own pets, Darwin (1871) noted that although animals were often indifferent to inanimate objects, they tended to show defensive proclivities (e.g., fiercely growling, barking) when these objects were seemingly endowed with agentic movement (e.g., when a parasol moves due to unobservable patterns of the wind). Darwin (1871) reasoned that animals may be inferring a potential threat to their safety when they saw animate movement. Following this observation, Tito Vignoli (1882) set up a series of experiments in which he explored animals' reaction to unfamiliar objects inserted into their cages. Vignoli (1882) observed that although animals tended to be calm upon seeing the object adopt inanimate movement, they would express violent gestures, shrieks, and other defensive signs when the object incorporated animate motion. Ethnographic work of the same era similarly finds that primitive societies often perceived lifelike movement in trees that swayed, eliciting defensive reactions (Tylor, 1871). These findings led researchers to argue that animate movement may be activating threat inferences in animals as well as humans (e.g., Warburg, 1923). This assertion falls in line with classic work on animals' fight-or-flight instincts, which suggests that for any species, securing personal safety is biologically more urgent than either reproduction or finding nutrition (e.g., Hediger, 1955). In this regard, preparedness for a potential threat may be considered the most adaptive response to the perception of animate movement.

Recent work expanded on the adaptive relevance of animate movement in humans (e.g., Caramazza & Shelton, 1998; Mahon & Caramazza, 2009; Schultz, Friston, O'Doherty, Wolpert & Frith, 2005). For example, researchers have shown that human newborns can distinguish

abstract geometric shapes based on whether they adopt animate or inanimate movement (e.g., Di Giorgio, Lunghi, Simion, & Vallortigara, 2017), suggesting that the knowledge of animate movement may exist in all humans at birth as part of primitive mental schemas. Similarly, research finds that animate motion judgments for abstract shapes are observable across diverse cultures, presenting themselves in nonindustrial societies with minimal exposure to television, computer, and other sources of artificial motion stimuli (Barrett, Todd, Miller, & Blythe, 2005). These findings fall in line with the intuition that the knowledge of animate motion may have its roots in the evolutionary process. Furthermore, recent neurological research shows that the perception of animate, but not inanimate, motion activates the amygdala and periaqueductal gray, also known as the acute threat circuitry, the structure involved in “fight-or-flight” responses (Coker-Appiah, White, & Clanton et al., 2013).

Despite the growing body of research on animate motion, the common research focus has been on what the adaptive relevance of animate motion means for the object in question. This research has shown that objects that are endowed with animate motion can automatically attract attention (Altman, Khislavsky, Coverdale, & Gilger, 2016; Lindemann, Nuku, Rueschemeyer, & Bekkering, 2011; Meyerhoff, Huff, & Schwan, 2013), enjoy spatial memory advantages (van Burren & Scholl, 2017), and correlate with threat perceptions (e.g., Leding, 2018; 2019; 2020). Researchers have yet to establish that there may be more to animate motion than what it means for the object in question. The insights into how animate motion may have implications that go beyond the object, and how marketers can use animate motion to impact consumption preferences, comes from a distinct line of research on visual design.

3.3.2 Visual Design and Symbolic Meanings

When it comes to shaping consumption preferences, one of the strongest tools at a marketer's disposal is visual design. Visual design refers to aesthetic features, such as colors, forms, and motion patterns, which are primarily applied to marketing communication elements, such as the brand logo (Fajardo et al., 2016; Jiang et al., 2016; Henderson & Cote, 1998; Luffarelli et al., 2019, Rahinel & Nelson, 2016), or the product packaging (Deng & Kahn, 2009, Sundar & Noseworthy, 2014). Well-crafted visual design can allow marketers to convey valuable information to consumers, often through the symbolic meanings embodied by design elements (Fajardo et al., 2016; Jiang et al., 2016). Meaning, in this context, refers to the connotations people derive from the physical stimuli that the design element emulates (e.g., the color red as an abstract representation of danger; Mandel & Johnson, 2002). Symbolic meanings can subsequently trigger inferences regarding elements of the context in which the design is viewed. Researchers have shown that visual elements can produce inferences even when consumers are not consciously aware of the symbolic meaning (Meert, Pandelare, & Patrick, 2014). For example, Meert and colleagues (2014) have shown that design elements that emulate evolutionarily relevant resources can trigger inferences regarding the product they are attached to, without consumers being consciously aware of the source of the inference. This view holds that consumers viewing animate motion in a marketing element, such as the brand logo, may use the innate meaning associated with this motion to make inferences that go beyond the object.

The above example relates to a critical aspect of higher-level inferential processes, which is that the inference derived from a visual element tends to be applied to the aspect of the context most relevant to the inference (Crolic, Zheng, Hoegg, & Alba, 2019; Jiang et al., 2016). Because animate motion implies the existence of potential threats in the vicinity, this suggests the possibility that animate motion may engender the inference of unsafe conditions in one's

environment. This proposition is consistent with evidence from evolutionary psychology, which suggests that being exposed to evolutionarily threatening stimuli tends to impact subsequent consumption preferences by sensitizing consumers to potential dangers that may exist in their environment (Maner, Kenrick, & Becker et al., 2005; Griskevicius & Kenrick, 2013). Further to this point, research in visual design similarly suggests that objects that imply potential dangers, such as objects that violate laws of physics, may create inferences regarding the conditions of one's environment (Rahinel & Nelson, 2016). Collectively, these findings point to the possibility that the adaptive relevance of animate motion may be harnessed by marketers to impact perceptions about the circumstances of the broad environment, which may subsequently shape preference.

3.3.3 Hypotheses

To recap, extant work on animate motion posits that objects that appear to move in a self-propelled way are associated with potential threats to personal safety (Coker-Apiah et al., 2013; Darwin, 1871; Vignoli, 1882). Furthermore, research on visual design suggests that design elements can carry symbolic meanings (e.g., Meert et al., 2014), which subsequently trigger inferential processes that are used to inform preferences regarding the product or the brand (Fajardo et al., 2016; Jiang et al., 2016; Henderson & Cote, 1998; Luffarelli et al., 2019; Rahinel & Nelson, 2016). However, it is not that people only generate inferences that relate to the product or brand, but that they just tend to do so when the inference is diagnostic to these elements (Crolic et al., 2019; Rahinel & Nelson, 2016). In the case of inferences regarding a lack of personal safety, the most salient target of the inference tends to be the broad environment (cf., Griskevicius & Kenrick, 2013). If animate motion indeed alters the perceived safety of one's

broad environment, this would inform consumption preferences in predictable ways. Specifically, when people perceive their broad environment to be unsafe, they become more amenable to products that can protect them, and their valuable resources, from negative events (Griskevicius & Kenrick, 2013)—what I refer to as *personal safety products*. Thus, it is my contention that animate motion will elevate consumer preference of personal safety products by generating the inference of unsafe conditions in their broad environment. Stated formally,

H1: Consumers will prefer personal safety products more after viewing animate, as opposed to inanimate, motion cues.

H2: The effect of animate motion on preference is mediated by the inference of unsafe conditions, such that viewing animate (vs. inanimate) motion elevates the perceived unsafety of the broad environment, which, in turn, enhances the preference of personal safety products.

My next step was to solidify the role that the inference of unsafe conditions elicited by animate motion plays on the preference of personal safety products. Although the inference of unsafe conditions should broadly encourage flight to safety, there is reason to believe that the strength of this relationship will be modulated by how people non-consciously interpret potential dangers in their environment. Specifically, evidence suggests that the interpretation of potential dangers as avoidable (vs. inevitable) allows consumers to engage in behaviours that can help eliminate potential negative outcomes (Meijen, Jones, McCarthy, Sheffield, & Allen, 2013; Stapinsky, Abbot, & Rapee, 2010; Pervin, 1963). To this end, one of the strongest predictors of

the way in which people interpret dangers relates to trait anxiety (Mathews & Mackintosh, 1998). Research shows that higher levels of trait anxiety corresponds with an adverse interpretation of potential dangers which connotes that threats are inevitable, whereas lower levels of trait anxiety tend to correspond with a more tempered interpretation which connotes that threats can be avoided (Boster & Mongeau, 1984; Hale & Dillard, 1993; Hale, Mongeau, & Lemieux, 1993; Janis & Feshbach, 1954; Mongeau, & Lemieux, 1993). Thus, if animate motion engenders the inference of unsafe conditions in the broad environment by conveying potential threats, then trait anxiety should modulate the extent to which the inference of unsafe conditions elevates the preference for personal safety products. Stated formally,

H3: Trait anxiety will moderate the impact of the unsafe conditions inference on preference, such that lower levels of trait anxiety will correspond with a greater impact of the inference of unsafe conditions elicited by animate motion on the preference of personal safety products.

Up to this point, my hypotheses focused on the link between the inference produced by animate motion and consumption preferences. However, there is an established finding in evolutionary psychology that may lend important insights into the link between animate motion and the inference of unsafe conditions. Specifically, extant work suggests that being exposed to evolutionary threats heightens autonomic physiological arousal, which is followed by a cascade of cognitive and emotional responses geared towards solving the ultimate problem (Esteves, Dimberg, & Ohman, 1994; Griskevicius et al., 2009; Griskevicius & Kenrick, 2013). Researchers have shown that this can occur outside of conscious awareness. For example,

Esteves and colleagues (1994) have shown that images of threatening stimuli tend to increase autonomic skin conductance responses (SCRs), even when rendered invisible by masking.

The importance of understanding the implications of this finding comes from related work on physiological arousal and attributional processes. This work shows that bringing the physiological arousal that originates from threats into conscious awareness, and having people attribute the source of this tension to salient objects, can have deleterious effects on the inferences produced by the stimulus (e.g., Noseworthy et al., 2014). Thus, if the inference of unsafe conditions produced by animate motion indeed relates to its association with potential threats, then such an inference may be shut down if consumers believe their tension originates from a salient source. Stated formally,

H4: Arousal attribution will moderate the influence of animate motion on preference, such that the previously stated hypotheses will only manifest when consumers remain unaware of the source of the physiological arousal they experience upon viewing animate motion. When consumers are presented with a salient source to which they can attribute their physiological arousal, animate motion will have no impact on the inference of unsafe conditions, and on subsequent preferences.

In sum, the innate link between animate motion and threats to personal safety (cf., Darwin, 1871), coupled with the established notion that visual design elements can shape consumption through the symbolic meanings they embody (Fajardo et al., 2016; Jiang et al., 2016; Henderson & Cote, 1998; Luffarelli et al., 2019), suggests the intriguing possibility that marketers may be able to use animate motion as a design element to elevate the preference of personal safety

products, i.e., products that can protect them and their valuable resources from the occurrence of negative events. Researchers exploring animate motion have yet to examine whether animate motion may have implications that extend beyond the object itself. The following studies were designed to test these predictions.

3.4 Overview of Studies

In focusing on the consumption-relevant consequences of animate motion, I crossed dependent variables which unite under the notion that they protect consumers and their valuable resources from negative events (i.e., personal safety products), including physical security (study 1), cyber security (study 2), and security of valuable resources (study 3). Each study shows the underlying role of perceived unsafe conditions in shaping consumption preferences. Study 1 establishes the relevance of the mechanism on preference by showing that animate motion elevates the preference of safety-relevant, but not safety-neutral, products. Study 2 elaborates on the mechanism by showing the role of trait anxiety, a core determinant of whether consumers perceive threats as avoidable (low trait anxiety) or inevitable (high trait anxiety), in shaping consumption preferences. Finally, study 3 rounds out this inquiry by directly moderating the perception of unsafe conditions using a classic misattribution task.

3.5 Study 1

Study 1 sets the stage by exploring the impact of viewing animate motion on subsequent consumption preferences. Specifically, I explore the prediction that animate motion elevates the preference for personal safety products, an effect which I expect will not extend to safety-neutral

products. The specificity of the predicted effect is supported by extant work, which suggests that the perception of unsafe conditions serves to elevate the utility of products that can shield consumers from negative events, but would not impact the perceived utility of products that are neutral to this purpose (cf., Griskevicius & Kenrick, 2013; Rahinel & Nelson, 2016). Researchers argue that this occurs because although safety-neutral products do not increase consumers' ability to shield themselves from potential dangers, they also do not reduce the ability to do so (Griskevicius & Kenrick, 2013). In exploring this critical parameter of the theoretical model, study 1 examines the impact of animate motion on the preference of a product that could plausibly be positioned as a safety-relevant, or safety-neutral, item.

3.5.1 Method

3.5.1.1 Participants and Design

An a priori sample was estimated based on the standard Type 1 error rate ($\alpha = .05$), estimated power ($1 - \beta = .80$), and the ability to identify a medium to small effect should one exist ($f = .18$; Cohen, 1988). The end result was a sample (N) of three hundred and twenty participants (41.9% Female; $M_{\text{age}} = 37.9$), recruited through Amazon's Mechanical Turk, and paid a nominal fee for their participation. Participants were randomly assigned to one of six conditions in a 3 (motion: static, inanimate, animate) \times 2 (positioning: safety-relevant, safety-neutral) between-subjects factorial design.

3.5.1.2 Stimuli—Product Category

The product category chosen for the current study was the toothpaste category. This category was selected for two reasons. First, toothpaste has been extensively featured in the goal-compatibility literature (e.g., Chatterjee, Roy, & Malshe, 2011; Chernev, 2004; Florack, Ineichen, & Bieri, 2009; Kopetz, Kruglanski, Arens, Etkin, & Johnson, 2012; Wang & Lee, 2006), as it can plausibly be positioned in relation to its ability to produce safety-relevant (protection for teeth), or safety-neutral outcomes (getting a beautiful smile; Wang & Lee, 2006). This gave me a well-established operationalization for product positioning. Second, the attributes of the toothpaste category are unrelated to movement. Extant work suggests that motion can increase the processing fluency of conceptual properties that relate to movement, which can elevate preference (cf., Cian et al., 2014; Brasel & Hagtvedt, 2016). Thus, in testing the impact of animate vs. inanimate motion on preferences compared to a static image, it was deemed critical to ensure that motion alone would not impact preference by producing processing fluency with product attributes presented to participants.

3.5.1.3 Stimuli—Animacy

In line with extant work (Heider & Simmel, 1944; Michotte, 1946; 1963), the stimulus selected for the animacy manipulation consisted of a simple geometric shape (diamond). The motion trajectory used in the study was vertical in nature, with the diamond initially moving upwards, and then concluding its motion by moving downwards to its original position. The critical difference between animate and inanimate conditions was the appearance of self-propulsion. Specifically, inanimate movement was operationalized as a rigid motion, with the shape of the diamond remaining constant throughout the movement pattern. In contrast, the

animate motion incorporated the diamond mimicking a jumping gesture, with the object contracting prior to moving upwards, and expanding upon its upward motion. The operationalization of animate and inanimate motion was directly taken from Kawabe (2017), and implemented on the selected geometric shape (diamond) by a graphic designer.

To ensure that the manipulation worked as intended, a pretest ($N = 150$) was conducted. The pretest consisted of participants viewing either the animate or inanimate diamond, and engaging in a categorization task. Specifically, upon viewing the motion pattern, participants were asked to select which of the two options (mechanic movement, organic movement) best fit the motion they were exposed to. To reinforce this categorical measure, participants answered two additional questions, which captured the extent to which the diamond appeared as if it was moving by its own force, and by its own momentum (anchored: 1 = *not at all*, 7 = *very much*). The latter two questions directly map onto the definition of self-propelled motion (cf., English Thesaurus, 2020), and thus were deemed ideal to further delineate animate motion judgments. A binary logistic regression (0 = mechanic, 1 = organic) confirmed that the animate motion was more likely to be categorized as organic (73.7%) than the inanimate motion (9.5%; $\beta = 3.28$, $SE = .48$, $Wald \chi^2 = 47.92$, $p < .001$). An independent samples t-test on self-propelled motion perception ($r = .76$) further supported these findings, such that animate motion was perceived as more self-propelled ($M = 5.53$) than the inanimate motion ($M = 3.31$, $t(148) = 7.43$, $p < .001$).

3.5.1.4 Procedures

Participants read that they were taking part in a survey conducted in collaboration with Baxtra, a company specializing in the toothpaste category, who was interested in consumers' perceptions of its new product. Participants read that they would see a mock-up advertisement

for the product in the next page, and provide their perceptions. Participants were directed to the next page, where they were exposed to the advertisement (Appendix E). The advertisement consisted of the brand logo, a picture of a toothpaste, and a product description. In the safety-related condition, the description consisted of a slogan (“*Best way to protect your teeth*”) and product attributes (“*prevents gingivitis,*” and “*prevents cavities*”) that aligned with personal safety. In contrast, in the safety-neutral condition, the description consisted of a slogan (“*Best way to get a beautiful smile*”) and product attributes (“*whitens your teeth,*” and “*freshens your breath*”) that were neutral to personal safety. The product descriptions were directly taken from Wang and Lee (2006). Animacy was manipulated through the brand logo, which consisted of a simple geometric shape (i.e., a diamond) with the brand name (i.e., Baxtra) written next to it. In the inanimate and animate conditions, the brand logo was endowed with movement, as specified in the pretest. The current study also included a static condition, in which the brand logo was not endowed with movement. This allowed me to explore the relative impact of motion cues, which either did or did not incorporate animate movement, compared to consumers’ baseline preferences. Across all conditions, the brand name next to the diamond remained static.

After participants examined the advertisement, they were directed to a questionnaire. In an effort to establish the basic phenomenon, participants responded to a three-item scale which captured their purchase likelihood of the product (9-point scales; anchored: unlikely/likely, impossible/possible, improbable/probable; Chattopadhyay & Basu, 1990). Afterwards, participants were directed to a separate page, where they were told that the researchers were interested in getting to know them better, and wanted to understand their perceptions about their broad environment. Participants then rated their agreement with three scale items (anchored: 1 = *strongly disagree*, 7 = *strongly agree*), which captured the perceived unsafety of the broad

environment (“*There are a lot of unsafe things in the world,*” “*My surroundings can be dangerous,*” “*Right now, my environment seems unsafe,*” adapted from Rahinel & Nelson, 2016). The manipulation checks described in the pretest were omitted in the main study, given that the study design made it unsuitable to collect motion-based judgments across all conditions.

3.5.2 Results

3.5.2.1 Personal Safety—Purchase Likelihood

A two-way ANOVA on purchase likelihood ($\alpha = .96$) revealed no significant main effects ($p > .11$), but a significant motion \times positioning interaction ($F(2, 314) = 3.89, p < .05$). Simple effects revealed that the purchase likelihood for the toothpaste varied as a function of motion in the safety-relevant condition ($F(2, 314) = 5.86, p < .005$), but not in the safety-neutral condition ($M_{\text{static}} = 5.20$ vs. $M_{\text{inanimate}} = 5.43$ vs. $M_{\text{animate}} = 5.18; p = .83$). Consistent with predictions, participants in the safety-relevant condition were more likely to purchase the product after viewing the animate motion ($M = 6.30$) than the inanimate motion ($M = 4.69; F(1, 314) = 11.40, p < .005$) and the static image ($M = 5.26; F(1, 314) = 4.78, p < .05$). Furthermore, the purchase likelihood of the safety-relevant product did not significantly differ between inanimate and static conditions ($p = .23$).

Although this pattern of results confirmed the formal hypothesis (H1), I conducted planned contrasts, which examined variations in purchase likelihood within each motion condition, for exploratory purposes. The results revealed that participants who viewed the animate motion were more likely to purchase the product when it was positioned as safety-relevant ($M = 6.30$) than safety-neutral ($M = 5.18; F(2, 314) = 5.60, p < .05$), whereas this effect did not extend to

participants viewing the static image ($M_{\text{safety-relevant}} = 5.26$ vs. $M_{\text{safety-neutral}} = 5.20$; $p = .88$).

Finally, although not expected, the results also suggested that participants who viewed the inanimate motion were directionally less likely to purchase the product when it was positioned as safety-relevant ($M = 4.69$) than safety-neutral ($M = 5.43$; $F(2, 314) = 2.47$, $p = .12$).

3.5.2.2 Inference—Unsafe Conditions

The results for purchase likelihood confirmed that animate motion indeed elevated the preference of the safety-relevant product, an effect which did not extend to the safety-neutral product. I then shifted my focus to what animate motion may mean for the proposed mechanism. To reiterate, I expected that being exposed to animate motion would elevate the inference of unsafe conditions in the broad environment (H2), but that this inference would only elevate the purchase likelihood of the safety-relevant, but not the safety-neutral, product (H1). A two-way ANOVA on unsafe conditions ($\alpha = .70$) as a function of motion and product positioning was conducted to explore the former prediction (H2). The results confirmed that there was a significant main effect of motion ($F(2, 314) = 3.92$, $p < .05$). The nature of this main effect was such that participants perceived their broad environment to be more unsafe after viewing the animate motion ($M = 4.80$) than the inanimate motion ($M = 4.40$; $F(1, 314) = 4.87$, $p < .05$) and the static image ($M = 4.33$; $F(1, 314) = 6.77$, $p < .05$). There were no significant differences between the inanimate and static conditions ($M_{\text{static}} = 4.33$ vs. $M_{\text{inanimate}} = 4.40$, $p = .69$). Neither the main effect of positioning, nor the brand logo \times positioning interaction were significant ($ps > .74$). Thus, in line with my prediction, animate motion elevated the perceived unsafety of the broad environment across both positioning conditions.

3.5.2.3 Mediated Moderation

To determine whether the inference of unsafe conditions accounted for the variations in purchase likelihood, a mediated moderation analysis was conducted (Hayes 2012; Model 15; bootstrapped with 10,000 draws). This model permits a back-ended moderator (“b” path) to an overall mediated effect. Theoretically this was appropriate given product positioning did not interact with motion to alter perceived unsafety, but it did interact with motion to alter purchase likelihood. As predicted, the results confirmed that the inference of unsafe conditions explained why the purchase likelihood of the safety-relevant product was elevated for participants viewing animate motion compared to the inanimate motion (95% CI: .03; .55), and the static image (95% CI: .09; .63). Critically, this effect did not extend to the safety-neutral product (95% CI: $-.07$; .26, and 95% CI: $-.08$; .29 respectively).

3.5.3 Discussion

The results of study 1 support the prediction that animate motion will elevate preference for personal safety products by increasing the perceived unsafety of the broad environment (H1 and H2). Furthermore, the results highlight the role of the mechanism in subsequent consumption preferences by showing that animate motion would not alter the preference of safety-neutral products, which neither help nor hurt consumers’ ability to protect themselves from potential dangers (Rahinel & Nelson, 2016). This supports the critical notion that the impact of animate motion on subsequent preferences corresponds to its association with potential threats in the environment (cf., Griskevicius & Kenrick, 2013). Given this, study 2 aimed to further delineate the mechanism by exploring the role of trait anxiety, which determines how consumers respond to threats, in the theoretical model.

3.6 Study 2

Study 2 was designed with two primary objectives in mind. First, I sought to conceptually replicate the core finding that animate motion elevates preference for personal safety products by increasing the perceived unsafety of the broad environment (H1 and H2). Second, I sought to establish trait anxiety as an important parameter for the impact of animate motion on subsequent preferences (H3). Extant work suggests that trait anxiety modulates the way in which consumers evaluate potential threats in their environment (e.g., Byrne, 1964), such that people with low trait anxiety tend to evaluate potential threats as avoidable, allowing them to take actions that can prevent negative events (Janis & Feshbach, 1954; Mongeau, & Lemieux, 1993). In contrast, people with high trait anxiety tend to evaluate potential threats as inevitable, which prevents them from taking action (Boster & Mongeau, 1984; Hale & Dillard, 1993; Hale, Mongeau, & Lemieux, 1993). Thus, if the animate motion elevates the perceived unsafety of the environment due to its association with threats to personal safety, then trait anxiety should modulate the impact of unsafety inferences on preferences.

3.6.1 Method

3.6.1.1 Participants and Design

Based on the parameters discussed in study 1, two hundred and fifteen participants (38% Female; $M_{\text{age}} = 35.1$) were recruited through Amazon's MTurk in return for a nominal fee. Participants were randomly assigned to one of two motion conditions in a 2 (motion: inanimate, animate) \times (trait anxiety: continuous) between-subjects factorial design.

3.6.1.2 Stimuli—Product Category

The product category chosen for the current study was security software. This category was selected for two reasons. First, security software has clear implications for personal safety, as it is designed to prevent negative outcomes for electronic devices (i.e., protection against malware), as well as for the consumer (e.g., protection in bank transactions). Second, purchasing security software often involves selecting between options that come at different levels of personal safety. This gave me a natural setting to explore whether animate motion elevates preference for personal safety at the cost of additional charges.

3.6.1.3 Stimuli—Animacy

The stimulus selected for the animacy manipulation consisted of a letter (M), which was part of the fictitious brand logo created for the purposes of the study (Mefra). The motion trajectory used in the study was horizontal, with the letter M entering the screen from the left, and proceeding towards right until reaching the rest of the letters (efra). In line with study 1, the critical difference between animate and inanimate conditions was the appearance of self-propulsion. Specifically, inanimate movement was operationalized as a rigid motion, with the letter M sliding across the screen. In contrast, the animate motion incorporated the letter mimicking a walking gesture, with the two straight lines in the letter acting as if they were the legs of the entity. To ensure that the manipulation worked as intended, a pretest ($N = 149$) was conducted, with the same measures described in study 1. A binary logistic regression (0 = mechanic, 1 = organic) confirmed that the animate motion was more likely to be categorized as organic (68%) than the inanimate motion (20.3%; $\beta = 2.12$, $SE = .38$, Wald $\chi^2 = 31.15$, $p < .001$).

An independent samples t-test on self-propelled motion perception ($r = .80$) further supported these findings, such that animate movement was perceived as more self-propelled ($M = 5.42$) than the inanimate movement ($M = 3.85$, $t(148) = 5.96$, $p < .001$).

3.6.1.4 Procedures

Participants read that they were taking part in a survey conducted in collaboration with Mefra, a company specializing in digital security solutions, who was interested in consumers' perceptions of its product selection. Participants then read that they would see the product selection in the next page, and provide their opinions. In the next page, participants were exposed to the brand logo, which was situated on top of the page, with the product options displayed below it (Appendix F). Overall, participants were presented with two product options, one titled "Basic Security" priced at \$29.99 per year, and the other titled "Total Security" priced at \$49.99 per year. A detailed description of both products was placed below the product images. The Basic Security option was specified to bring protection only to the electronic devices it was installed in (e.g., blocking viruses, cryptolockers), whereas the Total Security option was specified such that in addition to the existing features of the Basic Security option, the product also helped protect the user (e.g., stops webcam spies from watching you in your home). This allowed me to explore whether animate motion would elevate preference of personal safety features at the cost of additional charges. Animacy was once again manipulated through the brand logo, with participants in the animate (inanimate) condition being exposed to logo movement endowed with self-propulsion, as specified in the pretest.

After participants examined the product selection, they were directed to a questionnaire. The questionnaire began with participants considering they were buying a security software that

day, and selecting the option they preferred. To ensure that participants were aware of the pricing points, each option included the price information underneath the product name. Afterwards, participants responded to a ten-item scale (anchored: 1 = *Almost Never*, 4 = *Almost Always*) capturing their trait anxiety level (e.g., “*I am nervous and restless*,” “*I am a steady person*,” Spielberger & Reheiser, 2009). Finally, participants rated the same unsafe conditions scale, and the manipulation checks described in study 1.

3.6.2 Results

3.6.2.1 Manipulation Checks

A binary logistic regression on motion categorization as a function of motion, trait anxiety ($M = 2.10$, $\alpha = .91$), and their interaction revealed a main effect of motion, such that the animate motion was more likely to be categorized as organic (68.9%) than the inanimate motion (18.3%; $\beta = 3.27$, $SE = .95$, Wald $\chi^2 = 11.74$, $p < .001$). No other effects were significant ($ps > .27$). Furthermore, a linear regression analysis on self-propelled motion perception ($r = .77$) confirmed that animate motion was perceived as more self-propelled ($M = 5.82$) than inanimate motion ($M = 4.61$, $\beta = 1.19$, $SE = .57$, $t(211) = 2.10$, $p < .05$). No other effects were significant ($ps > .89$).

3.6.2.2 Inference—Unsafe Conditions

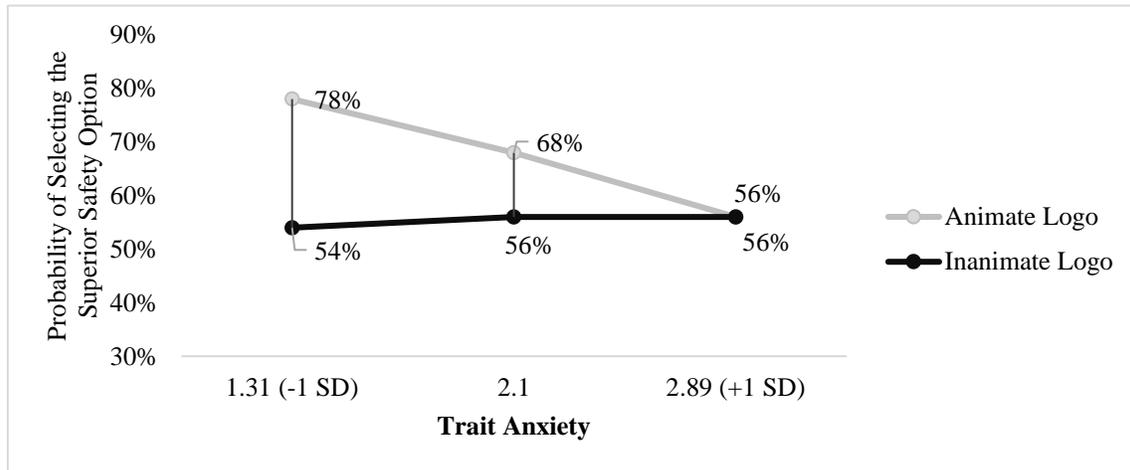
A linear regression analysis on perceived unsafety of the broad environment ($\alpha = .77$) revealed a main effect of motion, such that participants who viewed the animate motion inferred greater unsafety in their environment ($M = 4.67$) than participants who viewed the inanimate motion ($M = 4.10$; $\beta = 1.21$, $SE = .50$, $t(211) = 2.43$, $p < .05$). The results also revealed a

predictable main effect of trait anxiety ($\beta = 1.12$, $SE = .34$, $t(211) = 3.24$, $p < .005$), such that higher levels of trait anxiety corresponded with greater perceived unsafety. Critically, there was no significant motion \times trait anxiety interaction ($p = .23$). This supports the notion that animate motion is relevant to the perceived safety of the broad environment at varying levels of trait anxiety. The critical question was whether trait anxiety related to the extent to which participants would act on the inference of unsafe conditions.

3.6.2.3 Personal Safety—Product Choice

A binary logistic regression on product choice revealed a main effect of motion ($\beta = 2.05$, $SE = .85$, Wald $\chi^2 = 5.91$, $p < .05$), such that participants were more likely to select the superior safety option after viewing the animate motion (67.9%) than in the inanimate motion (56%). The main effect of trait anxiety was not significant ($p = .70$). Importantly, there was a significant motion \times trait anxiety interaction ($\beta = -.73$, $SE = .37$, Wald $\chi^2 = 3.94$, $p < .05$). As illustrated in Figure 1, the nature of this interaction was such that in the animate motion condition, lower levels of trait anxiety corresponded with greater likelihood of selecting the superior safety option ($\beta = -.64$, $SE = .28$, $Z = -2.29$; $p < .05$). In contrast, there was no significant relationship between trait anxiety and product preference in the inanimate motion condition ($\beta = .09$, $SE = .24$, $Z = -.39$; $p = .70$). Another way of decomposing this interaction is by identifying the ranges of trait anxiety for which the simple effect of motion had a significant impact on product preference. A floodlight analysis revealed that a significant Johnson-Neyman region ($p < .05$) emerged when trait anxiety was lower than 2.03 on the 4-point trait anxiety scale ($M = 2.10$), such that these participants were more likely to select the superior safety option when presented with the animate (vs. inanimate) motion.

Figure 1: Estimated Choice Likelihood of Superior Safety Option in Study 2



3.6.2.4 Mediated Moderation

To explore whether the inference of unsafe conditions accounted for the observed variations in product choice, I tested for mediated moderation (Hayes, 2012; Model 15; bootstrapped with 10,000 draws). Similar to study 1, the model used a back-ended moderator (“b” path), given that trait anxiety did not interact with motion to alter perceived unsafety, but it did interact with motion to alter product choice. As predicted, perceived unsafety explained why seeing the animate motion (coded: 1) elevated the choice likelihood of the superior safety option for participants with lower trait anxiety (at trait anxiety of 1.31: 95% CI: .09; .70; at trait anxiety of 2.10: 95% CI: .04; .44). This effect was eliminated for participants with higher trait anxiety (at trait anxiety of 2.89, 95% CI: -.16; .29).

3.6.3 Discussion

The results of study 2 conceptually replicated the core findings of study 1 and further demonstrated the process by illustrating the role of trait anxiety, a critical variable that has been shown to modulate how people respond to potential threats in their environment (Byrne, 1964). Specifically, the results confirm that trait anxiety has a robust impact on whether people enact on the perceived unsafety in their broad environment upon viewing animate motion, such that lower levels of trait anxiety corresponded with greater choice likelihood of a product that could elevate personal safety. This is consistent with extant work on evolutionary psychology, which suggests that people with low trait anxiety respond to the perception of evolutionary threats by taking action (i.e., the fight-or-flight response), whereas people with high trait anxiety often exhibit avoidant behavior (i.e., the freeze response; Schmidt, Richey, Zvolensky, & Maner, 2008). Given this, study 3 aimed to directly manipulate the mechanism by exploring the underlying role of the non-conscious processes that give rise to inferences regarding safety.

3.7 Study 3

Study 3 was designed with two primary objectives in mind. First, I sought to conceptually replicate the core predictions that animate motion elevates preference for personal safety products by increasing the perceived unsafety of the broad environment (H1 and H2). Second, I sought to lend insights into the link between animate motion and the inference of unsafe conditions (H4). Extant work in evolutionary psychology finds that being exposed to evolutionary threats tends to elevate autonomic physiological arousal, which serves a critical function in alerting people to the existence of potential threats in the vicinity (Esteves, Dimberg, & Ohman, 1994; Griskevicius et al., 2009; Griskevicius & Kenrick, 2013). Furthermore, recent evidence suggests that bringing the physiological arousal into conscious awareness, and having

people attribute the source of this tension to salient objects, can have deleterious effects on the inferences produced by the arousing stimulus (e.g., Noseworthy et al., 2014). Thus, if the physiological arousal elicited by animate motion enables the inference of unsafe conditions in the broad environment, then such an inference may be shut down if consumers believe their arousal originates from a salient source. To explore this implication, the current study used a well-established paradigm that relied on auditory misattribution of physiological arousal (cf., Savitsky et al., 1998).

3.7.1 Method

3.7.1.1 Participants and Design

One hundred and ninety-one participants (45% Female; $M_{\text{age}} = 38.24$) were recruited through Amazon's MTurk, and were assigned at random to one of four conditions in a 2 (motion: inanimate, animate) \times 2 (misattribution: no vs. yes) between-subjects factorial design. The sample consisted of participants who had passed a pre-screening conducted under the guise of a hearing test, which was a critical component of the misattribution task. The details of the prescreening that preceded the main study are described in procedures.

3.7.1.2 Stimuli—Product Category

The product category chosen for the current study was backpacks. This category was selected for two reasons. First, backpacks are often used to carry important and valuable resources, such as money, credit cards, and identification. This gave me a natural context in which a product, which does not protect the consumer physically, would nevertheless have

important implications on personal safety. Second, there is a natural variation in the extent to which a backpack can elevate personal safety (e.g., protection against pickpockets, protection against hacker scanning of credit cards). This allowed me to employ a product that specifically focused on personal safety concerns.

3.7.1.3 Stimuli—Animacy

The stimulus selected for the animacy manipulation consisted of a geometric shape (a circle), which was displayed as the logo of a fictitious brand (Ornia). The motion trajectory used in the study was horizontal in nature, with the circle initially appearing in the middle of the screen, and exiting the screen by moving toward the left of the screen. The motion was then concluded with the circle re-entering the screen from the right, and stopping in its original position. Following previous studies, the critical difference between animate and inanimate conditions was the appearance of self-propulsion. Specifically, inanimate movement was operationalized as a rigid motion, with the circle sliding across the screen. In contrast, the animate motion incorporated the circle mimicking a running gesture, with the circle initiating its motion by first stretching to its right, and continuing its motion by stretching to its left. To emphasize the ability to move on its own volition, the end of the motion trajectory included the appearance of coming to a stop, with the circle stretching to its right. To ensure that the manipulation worked as intended, a pretest ($N = 151$) was conducted. A binary logistic regression (0 = mechanic, 1 = organic) confirmed that the animate motion was more likely to be categorized as organic (65.8%) than the inanimate motion (12%; $\beta = 2.64$, $SE = .43$, Wald $\chi^2 = 37.91$, $p < .001$). An independent samples t-test on self-propelled motion perception ($r = .72$)

further supported these findings, such that animate movement was perceived as more self-propelled ($M = 5.44$) than the inanimate movement ($M = 4.24$, $t(149) = 4.69$, $p < .001$).

3.7.1.4 Procedures

Participants read that they were taking part in a study on the effects of subliminal sounds on memory. Participants further read that they would be presented with a mock-up advertisement of a product in the upcoming pages, and would be required to recall specific aspects of the advertisement at the end of the study. Participants were then instructed to ensure that their device was sound enabled, and to set the volume at a high level. Prior to beginning the main survey, participants read that I would conduct a short hearing test to capture their ability to hear at different frequencies. They further read that some of the sounds that I would test them on could be at extremely high frequencies, and thus undetectable by humans. In reality, this allowed me to ensure that participants were following instructions regarding having their device sound enabled, which was a critical aspect of the misattribution manipulation that followed. Specifically, participants were asked, on five consecutive pages, whether they heard the sound that played automatically for two seconds. Three out of the five pages contained sound files (which were not visible to participants), whereas the remainder two did not. All sound files that were played were in the acceptable range of human hearing (between 6 kHz and 10 kHz). To ensure that participants had a reasonable understanding of the task, they first engaged in a test trial, wherein they were exposed to a sound frequency (8 kHz) for two seconds, which was conveyed as within the expected range for what they would be able to pick up on in the main hearing test. Afterwards, participants moved on to the main hearing test, wherein they were asked to identify, on five consecutive pages, whether they detected the sound frequency that was emitted on the

page (No/Yes). Participants who were not able to correctly identify whether a sound was played or not were eliminated from the final sample.

After finalizing the supposed hearing test, participants were directed to the next page, where they were informed that from that point onward, they would be exposed to an extremely high frequency sound (above 20 kHz) that humans are incapable of consciously hearing. They further learned that while they cannot hear this sound, their subconscious would pick up on it. In reality, participants were not exposed to any sound. Participants in the misattribution condition read “*Subliminal sound has been found to cause individuals' heart rate to increase. People exposed to subliminal sound report feeling somewhat anxious and nervous. The heart rate increase, anxiety and nervousness can start almost instantly, but are not permanent, and will continue only while you are exposed to this sound.*” In contrast, participants in the no misattribution condition read that “*Subliminal sound has no discernible effects on people.*” All participants were then asked to ensure that their device remained sound enabled throughout the survey, which was conveyed as critical to test the impact of subliminal sounds on their memory. This misattribution manipulation was directly taken from Savistky et al. (1998).

After the misattribution guise, participants read that they would now see the product advertisement for which they would receive a memory task at the end of the survey. The electronic instrument then transitioned to the advertisement, which contained the brand logo displayed on top of the page (one of the two motion conditions), with the name of the company below the logo, and the picture of the product alongside a description at the bottom (Appendix G). The description consisted of a slogan (“*Protect your money, credit cards, ID, and more*”) and three product attributes that aligned with personal safety (e.g., “*RFIDsafe blocking material protects IDs and credit cards from hacker scanning*”). After viewing the advertisement,

participants were told that I wanted to give their brain time to process the subliminal sound before moving on to the memory task, and thus I would take this time to understand their overall perceptions regarding the product, and get to know them better. Participants were then redirected to a questionnaire, which consisted of the same purchase likelihood, unsafe conditions, and manipulation checks described in study 1. Participants were then debriefed, and thanked for their participation in the study.

3.7.2 Results

3.7.2.1 Manipulation Checks

A binary logistic regression on motion categorization as a function of motion, misattribution, and their interaction revealed a main effect of motion, such that the animate motion was more likely to be categorized as organic (61.5%) than the inanimate motion (12.6%; $\beta = 2.25$, $SE = .51$, Wald $\chi^2 = 19.78$, $p < .001$). No other effects were significant ($ps > .51$). Furthermore, a two-way ANOVA on self-propelled motion perception ($r = .82$) confirmed that animate motion was perceived as more self-propelled ($M = 5.52$) than inanimate motion ($M = 4.16$; $F(1, 187) = 34.90$, $p < .001$). No other effects were significant ($ps > .11$).

3.7.2.2 Inference—Unsafe Conditions

A two-way ANOVA on perceived unsafety of the environment ($\alpha = .70$) revealed no main effects ($ps > .25$), but a significant motion \times misattribution interaction ($F(1, 187) = 4.16$, $p < .05$). The nature of this interaction was such that, in the no misattribution condition, participants indicated greater perceived unsafety of the broad environment after viewing animate motion (M

= 4.76) than inanimate motion ($M = 4.13$; $F(1, 187) = 4.98, p < .05$). As predicted, this effect was eliminated in the misattribution condition ($M_{animate} = 4.12$ vs. $M_{inanimate} = 4.30$; $p = .51$). An alternative way of examining this interaction is by exploring the impact of misattribution within each motion condition. The results showed that, in the animate motion condition, participants indicated lower perceived unsafety of the broad environment in the misattribution condition ($M = 4.12$) than in the no misattribution condition ($M = 4.76$; $F(1, 187) = 5.09, p < .05$). This effect did not extend to inanimate motion $M_{misattribution} = 4.30$ vs. $M_{no-misattribution} = 4.13$; $p = .53$).

3.7.2.3 Personal Safety—Purchase Likelihood

A two-way ANOVA on purchase likelihood ($\alpha = .70$) revealed no main effects ($ps > .11$), but a marginal motion \times misattribution interaction ($F(1, 187) = 3.48, p = .064$). The nature of this interaction was such that, in the no misattribution condition, participants were more likely to purchase the product after viewing animate motion ($M = 6.63$) than inanimate motion ($M = 5.55$; $F(1, 187) = 6.02, p < .05$). As predicted, this effect was eliminated in the misattribution condition ($M_{animate} = 5.66$ vs. $M_{inanimate} = 5.75$; $p = .85$). An alternative way of examining this interaction is by exploring the impact of misattribution within each motion condition. The results showed that participants who viewed the animate motion were less likely to purchase the product in the misattribution condition ($M = 5.66$) than in the no misattribution condition ($M = 6.63$; $F(1, 187) = 4.85, p < .05$). This effect did not extend to participants who viewed inanimate motion ($M_{no-misattribution} = 5.55$ vs. $M_{misattribution} = 5.75$; $p = .66$).

3.7.2.4 Mediated Moderation

To explore whether the inference of unsafe conditions accounted for the variations in purchase likelihood, I tested for mediated moderation (Hayes, 2012; Model 8; bootstrapped with 10,000 draws). Unlike prior studies, the current study used a front-end moderator (“a” path), given that the misattribution task interacted with motion to impact the inference of unsafe conditions. The analysis confirmed that perceived unsafety explained why viewing the animate motion (coded: 1) elevated purchase likelihood in the no misattribution condition (95% CI: .07; 1.01). As predicted, this effect was eliminated for participants who were provided a salient source to misattribute their tension (95% CI: $-.59$; $.31$).

3.7.3 Discussion

The results of study 3 further supported the core predictions that viewing animate motion corresponds with greater perceived unsafety of the broad environment, which subsequently elevates the purchase likelihood of a personal safety product (H1 and H2). Critically, study 3 expanded on the attributional processes that contribute to the mechanism by using a classic misattribution task. Specifically, following the notion that being exposed to evolutionary threats can produce physiological tension (Esteves et al., 1994), which can sensitize consumers to the unsafe conditions in their broad environment (Griskevicius et al., 2009; Maner et al., 2005), the current study established that animate motion would produce the inference of unsafe conditions when consumers are not provided with a salient source for the tension produced by animate motion. In contrast, when consumers are given a salient source, the impact of animate motion on subsequent inferences is reduced to levels consistent with the control (i.e., inanimate motion

condition). This finding is consistent with extant work on attributional processes that hinge on physiologically arousing stimuli (e.g., Noseworthy et al., 2014).

3.8 General Discussion

Evidence from three studies suggests that animate motion, which is associated with potential threats in the environment, can elevate consumers' preference for personal safety products (supporting H1). This covers everything from physical security (tooth decay prevention toothpastes, study 1), cyber security (software that protects from webcam spies, study 2), and security of important resources (backpack that prevents pickpocketing, study 3).

Furthermore, I find that the preference for personal safety products is the result of the inference of unsafe conditions in one's broad environment (supporting H2). Specifically, all studies show that the perception of unsafe conditions mediates the preference for personal safety products. Study 1 demonstrates the relevance of the mediator in shaping subsequent preferences by showing that animate motion elevates the preference for safety-relevant, but not safety-neutral, products. Study 2 elaborates on the mechanism by examining the importance of trait anxiety, which determines whether people evaluate threats as avoidable or inevitable, in the theoretical model (supporting H3). Finally, study 3 focuses on the attributional processes that contribute to the inference of unsafe conditions by using a classic arousal misattribution task (Savitsky et al., 1998). This study shows that animate motion would produce the inference of unsafe conditions when people remain unaware of the tension that follows, an effect which dissipates when participants are given a salient source to attribute their tension to (supporting H4). Overall, these findings suggest that because animate motion is associated with potential threats, it can shape consumption preferences in predictable ways.

3.8.1 Theoretical Implications

In examining the impact of animate motion in subsequent preferences, the current work makes important theoretical advances. First, the current work advances research on visual design by highlighting the role that animate motion cues can play in creating higher-level inferences. Research on visual design has commonly focused on static design elements, with considerably less focus being devoted to marketing communication elements that incorporate dynamic cues. However, there is some recent work that begun exploring how consumers respond to the dynamic visual properties in marketing communications (Brasel & Hagtvedt, 2016; Simola et al., 2011; Yoo & Kim, 2005). The bulk of this research has focused motion in relation to relatively automatic processes, such as the ability of motion to capture attention (Cian et al., 2014; Simola et al., 2011; Yoo & Kim, 2005), and to elevate the processing fluency of conceptual cues that imply dynamism (Brasel & Hagtvedt, 2015; Cian et al., 2014). However, researchers have seldom considered that certain motion properties can generate higher-level inferential processes that can subsequently impact consumption preferences (see Kim & Lakshmanan, 2015 for one exception). The current work contributes to this literature by illustrating that because animate motion is associated with potential threats in the vicinity, it can produce higher-level inferences regarding the broad environment that subsequently elevates the preference for personal safety products.

Second, the current work advances the growing body of research examining animate motion. Despite the original hypothesis that animate motion may activate threat response mechanisms (e.g., Darwin, 1871; Vignoli, 1882; Wagner, 1923), and the growing evidence that attests to the adaptive relevance of animate motion (Altman et al., 2016; Lindemann et al., 2011;

Meyerhoff et al., 2013; van Burren & Scholl, 2017), researchers have commonly focused on what animate motion means for the cognitive and emotional responses accrued by the object in question. Building on work that extends evolutionary psychology to consumption preferences (e.g., Griskevicius et al., 2009; Griskevicius & Kenrick, 2013), the current work highlights the role that animate motion plays in subsequent consumption preferences. To my knowledge, this work is the first to explore the evolutionary implications of animate motion in shaping consumption preferences.

3.8.2 Managerial Implications

The current work provides critical insights to marketers. With the surge of consumer interest in dynamic media, companies are devoting a substantial amount of their resources to elevating consumers' engagement in their brands in online outlets. One of the biggest advantages of digital media compared to most traditional media outlets is the ability to incorporate motion into the marketing communication elements (Yoo & Kim, 2005). While some companies simply use motion as a low-level perceptual cue to capture attention, others have begun to distinguish between animate and inanimate motion. For example, Google has recently introduced an animated version of their logo, wherein four dots of different colors jump around on their own until they merge together to create the classic 'G' sign (Oremus, 2015). Similarly, Yahoo! has been experimenting with animate motion in their brand logo, wherein the exclamation point was animated as if it was dancing around the static Yahoo logo (Oremus, 2015). Companies using animate motion often convey this is done to communicate that the brand is 'alive' and 'dynamic' (Brasel & Hagtvædt, 2016; Oremus, 2015). However, the current essay illustrates that animate motion may have implications that go beyond the brand. Specifically, the current essay suggests

that brands may be able to harness animate motion to increase consumer interest in products that can elevate personal safety, because animate motion is associated with potential threats in the environment.

The current findings have implications for the marketing of personal safety products. Although personal safety products have critical implications for consumer well-being, people often tend to underplay their need for such products. For example, research finds that people perceive themselves less likely to incur negative events than others (Weinstein, 1980), leading them to interpret risk factors in a biased manner (Todesco & Hillman, 1999), and to downplay the risks associated with their actions (Weinstein, 1989). The current essay illustrates that an effective strategy to elevate the preference of personal safety products may be to sensitize consumers to the unsafe conditions that may exist in their broad environment, and that using animate motion may help accomplish this goal.

3.8.3 Alternative Explanations

The current essay illustrated that animate motion may impact subsequent consumption preferences by creating the inference of unsafe conditions in the broad environment. Importantly, I showed that this inference relates to the physical tension elicited by animate motion (study 3), which I posited was an indication of animate motion being associated with physical threats. Although three studies provided support consistent with these predictions, there may be other factors associated with animate motion which can contribute to the elevated physical tension. One possibility is that incorporating animate motion in the visual design of brand logos can constitute an expectancy violation. Support for this possibility can be found in a recent article by

Kim & Lakshmanan (2015), which demonstrates that endowing the picture of a product with certain motion cues, such as greater kinetic property, can elevate the perceived liveliness of the product, which, in turn, can reduce its perceived typicality. The authors suggest that this occurs because products are expected to be inanimate, and therefore motion patterns that make products appear lively can violate this expectation. Using a similar logic, one can posit that incorporating animate motion cues in the visual design of brand logos may violate consumers' expectations. Furthermore, because expectancy violations can elicit physical tension (Heine & Proulx, 2008), one can argue that an alternate reason as to why animate motion elicits physical tension is that it violates consumers' expectations of how a brand logo should move.

While this is an intriguing possibility that was not directly tested in the main studies, there is reason to believe that this is an unlikely explanation for the current findings. First, from an empirical standpoint, I have conducted pilot studies wherein I explored whether a brand logo would appear more 'alive' when it incorporated animate (vs. inanimate) motion (9-point scales, anchored: 1 = *not at all*, 9 = *very much*). The results showed no significant differences for the perceived liveliness of brand logos used within the main studies as a function of animate (vs. inanimate) motion. This finding suggests that although consumers may perceive the animate motion to be biological and self-propelled, this judgment would not impact the perception of the liveliness of the object itself. Therefore, the atypicality of perceived liveliness of a brand logo was deemed unlikely to explain the subsequent inferences created by animate motion. Second, assuming that perceived liveliness of a brand logo could be impacted by animate (vs. inanimate) motion, extant work in the brand logo literature suggests that this may be unlikely to constitute an expectancy violation. Specifically, research suggests that a logo is an abstract representation of the brand, and that consumers often tend to imbue brands with distinct personalities (Aaker,

1997), and foster relationships with them (Aggarwal, 2004; Fournier, 1996). As such, unlike consumer products, visual representations of a brand, such as the brand logo, may not have an established expectation of being inanimate.

Furthermore, if animate motion indeed constitutes an expectancy violation for brand logos, there is reason to believe that this would impact subsequent consumption preferences in ways that are distinct from the current findings. Specifically, extant work finds that objects that violate expectations tend to threaten consumers' sense of meaning, which elicits arousal-induced anxiety (Heine & Proulx, 2008). The arousal-induced anxiety elicited by expectancy violations subsequently elevates the preference of products that can affirm salient beliefs in unrelated consumption schemas (Taylor & Noseworthy, 2020). For example, researchers have shown that exposure to a visual expectancy violation can elevate the preference of objects that can affirm salient semantic associations, such as category dominant brands (e.g., the choice of Campbell's in the soup category; Taylor & Noseworthy, 2020). Diverging from this work, the current essay documented that animate motion would increase the preference for products that can elevate personal safety. Of course, while not yet documented by extant research, it is possible that personal safety is a salient belief system that consumers may want to affirm upon exposure to expectancy violations. Future work can explore this possibility.

3.8.4 Future Research

Future research can elaborate on the factors that elevate the inference of unsafe conditions elicited by animate motion. For example, extant work finds that objects that seemingly approach (vs. recede from) the observer are more likely to be associated with potential threats (Ghazanfar, Neuhoff, & Logothetis, 2002; Maier, Chandrasekaran, & Ghazanfar, 2008; Schiff, 1965; Schiff,

Caviness, & Gibson, 1962). This suggests that one way to further solidify the role of animate motion in the preference of personal safety products may be to incorporate motion cues that give the impression of approaching the viewer. Furthermore, research can elaborate on this work using a multi-sensory approach. Like many perceptual events, the non-conscious processes that relate to animate motion can likely be facilitated by the integration of multisensory cues (cf., Stein & Meredith, 1993; Welch & Warren, 1980). For example, pairing an ominous sound with animate motion will likely reinforce the proposed interpretation of animate motion. Future research can benefit from elaborating on how multisensory cues, such as the integration of visual and auditory cues, impact the interpretation of potential threats.

Future research can also benefit from documenting the downside of using animate motion in marketing campaigns. For example, because animate motion elevates the inference of unsafe conditions, it is possible that products which can potentially induce bodily harm (e.g., sky-diving lessons) may be preferred less when presented alongside animate motion. This possibility is consistent with evidence from evolutionary psychology, which suggests that consumers tend to avoid objects that can harm them more when the environment is perceived to be unsafe (cf., Griskevicius & Kenrick, 2013). Similarly, future work can examine whether animate motion elevates perceived risks associated with product usage, such as the perceived likelihood of experiencing side effects of pharmaceuticals. Because unsafety in the broad environment can sensitize consumers to potential threats to their physical safety (Maner et al., 2005), it is possible that using animate motion may elevate consumers' concerns regarding the risks associated with product usage. Finally, future work can also elaborate on products that are ambiguous to the goal of elevating personal safety. For instance, products such as firearms can be construed both as a means of elevating one's personal safety (e.g., if the consumer is in possession of the product),

and as a threat to personal safety (e.g., if the consumer is exposed to the product, but is not in possession of it). Recent work finds that contextual factors can impact the interpretation of such ambiguous products. For example, the picture of a firearm tends to be interpreted as a threat when the firearm is pointed towards the observer, but it tends to be interpreted as a means of elevating personal safety when the firearm is directed away from the observer (Fernandez Jr., Portugal, & Alves et al., 2013). Future research could explore whether such contextual factors may contribute to the impact of animate motion on the preference of safety-ambiguous products.

Another area worthy of further exploration would entail expanding on the distinct downstream consequences of animate motion. Specifically, the current work documented that exposure to animate motion elicits physical tension, which, in turn, encourages the inference of unsafe conditions (study 3). Whereas I focused on physical tension as an indication of the association between animate motion and potential threats, it is possible that other factors may have contributed to the physical tension elicited by animate motion. For example, because animate (vs. inanimate) motion implies that the object has the capacity to move on its own volition (Di Giorgio et al., 2017), one can argue that being exposed to animate motion may also elevate the feeling of uncertainty regarding the potential upcoming movements of the object. Extant work finds that the feeling of uncertainty can elicit physical tension, and engender behaviours that can alleviate this tension (Nash, McGregor, & Prentice, 2011). Importantly, however, the tension elicited by uncertainty tends to encourage consumers to affirm expected relationships in unrelated areas, and therefore the experience of uncertainty is considered to be akin to a meaning threat (Nash et al., 2011; Wichman, 2012). As such, if animate motion indeed corresponds with an uncertainty response, the downstream consequences of this response would be that consumers may affirm expected relationships in unrelated consumption schemas.

Potential consequences to explore include the affirmation of semantic associations (Randles et al., 2011), ethicality (Proulx & Heine, 2008), and cultural identity (Proulx et al., 2010). Second, taking this argument one step further, one can posit that consumers may believe they have less ability to exert control over objects that move in an animate (vs. inanimate) way. Recent evidence finds that maintaining the feeling of control is a powerful motivation (Taylor, Noseworthy, & Pancer, 2019), and as such, it is possible that consumers may attempt to reassert control through their consumption preferences when they are exposed to animate (vs. inanimate) motion. Future work can explore whether exposure to animate motion indeed increases the preference for products that can elevate felt control.

Future work can also expand on the role that trait anxiety plays in the tendency to purchase safety-relevant products documented in this essay. Specifically, the current essay showed that trait anxiety moderated the impact of animate motion on product preference, such that low (vs. high) trait anxiety corresponded with a greater impact of animate motion on subsequent preference for personal safety products. I argued that this was the result of how consumers evaluated threats, such that consumers who perceived threats to be avoidable (low trait anxiety) were predicted to have a greater tendency to purchase personal safety products upon exposure to animate motion compared to consumers who perceived threats to be inevitable (high trait anxiety; cf., Boster & Mongeau, 1984; Mongeau, & Lemieux, 1993). On a broad level, this proposition aligns with Parallel Process Model (PPM; Sternthal, 1970; Sternthal & Craig, 1974; Witte, 1996; Witte & Allen, 2000), which documents the impact of fear-arousing messages on subsequent behavior. PPM posits that the perception of threats motivates consumers to engage in strategies that can alleviate the fear elicited by the threat. These strategies are grouped into two categories, consisting of (1) controlling the danger (i.e., adopting behaviors that can reduce

potential negative outcomes), and (2) controlling the fear (i.e., adopting behaviors that can reduce fear without neutralizing the threat). The first strategy is often adopted by people with high efficacy perceptions (i.e., people who believe they can overcome the threat with appropriate actions, Witte & Allen, 2000). In contrast, the second strategy is often adopted by people with low efficacy perceptions (Witte & Allen, 2000). Examples of the second strategy include denial (e.g., “*I am not at risk, nothing bad will happen to me*”), and defensive avoidance (e.g., “*This is too scary, I am not going to think about it,*” Witte & Allen, 2000). Given that the current essay focused on products that can protect consumers from negative outcomes, it is reasonable to suggest that this essay falls in line with the first strategy documented by PPM. Further strengthening this possibility is the finding that low (vs. high) trait anxiety corresponds with high (vs. low) self-efficacy judgments (Bandura, 2010; Muris, 2002; Tahmassian & Moghadam, 2011). However, the PPM explanation should be considered with caution given that a meta-analysis on the persuasiveness of fear arousing messages by Witte & Allen (2000) suggests that trait anxiety may not always have a stable impact on subsequent behaviors. A potential reason for the divergence between the current findings and the meta-analysis of Witte & Allen (2000) is that the current essay focused on the preference for objects that were unrelated to the original threat, whereas Witte & Allen (2000) focused on behaviors that were directly related to the threatening stimulus (e.g., the impact of a message relaying the dangers of smoking on subsequent smoking tendency). Future work could explore this possibility.

Finally, research can expand on different types of threat cues. Although the current work focused on a physical threat cue, evidence suggests that meaning threats, which violate consumers’ ability to confirm expected relationships, can also impact preferences in predictable ways (cf., Heine & Proulx, 2008). This work shows that consumers will compensate for being

exposed to an expectancy violation by affirming other schemas, such as ethical beliefs (e.g., preferring green products; Taylor & Noseworthy, 2020). Because the classic design of brand logos is often comprised of abstract objects that are represented two-dimensionally, it is unlikely that such compensatory processes are commonly engendered by logo design. However, there may be certain cases where brands can utilize the notion of meaning threats in their logos. One example is when brand logos use three-dimensional logos, a recently emerging trend in the marketing landscape. For example, AT&T recently redesigned its logo to incorporate a three-dimensional representation of its classic two-dimensional logo. Because three-dimensionality implies a real object, consumers may non-consciously relate three-dimensional logos with their expectations of real objects (e.g., abide by laws of physics such as gravity). When a brand logo violates these expectations (e.g., being situated on top of the product packaging, and thus giving the appearance of floating on air), this may inadvertently create a meaning threat. Future work can benefit from expanding on this form of threat.

Chapter 4

Conclusions

Across two empirical essays, the current dissertation sought to document how design elements that imply threat cues, which coincide with heightened levels of physical tension and can elicit negative affective states, can be strategically used to elevate the preference for products that solve the tension associated with the threat cue. Despite the common intuition that design elements should elicit positive affective states to encourage consumption (e.g., Henderson, Cote, Leong, & Schmidt, 2006; Janiszewski & Meyvis, 2001; Schechter, 1993; Sundar & Noseworthy, 2014; 2016), this dissertation illustrated that this would only be the case when consumers are not presented with products that can satiate the motivation to resolve the tension associated with the negative connotation. When coupled with products that help combat the ultimate problem, such design elements can be even more successful in encouraging consumption than otherwise.

Essay 1 elaborated on the notion of meaning threats in relation to product form. This essay theorized that extreme incongruity in product design, such as Heinz's purple colored ketchup, can constitute a meaning threat, because it undermines consumers' ability to confirm expected relationship in the category (i.e., the color red in relation to ketchup category). Despite the common research focus on what an incongruent attribute may mean for the product in question (Campbell & Goodstein, 2001; Galli & Gorn, 2011; Maoz & Tybout, 2002; Meyers-Levy & Tybout, 1989; Noseworthy, Murray, & Di Muro, 2018; Peracchio & Tybout, 1996), essay 1 illustrated that such expectancy violations can have implications that go beyond the category by encouraging consumers to compensate for the arousal-induced anxiety elicited by extreme incongruity by affirming expected relationships in unrelated schemas. In so doing, this essay

provided a critical bridge between the *schema congruity literature*, which examines how the incidental affect elicited by products that are incongruent with their expectations impacts evaluations (Mandler, 1982; Meyers-Levy & Tybout, 1989), and the *meaning maintenance literature*, which examines how consumers compensate for the arousal-induced anxiety they experience upon viewing objects that violate their expectations (e.g., Heinz & Proulx, 2008). This essay thus concluded that extreme incongruity may encourage consumption in ways that have previously eluded researchers, corresponding with a form of *passive coping mechanism* that helps consumers to alleviate the tension elicited by the extremely incongruent product form.

Essay 2 elaborated brand logo design in relation to physical threats, a different type of threat cue that was theorized to elicit a different coping mechanism. This essay argued that motion can serve as a threat cue if it gives the impression of animacy, which refers to the perceived ability of objects to move on their own volition (Di Giorgio et al., 2017; Rakison, 2006). Despite the common research focus on what animate motion may mean for the object in question (Altman et al., 2016; Leding, 2018; 2019; 2020; Lindemann et al., 2011; Meyerhoff et al., 2013; van Burren & Scholl, 2017), essay 2 illustrated that using animate motion in marketing communication elements such as the brand logo can have implications that go beyond the object by encouraging consumers to prefer products that reduce the likelihood of negative events from occurring to them, and their valuable resources (i.e., personal safety products). I further illustrated that the impact of animate motion on subsequent preferences was the result of the inference of unsafe conditions in the broad environment. In so doing, this essay contributed to literature on *animate motion*, which often examines how people react to abstract objects that appear to move in a self-propelled way (e.g., Heider & Simmel, 1944; Michotte, 1946), and to the growing body of work on *visual design*, which often emphasizes the importance of positive

affect elicited by design elements in subsequent preferences (Fajardo et al., 2016; Jiang et al., 2016; Henderson & Cote, 1998; Luffarelli et al., 2019). This essay thus concluded that animate motion may encourage consumption of personal safety products, corresponding with a form of *active coping mechanism* that helps consumers protect themselves from potential dangers.

Both essays used relevant moderators to solidify the role of the mechanisms that gave rise to consumption preferences. Building on the notion that extreme incongruity encourages consumers to engage in a passive coping mechanism to alleviate anxiety, essay 1 introduced well-established moderators that impact whether exposure to extreme incongruity would give rise to anxiety (relaxation task, study 3; compensation task, study 4), and whether anxiety would, in turn, elevate the preference of objects that can affirm existing beliefs in unrelated domains (misattribution task; study 2). Furthermore, building on the notion that animate motion encourages consumers to engage in an active coping mechanism to reduce the unsafe conditions in their broad environment, essay 2 introduced well-established moderators that impact whether exposure to animate motion would give rise to the inference of unsafe conditions (misattribution task, study 3), and whether the inference of unsafe conditions, in turn, would elevate the preference of objects that can reduce negative outcomes (trait anxiety, study 2).

Both essays used misattribution as a critical moderator that can eliminate the impact of the threat cues on subsequent preferences. The difference was that essay 1 illustrated that misattribution of arousal would not reduce arousal-induced anxiety, but would erase its impact on subsequent preference. In contrast, essay 2 focused on the inferences that would be produced by arousal-induced feelings as the mediator (i.e., the inference of unsafe conditions). As such, this essay theorized that misattribution would eliminate the impact of the threat on subsequent inferences regarding unsafety of the broad environment. Thus, it is not that the negative affective

state produced by physical tension would be alleviated by using misattribution, but that the relevant inferences would be eliminated when consumers are given a salient source to attribute their arousal to. As such, while originating from the same theory and having the same intent, the way in which misattribution would impact the process across the two essays were differentiated.

4.1 Future Directions

This dissertation documents how threat cues can spur consumption in specific ways. Although each essay discusses potential future research that relates to the specific theoretical framework outlined in the essay, the current section will expand on the broader implications of the current work for future research.

The current dissertation explored meaning threats (essay 1), and physical threats (essay 2) in relation to the product form, and the brand logo, respectively. However, there is one additional form of threat that future research can expand on. Specifically, extant work finds that people often perceive objects that pose potential threats to health (e.g., pathogens) to be threatening on an adaptive level, so much so that there is a domain specific system in the human brain devoted to identifying objects that can potentially induce sickness (i.e., the disease avoidance system (Neuberg, Kenrick, & Schaller, 2011). Objects that connote potential diseases often elicit the negative emotional state of disgust (Griskevicius & Kenrick, 2013; Neuberg et al., 2011), which serves a critical role in helping people avoid these objects, and, more relevant to consumption preferences, increasing the desire for products that inherently oppose the idea of contamination (e.g., cleaning products, Galoni & Noseworthy, 2014).

Physical threats can, at times, produce identical effects on consumption preferences with health threats. For example, cleaning products would serve to protect the body by reducing the likelihood of catching a disease, and thus being exposed to a physical vs. health threats prior to evaluating a cleaning product may similarly serve to elevate preference. However, there are important ways in which the two forms of threats can be differentiated. For example, extant work suggests that being exposed to physical threats can elevate the desire for popular products due to the innate perception that there is strength in numbers (Griskevicius et al., 2009). Specifically, Griskevicius and colleagues (2009) argued that a critical strategy in protecting the self against physical threats, such as a predator, would be in being close proximity to the herd, and thus this symbolic association could carry over to consumers preferring popular and crowded establishments upon sensing potential threats in the vicinity. However, this instinct would be a detrimental response to viewing objects that imply potential diseases, which requires that people isolate themselves rather than gather as a herd to protect the body. In such cases where consumers are exposed to objects that imply health threats, it is likely that consumers would prefer unpopular products, and deserted locations. Thus, although physical threats can often align with health threats in their ability to elevate the preference of certain types of products (e.g., tooth decay prevention toothpaste, study 1, essay 2), they would lead to opposing preference structures for popular products and brands, as well as crowded establishments.

The above-mentioned distinction predicts that brands and products that are perceived to be popular could benefit from using physical threat cues in their visual design, whereas brands and products that are perceived to be unpopular could elevate preference by using health threat cues in their visual design. To my knowledge, research has yet to identify design elements that can activate the disease avoidance system. However, there is a growing body of work which suggests

that some visual and verbal cues may indeed elicit a disgust response (e.g., Di Muro & Noseworthy, 2013; Hingston & Noseworthy, 2018; 2020). Future work can expand on this to explore the implications of disease avoidance system in relation to visual design. For example, future work could examine whether products that are intentionally made to look worn out would elevate the preference of objects that satisfy the urge to fight contamination, such as the preference of less crowded establishments. Certainly, more work is needed in this area.

4.2 Final Remarks

In conclusion, the current work expanded on the role that visual design can play on spurring consumption by exploring the somewhat counterintuitive notion that design elements that connote meanings which elicit negative affective states, such as threat cues, can spur consumption in predictable ways. In exploring this notion, two essays elaborated on threat cues in both product form (essay 1) and brand logo design (essay 2). These essays collectively showed that marketers can strategically use threat cues in visual design to elevate the preference of products that can help combat the connotations embodied by the design element. Each essay solidified the role of the proposed mechanisms in the theoretical model by using well-established moderators. Furthermore, a guideline for future work is proposed within each essay in relation to the specific theoretical model explored, as well as within the conclusions section in relation to the broader idea of threat cues.

References

- Aaker, J. L. (1997). Dimensions of brand personality. *Journal of marketing research*, 34(3), 347-356.
- Aggarwal, P. (2004). The effects of brand relationship norms on consumer attitudes and behavior. *Journal of consumer research*, 31(1), 87-101.
- Altman, M. N., Khislavsky, A. L., Coverdale, M. E., & Gilger, J. W. (2016). Adaptive attention: how preference for animacy impacts change detection. *Evolution and Human Behavior*, 37(4), 303-314.
- Antonovsky, A. (1979). *Sense of Coherence Scale*. San Francisco: Jossey-Bass.
- Aristotle, A. (2000). *On the Motion of Animals*. Alex Catalogue.
- Bagga, C. K., Noseworthy, T. J., & Dawar, N. (2016). Asymmetric Consequences of Radical Innovations on Category Representations of Competing Brands. *Journal of Consumer Psychology*, 26(1), 29-39.
- Bandura, A. (2010). Self-efficacy. *The Corsini encyclopedia of psychology*, 1-3.
- Barrett, H. C., Todd, P. M., Miller, G. F., & Blythe, P. W. (2005). Accurate judgments of intention from motion cues alone: A cross-cultural study. *Evolution and Human Behavior*, 26(4), 313-331.
- Batson, C. D., Fultz, J., & Schoenrade, P. A. (1987). Adults' emotional reactions to the distress of others. *Empathy and its development*, 163-184.
- Berlyne, D. E. (1960). Conflict, arousal, and curiosity.
- Berlyne, D. E. (1978). Curiosity and learning. *Motivation and emotion*, 2(2), 97-175.

- Bird-David, N. (1999). "Animism" revisited: personhood, environment, and relational epistemology. *Current anthropology*, 40(S1), S67-S91.
- Bornstein, R. F., Leone, D. R., & Galley, D. J. (1987). The generalizability of subliminal mere exposure effects: Influence of stimuli perceived without awareness on social behavior. *Journal of personality and social psychology*, 53(6), 1070.
- Boster, F. J., & Mongeau, P. (1984). Fear-arousing persuasive messages. *Annals of the International communication Association*, 8(1), 330-375.
- Brasel, S. A., & Hagtvedt, H. (2016). Living brands: consumer responses to animated brand logos. *Journal of the Academy of Marketing Science*, 44(5), 639-653.
- Bruner, J. S. (1990). *Acts of Meaning* (Vol. 3). Cambridge, MA: Harvard University Press.
- Byrne, D. (1964). Repression-sensitization as a dimension of personality. In B. A. Maher (Ed.), *Progress in experimental personality research*. New York : Academic Press
- Campbell, M. C., & Goodstein, R. C. (2001). The Moderating Effect of Perceived Risk on Consumers' Evaluations of Product Incongruity: Preference for the Norm. *Journal of Consumer Research*, 28(3), 439-449.
- Caramazza, A., & Shelton, J. R. (1998). Domain-specific knowledge systems in the brain: The animate-inanimate distinction. *Journal of cognitive neuroscience*, 10(1), 1-34.
- Chatterjee, S., Roy, R., & Malshe, A. V. (2011). The role of regulatory fit on the attraction effect. *Journal of Consumer Psychology*, 21(4), 473-481.
- Chattopadhyay, A., & Basu, K. (1990). Humor in advertising: The moderating role of prior brand evaluation. *Journal of Marketing Research*, 27(4), 466-476.
- Chernev, A. (2004). Goal orientation and consumer preference for the status quo. *Journal of Consumer Research*, 31(3), 557-565.

- Cialdini, R. B., Trost, M. R., & Newsom, J. T. (1995). Preference for consistency: the development of a valid measure and the discovery of surprising behavioral implications. *Journal of personality and social psychology*, *69*(2), 318.
- Cian, L., Krishna, A., & Elder, R. S. (2014). This logo moves me: Dynamic imagery from static images. *Journal of Marketing Research*, *51*(2), 184-197.
- Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences*. Hillsdale, NJ: Lawrence Erlbaum.
- Coker-Appiah, D. S., White, S. F., Clanton, R., Yang, J., Martin, A., & Blair, R. J. R. (2013). Looming animate and inanimate threats: the response of the amygdala and periaqueductal gray. *Social neuroscience*, *8*(6), 621-630.
- Consumer Insights. "Attention spans." (2015).
- Cornescu, V., & Adam, C. R. (2013). The Consumer Resistance Behavior Towards Innovation. *Procedia Economics and Finance*, *6*, 457-465.
- Craig, K., Brown, K., & Baum, A. (1995). Psychopharmacology: The Fourth Generation of Progress. In F. Bloom, & D. Kupfer, *Environmental factors in the etiology of anxiety* (pp. 1325-1339). New York, NY: Raven Press.
- Crolic, C., Zheng, Y., Hoegg, J., & Alba, J. W. (2019). The influence of product aesthetics on consumer inference making. *Journal of the Association for Consumer Research*, *4*(4), 398-408.
- Darwin C. *Descent of man*. London, 1871.
- Deng, X., & Kahn, B. E. (2009). Is your product on the right side? The "location effect" on perceived product heaviness and package evaluation. *Journal of Marketing Research*, *46*(6), 725-738.

- Derryberry, D., & Rothbart, M. K. (1988). Arousal, affect, and attention as components of temperament. *Journal of Personality and Social Psychology*, 55(6), 958.
- Di Giorgio, E., Lunghi, M., Simion, F., & Vallortigara, G. (2017). Visual cues of motion that trigger animacy perception at birth: the case of self-propulsion. *Developmental Science*, 20(4), e12394.
- Di Muro, F., & Noseworthy, T. J. (2013). Money isn't everything, but it helps if it doesn't look used: How the physical appearance of money influences spending. *Journal of Consumer Research*, 39(6), 1330-1342.
- English Thesaurus (2020). Synonyms for self-propelled. Retrieved July 11, 2020, from <https://englishthesaurus.net/synonym/self-propelled>
- Esteves, F., Dimberg, U., & Öhman, A. (1994). Automatically elicited fear: Conditioned skin conductance responses to masked facial expressions. *Cognition & Emotion*, 8(5), 393-413.
- Eysenck, H. J. (1967). *The dynamics of anxiety and hysteria*. Routledge & Kegan Paul.
- Fajardo, T. M., Zhang, J., & Tsiros, M. (2016). The contingent nature of the symbolic associations of visual design elements: The case of brand logo frames. *Journal of Consumer Research*, 43(4), 549-566.
- Fazio, R. H. (1987). Self-perception theory: A current perspective. In *Social Influence: The Ontario Symposium* (Vol. 5, pp. 129-50).
- Fazio, R. H. (1990). A practical guide to the use of response latency in social psychological research. *Research methods in personality and social psychology*, 11, 74-97.

- Fiske, S. T., Morling, B., & Stevens, L. E. (1996). Controlling self and others: A Theory of Anxiety, Mental Control, and Social Control. *Personality and Social Psychology Bulletin*, 22(2), 115-123.
- Florack, A., Ineichen, S., & Bieri, R. (2009). The impact of regulatory focus on the effects of two-sided advertising. *Social Cognition*, 27(1), 37-56.
- Fournier, S. M. (1996). A consumer-brand relationship framework for strategic brand management.
- Galli, M., & Gorn, G. (2011). Unconscious Transfer of Meaning to Brands. *Journal of Consumer Psychology*, 21(3), 215-225.
- Gell, A. (1998). *Art and agency: an anthropological theory*. Clarendon Press.
- Goldenberg, J. L., McCoy, S. K., Pyszczynski, T., Greenberg, J., & Solomon, S. (2000). The body as a source of self-esteem: The effect of mortality salience on identification with one's body, interest in sex, and appearance monitoring. *Journal of personality and social psychology*, 79(1), 118.
- Goodstein, R. C. (1993). Category-Based Applications and Extensions in Advertising: Motivating More Extensive Ad Processing. *Journal of Consumer Research*, 20(1), 87-99.
- Greggor, A. L., McIvor, G. E., Clayton, N. S., & Thornton, A. (2018). Wild jackdaws are wary of objects that violate expectations of animacy. *Royal Society open science*, 5(10), 181070.
- Griskevicius, V., & Kenrick, D. T. (2013). Fundamental motives: How evolutionary needs influence consumer behavior. *Journal of Consumer Psychology*, 23(3), 372-386.

- Griskevicius, V., Goldstein, N. J., Mortensen, C. R., Sundie, J. M., Cialdini, R. B., & Kenrick, D. T. (2009). Fear and loving in Las Vegas: Evolution, emotion, and persuasion. *Journal of Marketing Research*, 46(3), 384-395.
- Griskevicius, V., Tybur, J. M., & Van den Bergh, B. (2010). Going Green to be Seen: Status, Reputation, and Conspicuous Conservation. *Journal of Personality and Social Psychology*, 98(3), 392–401.
- Hale, J. L., & Dillard, J. P. (1993). Fear appeals in health campaigns: Too much, too little, or just right. In *annual meeting of the Speech Communication Association, Miami Beach, FL*.
- Hale, J. L., Mongeau, P. A., & Lemieux, R. (1993). Trait anxiety and fear-arousing messages regarding sun exposure. In *annual meeting of the Speech Communication Association, Miami Beach, FL*.
- Hayes, A. F. (2012). PROCESS: A Versatile Computational Tool for Observed Variable Mediation, Moderation, and Conditional Process Modeling.
- Hayward, S. D. (1997). Effects of motion on adaptive arrays. *IEE Proceedings-Radar, Sonar and Navigation*, 144(1), 15-20.
- Hediger, H. (1955). Studies of the psychology and behavior of captive animals in zoos and circuses.
- Heider, F., & Simmel, M. (1944). An experimental study of apparent behavior. *The American journal of psychology*, 57(2), 243-259.
- Heine, S. J., Proulx, T., & Vohs, K. D. (2006). The Meaning Maintenance Model: On the Coherence of Social Motivations. *Personality and Social Psychology Review*, 10(2), 88–110.

- Henderson, P. W., & Cote, J. A. (1998). Guidelines for selecting or modifying logos. *Journal of marketing*, 62(2), 14-30.
- Henderson, P. W., Cote, J. A., Leong, S. M., & Schmitt, B. (2003). Building strong brands in Asia: Selecting the visual components of image to maximize brand strength. *International Journal of Research in Marketing*, 20(4), 297-313.
- Herr, P. M., Farquhar, P. H., & Fazio, R. H. (1996). Impact of Dominance and Relatedness on Brand Extensions. *Journal of Consumer Psychology*, 5(2), 135–159.
- Hingston, S. T., & Noseworthy, T. J. (2018). Why Consumers Don't see the Benefits of Genetically Modified Foods, and what Marketers can do about It. *Journal of Marketing*, 82(5), 125-140.
- Hingston, S. T., & Noseworthy, T. J. (2020). On the Epidemic of Food Waste: Idealized Prototypes and the Aversion to Misshapen Fruits and Vegetables. *Food Quality and Preference*, 103999.
- Janis, I. L., & Feshbach, S. (1954). Personality Differences Associated with Responsiveness to Fear-Arousing Communications 1. *Journal of personality*, 23(2), 154-166.
- Janiszewski, C., & Meyvis, T. (2001). Effects of brand logo complexity, repetition, and spacing on processing fluency and judgment. *Journal of consumer research*, 28(1), 18-32.
- Jhang, J. H., Grant, S. J., & Campbell, M. C. (2012). Get It? Got It. Good! Enhancing New Product Acceptance by Facilitating Resolution of Extreme Incongruity. *Journal of Marketing Research*, 49(2), 247–259.
- Jiang, Y., Gorn, G. J., Galli, M., & Chattopadhyay, A. (2016). Does your company have the right logo? How and why circular-and angular-logo shapes influence brand attribute judgments. *Journal of Consumer Research*, 42(5), 709-726.

- Junior, O. F., Portugal, L. C. L., Alves, R. D. C. S., Campagnoli, R. R., Erthal, F. C. S., Mocaiber, I. F., ... & Pereira, M. G. (2013). How you perceive threat determines your behavior. *Frontiers in human neuroscience*, 7, 632.
- Karanam, K. (2019). Toshiba registers UK's first multimedia motion mark. Retrieved July 11, 2020, from <https://www.governmentcomputing.com/business/news/intellectual-property-office-toshiba>
- Kawabe, T. (2017). Image deformation as a cue to material category judgment. *Scientific reports*, 7, 44274.
- Kim, J., & Lakshmanan, A. (2015). How kinetic property shapes novelty perceptions. *Journal of Marketing*, 79(6), 94-111.
- Koolhaas, J. M., Korte, S. M., De Boer, S. F., Van Der Vegt, B. J., Van Reenen, C. G., Hopster, H., ... & Blokhuis, H. J. (1999). Coping styles in animals: current status in behavior and stress-physiology. *Neuroscience & Biobehavioral Reviews*, 23(7), 925-935.
- Kopetz, C. E., Kruglanski, A. W., Arens, Z. G., Etkin, J., & Johnson, H. M. (2012). The dynamics of consumer behavior: A goal systemic perspective. *Journal of Consumer Psychology*, 22(2), 208-223.
- Krahé, B., Moller, I, Huesmann, R. L., Kirwil, L., Felber, J., & Berger, A. (2011). Desensitization to Media Violence: Links with Habitual Media Violence Exposure, Aggressive Cognitions and Aggressive Behavior. *Journal of Personality and Social Psychology*. 100(4), 630–646.
- Kruglanski, A. W., & Webster, D. M. (1996). Motivated closing of the mind:" Seizing" and "freezing.". *Psychological review*, 103(2), 263.

- Kunst-Wilson, W. R., & Zajonc, R. B. (1980). Affective discrimination of stimuli that cannot be recognized. *Science*, *207*(4430), 557-558.
- LaTour, M. S., & Rotfeld, H. J. (1997). There are threats and (maybe) fear-caused arousal: Theory and confusions of appeals to fear and fear arousal itself. *Journal of advertising*, *26*(3), 45-59.
- Leding, J. K. (2018). The animacy advantage in memory: Manipulations of levels of processing and survival processing. *American Journal of Psychology*, *131*(3), 273-281.
- Leding, J. K. (2019). Intentional memory and online data collection: A test of the effects of animacy and threat on episodic memory. *Journal of Cognitive Psychology*, *31*(1), 4-15.
- Leding, J. K. (2020). Animacy and threat in recognition memory. *Memory & Cognition*, 1-12.
- Lindemann, O., Nuku, P., Rueschemeyer, S. A., & Bekkering, H. (2011). Grasping the other's attention: The role of animacy in action cueing of joint attention. *Vision Research*, *51*(8), 940-944.
- Luffarelli, J., Stamatogiannakis, A., & Yang, H. (2019). The visual asymmetry effect: An interplay of logo design and brand personality on brand equity. *Journal of marketing research*, *56*(1), 89-103.
- Ma, Z., Gill, T., & Jiang, Y. (2015). Core versus peripheral innovations: The effect of innovation locus on consumer adoption of new products. *Journal of Marketing Research*, *52*(3), 309-324.
- Mahon, B. Z., & Caramazza, A. (2009). Concepts and categories: a cognitive neuropsychological perspective. *Annual review of psychology*, *60*, 27-51.
- Major, B., & Townsend, S. S. (2012). Meaning Making in Response to Unfairness. *Psychological Inquiry*, *23*(4), 361-366.

- Mandel, N., & Johnson, E. J. (2002). When web pages influence choice: Effects of visual primes on experts and novices. *Journal of consumer research*, 29(2), 235-245.
- Mandel, N., Rucker, D. D., Levav, J., & Galinsky, A. D. (2017). The Compensatory Consumer Behavior Model: How Self-Discrepancies Drive Consumer Behavior. *Journal of Consumer Psychology*, 27(1), 133-146.
- Mandler, G. (1982). The Structure of Value: Accounting for Taste. In M. S. Clark & S. T. Fiske (Eds), *Affect and Cognition: The Seventeenth Annual Carnegie Symposium on Cognition*, Hillsdale, NJ: Lawrence Erlbaum, 3–36.
- Mandler, J. M. (1992). How to build a baby: II. Conceptual primitives. *Psychological review*, 99(4), 587.
- Maner, J. K., Kenrick, D. T., Becker, D. V., Robertson, T. E., Hofer, B., Neuberg, S. L., ... & Schaller, M. (2005). Functional projection: How fundamental social motives can bias interpersonal perception. *Journal of personality and social psychology*, 88(1), 63.
- Maoz, E., & Tybout, A. M. (2002). The Moderating Role of Involvement and Differentiation in the Evaluation of Brand Extensions. *Journal of Consumer Psychology*, 12(2), 119–131.
- Mathews, Andrew, and Bundy Mackintosh (1998). "A cognitive model of selective processing in anxiety." *Cognitive therapy and research*, 22(6), 539-560.
- Mazar, N., & Zhong, C. (2010). Do Green Products Make Us Better People?. *Psychological Science*, 21(4), 494–498.
- McGregor, I., Prentice, M., & Nash, K. (2012). Approaching Relief: Compensatory Ideals Relieve Threat-Induced Anxiety by Promoting Approach-Motivated States. *Social Cognition*, 30(6), 689-714.

- Meert, K., Pandelaere, M., & Patrick, V. M. (2014). Taking a shine to it: How the preference for glossy stems from an innate need for water. *Journal of Consumer Psychology, 24*(2), 195-206.
- Mehrabian, A., & Russell, J. A. (1973). A measure of arousal seeking tendency. *Environment and Behavior, 5*(3), 315.
- Meijen, C., Jones, M. V., McCarthy, P. J., Sheffield, D., & Allen, M. S. (2013). Cognitive and affective components of challenge and threat states. *Journal of Sports Sciences, 31*(8), 847-855.
- Meyerhoff, H. S., Huff, M., & Schwan, S. (2013). Linking perceptual animacy to attention: Evidence from the chasing detection paradigm. *Journal of Experimental Psychology: Human Perception and Performance, 39*(4), 1003.
- Meyers-Levy, J., & Tybout, A. M. (1989). Schema Congruity as a Basis for Product Evaluation. *Journal of Consumer Research, 16*(1), 39-54.
- Michotte, A. (1946). *The perception of causality, trans.* TR Miles and E. Miles. London: Methuen.
- Michotte, A. E. (1963). The perception of causality (TR Miles, Trans.). *London, England: Methuen & Co.*
- Muraven, M., Tice, D. M., & Baumeister, R. F. (1998). Self-Control as a Limited Resource: Regulatory Depletion Patterns. *Journal of Personality and Social Psychology, 74*(3), 774.
- Muris, P. (2002). Relationships between self-efficacy and symptoms of anxiety disorders and depression in a normal adolescent sample. *Personality and individual differences, 32*(2), 337-348.

- Nash, K., McGregor, I., & Prentice, M. (2011). Threat and defense as goal regulation: From implicit goal conflict to anxious uncertainty, reactive approach motivation, and ideological extremism. *Journal of personality and social psychology, 101*(6), 1291.
- Nesse, R. M. (1994). Fear and fitness: An evolutionary analysis of anxiety disorders. *Ethology and sociobiology, 15*(5-6), 247-261.
- Nesse, R. M. (1994). Fear and fitness: An evolutionary analysis of anxiety disorders. *Ethology and sociobiology, 15*(5-6), 247-261.
- Niedenthal, P. M., & Brauer, M. (2012). Social functionality of human emotion. *Annual review of psychology, 63*, 259-285.
- Noseworthy, T. J., & Trudel, R. (2011). Looks Interesting, But What Does It Do? Evaluation of Incongruent Product Form Depends on Positioning. *Journal of Marketing Research, 48*(6), 1008-1019.
- Noseworthy, T. J., Cotte, J., & Lee, S. H. (2011). The Effects of Ad Context and Gender on the Identification of Visually Incongruent Products. *Journal of Consumer Research, 38*(2), 358-375.
- Noseworthy, T. J., Finlay, K., & Islam, T. (2010). From a commodity to an experience: The moderating role of thematic positioning on congruity-based product judgment. *Psychology & Marketing, 27*(5), 465-486.
- Noseworthy, T. J., Muro, F. D., & Murray, K. B. (2014). The Role of Arousal in Congruity-Based Product Evaluation. *Journal of Consumer Research, 41*(4), 1108–1126.
- Noseworthy, T. J., Murray, K. B., & Di Muro, F. (2018). When Two Wrongs Make a Right: Using Conjunctive Enablers to Enhance Evaluations for Extremely Incongruent New Products. *Journal of Consumer Research, 44*(6), 1379-1396.

- O'Donnell, T. (2017). Monster Energy Drink Logo Design History. Retrieved May 20, 2020, from <https://logorealm.com/monster-energy-drink-logo/>
- Oppenheimer, D. M., Meyvis, T., & Davidenko, N. (2009). Instructional manipulation checks: Detecting satisficing to increase statistical power. *Journal of Experimental Social Psychology, 45*(4), 867-872.
- Oremus, W. (2015). Google's New Logo Looks Simple. It Isn't. Retrieved July 11, 2020, from <https://slate.com/technology/2015/09/google-s-new-animated-logo-is-the-future-of-mobile-branding.html>
- Pancer, E., McShane, L., & Noseworthy, T. J. (2017). Isolated environmental cues and product efficacy penalties: The color green and eco-labels. *Journal of Business Ethics, 143*(1), 159-177.
- Papapetros, S. (2012). *On the animation of the inorganic: Art, architecture, and the extension of life*. University of Chicago Press.
- Peracchio, L. A., & Tybout, A. M. (1996). The Moderating Role of Prior Knowledge in Schema-Based Product Evaluation. *Journal of Consumer Research, 23*(3), 177–192.
- Pervin, L. A. (1963). The need to predict and control under conditions of threat 1. *Journal of Personality, 31*(4), 570-587.
- Piaget, J. (1960). General Problems of the Psychological Development of the Child. In J. M. Tanner & B. Inhelder (Eds), *Discussion on Child Development, Proceedings of the World Health Organization Study Group on Psychological Development of the Child* (Vol. 4). New York: International Universities Press, 3–27.

- Priester, J. R., Godek, J., Nayakankuppum, D. J., & Park, K. (2004). Brand Congruity and Comparative Advertising: When and Why Comparative Advertisements Lead to Greater Elaboration. *Journal of Consumer Psychology, 14*(1&2), 115-123
- Proulx, T. & Inzlicht, M. (2012). The Five 'A' s of Meaning Maintenance: Finding Meaning in the Theories of Sense-Making. *Psychological Inquiry, 23*(4), 317–335.
- Proulx, T., & Heine, S. J. (2008). The Case of the Transmogrifying Experimenter Affirmation of a Moral Schema Following Implicit Change Detection. *Psychological Science, 19*(12), 1294–1300.
- Proulx, T., Heine, S. J., & Vohs, K. D. (2010). When is the Unfamiliar the Uncanny? Meaning Affirmation After Exposure to Absurdist Literature, Humor, and Art. *Personality and Social Psychology Bulletin, 36*(6), 817–829.
- Raghunathan, R., Pham, M. T., & Corfman, K. P. (2006). Informational properties of anxiety and sadness, and displaced coping. *Journal of Consumer Research, 32*(4), 596-601.
- Rahinel, R., & Nelson, N. M. (2016). When brand logos describe the environment: Design instability and the utility of safety-oriented products. *Journal of Consumer Research, 43*(3), 478-496.
- Rakison, D. H. (2006). Make the first move: How infants learn about self-propelled objects. *Developmental Psychology, 42*(5), 900.
- Randles, Daniel, Proulx, T., & Heine, S. J. (2011). Turn-Frogs and Careful Sweaters: Non-Conscious Perception of Incongruous Word Pairings Provokes Fluid Compensation. *Journal of Experimental Social Psychology, 47*(1), 246–249.
- Ravaja, N. (2004). Contributions of Psychophysiology to Media Research: Review and Recommendations. *Media Psychology, 6*(2), 193 – 235.

- Russell, J. A., Weiss, A., & Mendelsohn, G. A. (1989). Affect grid: a single-item scale of pleasure and arousal. *Journal of personality and social psychology*, 57(3), 493.
- Santos, N. S., David, N., Bente, G., & Vogeley, K. (2008). Parametric induction of animacy experience. *Consciousness and cognition*, 17(2), 425-437.
- Savitsky, K., Medvec, V. H., Charlton, A. E., & Gilovich, T. (1998). "What, me worry?": Arousal, misattribution, and the effect of temporal distance on confidence. *Personality and Social Psychology Bulletin*, 24(5), 529-536.
- Savitsky, K., Medvec, V. H., Charlton, A. E., & Gilovich, T. (1998). "What, Me Worry?": Arousal, Misattribution, and the Effect of Temporal Distance on Confidence. *Personality and Social Psychology Bulletin*, 24(5), 529–536.
- Scalco, D. (2017). 6 Ways Irresistible Product Images Enrapture Customers and Boost Conversions. Retrieved July 11, 2020, from <https://www.entrepreneur.com/article/293150>
- Schechter, A. H. (1993). Measuring the value of corporate and brand logos. *Design Management Journal (Former Series)*, 4(1), 33-39.
- Schmidt, N. B., Richey, J. A., Zvolensky, M. J., & Maner, J. K. (2008). Exploring human freeze responses to a threat stressor. *Journal of behavior therapy and experimental psychiatry*, 39(3), 292-304.
- Scholl, B. J., & Gao, T. (2013). Perceiving animacy and intentionality: Visual processing or higher-level judgment. *Social perception: Detection and interpretation of animacy, agency, and intention*, 4629.
- Scholl, B. J., & Tremoulet, P. D. (2000). Perceptual causality and animacy. *Trends in cognitive sciences*, 4(8), 299-309.

- Schooler, R.D. (1965). Product Bias in the Central American Common Market. *Journal of Marketing Research*, 2(4), 394–397.
- Schultz, J., Friston, K. J., O’Doherty, J., Wolpert, D. M., & Frith, C. D. (2005). Activation in posterior superior temporal sulcus parallels parameter inducing the percept of animacy. *Neuron*, 45(4), 625-635.
- Shimp, T. A., & Sharma, S. (1987). Consumer Ethnocentrism: Construction and Validation of the CETSCALE. *Journal of Marketing Research*, 280–289.
- Silvia, P. J., & Barona, C. M. (2009). Do people prefer curved objects? Angularity, expertise, and aesthetic preference. *Empirical studies of the arts*, 27(1), 25-42.
- Simola, J., Kuisma, J., Öörni, A., Uusitalo, L., & Hyönä, J. (2011). The impact of salient advertisements on reading and attention on web pages. *Journal of Experimental Psychology: Applied*, 17(2), 174.
- Sommet, N., & Morselli, D. (2017). Keep Calm and Learn Multilevel Logistic Modeling: A Simplified Three-Step Procedure Using Stata, R, Mplus, and SPSS. *International Review of Social Psychology*, 30(1).
- Spielberger, C. D., & Reheiser, E. C. (2009). Assessment of emotions: Anxiety, anger, depression, and curiosity. *Applied Psychology: Health and Well-Being*, 1(3), 271-302.
- Spielberger, C. D., & Reheiser, E. C. (2009). Assessment of Emotions: Anxiety, Anger, Depression, and Curiosity. *Applied Psychology: Health and Well-Being*, 1(3), 271–302.
- Stapinski, L. A., Abbott, M. J., & Rapee, R. M. (2010). Evaluating the cognitive avoidance model of generalised anxiety disorder: Impact of worry on threat appraisal, perceived control and anxious arousal. *Behaviour Research and Therapy*, 48(10), 1032-1040.

- Staw, B. M., Sandelands, L. E., & Dutton, J. E. (1981). Threat rigidity effects in organizational behavior: A multilevel analysis. *Administrative science quarterly*, 501-524.
- Staw, B. M., Sandelands, L. E., & Dutton, J. E. (1981). Threat rigidity effects in organizational behavior: A multilevel analysis. *Administrative science quarterly*, 501-524.
- Steele, C. M. (1988). The Psychology of Self-Affirmation: Sustaining the Integrity of the Self. In *Advances in Experimental Social Psychology* (Vol. 21, Pp. 261-302). Academic Press.
- Steimer, T. (2002). The biology of fear-and anxiety-related behaviors. *Dialogues in clinical neuroscience*, 4(3), 231.
- Sternthal, B., & Craig, C. S. (1974). Fear appeals: Revisited and revised. *Journal of Consumer Research*, 1(3), 22-34.
- Stringer, M. D. (1999). *On the perception of worship*. A&C Black.
- Sundar, A., & Noseworthy, T. J. (2014). Place the logo high or low? Using conceptual metaphors of power in packaging design. *Journal of Marketing*, 78(5), 138-151.
- Tahmassian, K., & Moghadam, N. J. (2011). Relationship between self-efficacy and symptoms of anxiety, depression, worry and social avoidance in a normal sample of students. *Iranian journal of psychiatry and behavioral sciences*, 5(2), 91.
- Taylor, N., & Noseworthy, T. J. (2020). Compensating for Innovation: Extreme Product Incongruity Encourages Consumers to Affirm Unrelated Consumption Schemas. *Journal of Consumer Psychology*, 30(1), 77-95.
- Taylor, N., Noseworthy, T. J., & Pancer, E. (2019). Supersize My Chances: Promotional Lotteries Impact Product Size Choices. *Journal of Consumer Psychology*, 29(1), 79-88.
- Taylor, S. F., Liberzon, I., & Koeppe, R. A. (2000). The Effect of Graded Aversive Stimuli on Limbic and Visual Activation. *Neuropsychologia*, 38(10), 1415 – 1425.

- Tingley, Dustin, Teppei Yamamoto, Kentaro Hirose, Luke Keele, and Kosuke Imai (2014).
“Mediation: R package for causal mediation analysis.”
- Todesco, P., & Hillman, S. B. (1999). Risk perception: Unrealistic optimism or realistic expectancy. *Psychological reports*, 84(3), 731-738.
- Top Tens. (2019). Companies and Products. Retrieved July 11, 2020, from
<https://www.thetoptens.com/companies-products/>
- Tremoulet, P. D., & Feldman, J. (2000). Perception of animacy from the motion of a single object. *Perception*, 29(8), 943-951.
- Tremoulet, P. D., & Feldman, J. (2000). Perception of animacy from the motion of a single object. *Perception*, 29(8), 943-951.
- Tritt, S. M., Inzlicht, M., & Harmon-Jones, E. (2012). Toward a Biological Understanding of Mortality Salience (and Other Threat Compensation Processes). *Social Cognition*, 30(6), 715–733.
- Tylor, E. B. (1871). *Primitive culture: researches into the development of mythology, philosophy, religion, art, and custom* (Vol. 2). J. Murray.
- United Nations Statistics Division (2018). Standard Country and Area Codes Classifications – Methodology. <https://unstats.un.org/unsd/methodology/m49/>.
- van Buren, B., & Scholl, B. J. (2017). Minds in motion in memory: Enhanced spatial memory driven by the perceived animacy of simple shapes. *Cognition*, 163, 87-92.
- Vignoli, T. (1882). *Myth and science: an essay* (Vol. 38). London: K. Paul, Trench,...
- Wall, M., & Heslop, L. A. (1986). Consumer Attitudes Toward Canadian-Made Versus Imported Products. *Journal of the Academy of Marketing Science*, 14(2), 27–36.

- Weinstein, N. D. (1980). Unrealistic optimism about future life events. *Journal of personality and social psychology*, 39(5), 806.
- Weinstein, N. D. (1989). Optimistic biases about personal risks. *Science*, 246(4935), 1232-1234.
- Wertenbroch, K. & Skiera, B. (2002). Measuring Consumers' Willingness to Pay at the Point of Purchase. *Journal of Marketing Research*, 39(2), 228–241.
- Westerman, S. J., Sutherland, E. J., Gardner, P. H., Baig, N., Critchley, C., Hickey, C., ... & Zervos, Z. (2013). The design of consumer packaging: Effects of manipulations of shape, orientation, and alignment of graphical forms on consumers' assessments. *Food Quality and Preference*, 27(1), 8-17.
- White, A. E., Li, Y. J., Griskevicius, V., Neuberg, S. L., & Kenrick, D. T. (2013). Putting all your eggs in one basket: Life-history strategies, bet hedging, and diversification. *Psychological Science*, 24(5), 715-722.
- Wichman, A. L. (2012). Uncertainty threat can cause stereotyping: The moderating role of personal need for structure. *Sage Open*, 2(2).
- Witte, K. (1996). Fear as motivator, fear as inhibitor: Using the extended parallel process model to explain fear appeal successes and failures. In *Handbook of communication and emotion* (pp. 423-450). Academic Press.
- Witte, K., & Allen, M. (2000). A meta-analysis of fear appeals: Implications for effective public health campaigns. *Health education & behavior*, 27(5), 591-615.
- Yoo, C. Y., & Kim, K. (2005). Processing of animation in online banner advertising: The roles of cognitive and emotional responses. *Journal of Interactive marketing*, 19(4), 18-34.
- Zaltman, G. (2003). *How customers think: Essential insights into the mind of the market*. Harvard Business Press.

Appendices

Appendix A: Details for Study 1 of Chapter 2

Stimuli

- *Stimuli for Product Congruity Manipulation.*

Congruent



Extremely Incongruent



- *Stimuli for Compensation Task—Product Categories and Brand Alternatives*
 - Soup Category: Campbell's, Amy's, Dole's, Imagine Creations, Progresso, Pacific Foods, Lipton, Trader Joe's, Nissin, Wolfgang Puck
 - Battery Category: Duracell, Energizer, Voyager, Eveready, Energizer, Panasonic, Toshiba, DieHard, PowerKing, Trojan
 - Vacuum Cleaner Category: Dyson, Hoover, Kenmore, Dirt Devil, Kent, Eureka, Electrolux, Oreck, Bissel, Shark
 - Smartphone Category: Apple, Samsung, Asus, Sony, Nokia, Motorola, LG, Blackberry, Lenovo, HTC
 - Coffee Category: Starbucks, Folger's, Maxwell House, Nescafe, Lavazza, Illy, Douwe Egberts, Jacobs, Chock Full O'Nuts, Eight O'Clock

Pilot for Study 1

I adapted a set of products, all of which incorporating the “black” attribute. Critically, this attribute was either congruent, moderately incongruent, or extremely incongruent with the category (taken from Jhang et al, 2012; images below). Participants ($N = 156$) were asked to rate

one of the three products on two seven-point items anchored by “atypical/typical” and “unusual/usual”. Participants were then asked to indicate how many mental steps would be needed to make sense of the product on a 0–5 sliding scale anchored by “few steps/many steps” (Jhang et al., 2012). These measures were employed to ensure the operationalization of product congruity. Participants then rated the state and trait anxiety subscales of State-Trait Personality Inventory used in the main studies (STPI; Spielberger and Reheiser 2009). Finally, participants moved on to indicating their preferred brand across five product categories used in study 1.

Stimuli used for Pilot Study 1



Manipulation Checks. A one-way ANOVA on typicality ($r = .81$) confirmed a significant main effect of the congruity manipulation ($F(2, 153) = 81.84, p < .001$). Specifically, the congruent product was perceived as far more typical ($M = 5.26$) than the moderately incongruent product ($M = 2.96; F(1, 153) = 64.09, p < .001$), which was perceived as more typical than the extremely incongruent product ($M = 1.65; F(1, 153) = 20.61, p < .005$). Furthermore, one-way ANOVA on mental steps taken revealed a significant main effect of the congruity manipulation ($F(2, 153) = 20.95, p < .001$), such that participants needed to take far less mental steps to make sense of the congruent product ($M = .94$) than the moderately incongruent product ($M = 1.80; F(1, 153) = 9.54, p < .005$), which needed far less mental steps to make sense of than the extremely incongruent product ($M = 3.08; F(1, 153) = 20.69, p < .001$). The results confirmed the three-level operationalization of product congruity.

State Anxiety. Controlling for trait anxiety ($F(1, 152) = 45.26, p < .001$), an ANCOVA on state anxiety ($\alpha = .91$) yielded a main effect of product congruity ($F(2, 152) = 7.93, p < .005$). Replicating prior research (Noseworthy et al., 2014), participants were more anxious after being exposed to the extremely incongruent product ($M = 2.08$) compared to the congruent ($M = 1.66; F(1, 152) = 11.32, p < .005$) and the moderately incongruent products ($M = 1.63; F(1, 152) = 12.46, p < .005$). Critically, there was no difference between congruent and moderately incongruent conditions ($p = .84$). This finding supported the notion that incongruity impacts anxiety only when it is extreme, but not when it is moderate enough to make sense of (Mandler, 1982; Noseworthy et al., 2014).

Compensation. A one-way ANOVA yielded a main effect of product congruity, such that participants were more likely to select dominant brands after being exposed extremely incongruent product (48%) than after being exposed to the congruent (31.4%, $\beta = .71, SE = .19, p < .001, OR = 2.09$), and the moderately incongruent products (32.7%, $\beta = .67, SE = .19, p < .001, OR = 1.96$). Critically, there was no difference between congruent and moderately incongruent conditions ($p = .74$).

Appendix B: Details for Study 2 of Chapter 2

Stimuli

- *Stimuli for Product Congruity Manipulation.*

Congruent



Extremely Incongruent



- *Stimuli for Compensation Task – Environmentally Friendly Products*

- Sub-Zero Trend Eco Dishwasher:
 - Has a standard 40 minutes cycle
 - Uses a recirculating water system to save water
 - Has powerful sprays but produces no sound
- Honda Accord Hybrid:
 - Has a low-emission hybrid 120-horsepower engine
 - Comes with standard cloth seats and standard AM-FM radio
 - Averages 35 miles per gallon
- Lysol Natural Household Cleaner
 - Made from biodegradable non-toxic materials
 - Contains no acids, dyes, or harsh chemicals
 - Not tested on animals

Pilot 1

The design for pilot study 2 ($N = 128$) was the same as the pilot study 1. The difference was that the set of congruent, moderately incongruent, and extremely incongruent products were adapted from the running shoe category. Furthermore, compensation task was altered to reflect the three environmentally friendly items used in study 2.

Stimuli used for Pilot A for Study 2.



Manipulation Checks. A one-way ANOVA on typicality ($r = .81$) confirmed a significant main effect of the congruity manipulation ($F(2, 125) = 77.86, p < .001$). Specifically, the congruent running shoe was perceived as far more typical ($M = 5.92$) than the moderately incongruent running shoe ($M = 2.95; F(1, 125) = 84.23, p < .001$), which was perceived as more typical than the extremely incongruent running shoe ($M = 2.03; F(1, 125) = 8.40, p < .005$). Furthermore, one-way ANOVA on mental steps taken revealed a significant main effect of the congruity manipulation ($F(2, 125) = 49.11, p < .001$), such that participants needed to take far less mental steps to make sense of the congruent running shoe ($M = .98$) than the moderately incongruent running shoe ($M = 2.11; F(1, 125) = 17.79, p < .001$), which needed far less mental steps to make sense of than the extremely incongruent running shoe ($M = 3.65; F(1, 125) = 33.27, p < .001$). The results confirmed the three-level operationalization of product congruity.

State Anxiety. Controlling for trait anxiety ($F(1, 124) = 50.56, p < .001$), an ANCOVA on state anxiety ($\alpha = .91$) yielded a main effect of product congruity ($F(2, 124) = 3.01, p = .052$). Replicating prior research (Noseworthy et al. 2014), participants were more anxious after being exposed to the extremely incongruent running shoe ($M = 1.79$) compared to the congruent ($M = 1.49; F(1, 124) = 4.56, p < .05$) and the moderately incongruent running shoes ($M = 1.50; F(1, 124) = 4.42, p < .05$). Critically, there was no difference between congruent and moderately incongruent conditions ($p = .94$). Similar to pilot study 1, this finding again supported the notion that incongruity impacts anxiety only when it is extreme, but not when it is moderate enough to make sense of (Mandler 1982; Noseworthy et al. 2014).

Green Preference. Green preference was measured through participants' preference of three environmentally friendly items, which was subsequently combined into a composite by taking the average of the three preference ratings. A one-way ANOVA on product preference confirmed a main effect of the congruity manipulation ($F(2, 125) = 3.01, p = .053$). As predicted, participants preferred the green products more after being exposed to the extremely incongruent shoe ($M = 6.85$) compared to evaluating the congruent shoe ($M = 5.84; F(1, 125) = 6.24, p < .05$), and compared to evaluating the moderately incongruent shoe ($M = 5.89; F(1, 125) = 5.76, p < .05$). There was no difference between congruent and moderately incongruent conditions ($p = .89$).

Pilot 2

The primary goal of pilot 2 ($N=86$) was to ensure that the I was not inadvertently tapping into a general increase in preference in unrelated domains, which would extend to items decoupled from the process of regaining meaning. Participants were randomly assigned to 2 conditions (product congruity: congruent vs. extreme). The pilot used a simplified questionnaire, where participants were exposed to the congruent or extremely incongruent running shoe, which was immediately followed by questions about their preferences in unrelated domains. For the preference task, I used the same stimuli and the same dependent variable as study 2. The only difference was that I eliminated attributes that referenced environmentally friendly qualities, and simply exposed participants to the picture of the products shown in Appendix B. If participants would prefer any product more after being exposed to extreme incongruity, then the results should indicate an increase in preference regardless of the 'green' attributes. However, if I am correct in my assumption that consumers are indeed compensating in unrelated domains by affirming their established beliefs, then simply seeing a product should not elevate preference. An independent samples t-test on preference revealed no significant differences between the congruent and extremely incongruent conditions ($M_{\text{ext.inc.}} = 5.95$ vs. $M_{\text{cong.}} = 6.03$, $p = .82$). Thus, when the items used in study 2 were decoupled from the process of regaining meaning, being exposed to extreme incongruity no longer elevated preference in unrelated domains, as expected.

Appendix C: Details for Study 3 of Chapter 2

Stimuli

- *Stimuli for Product Congruity Manipulation.*

Congruent



Extremely Incongruent



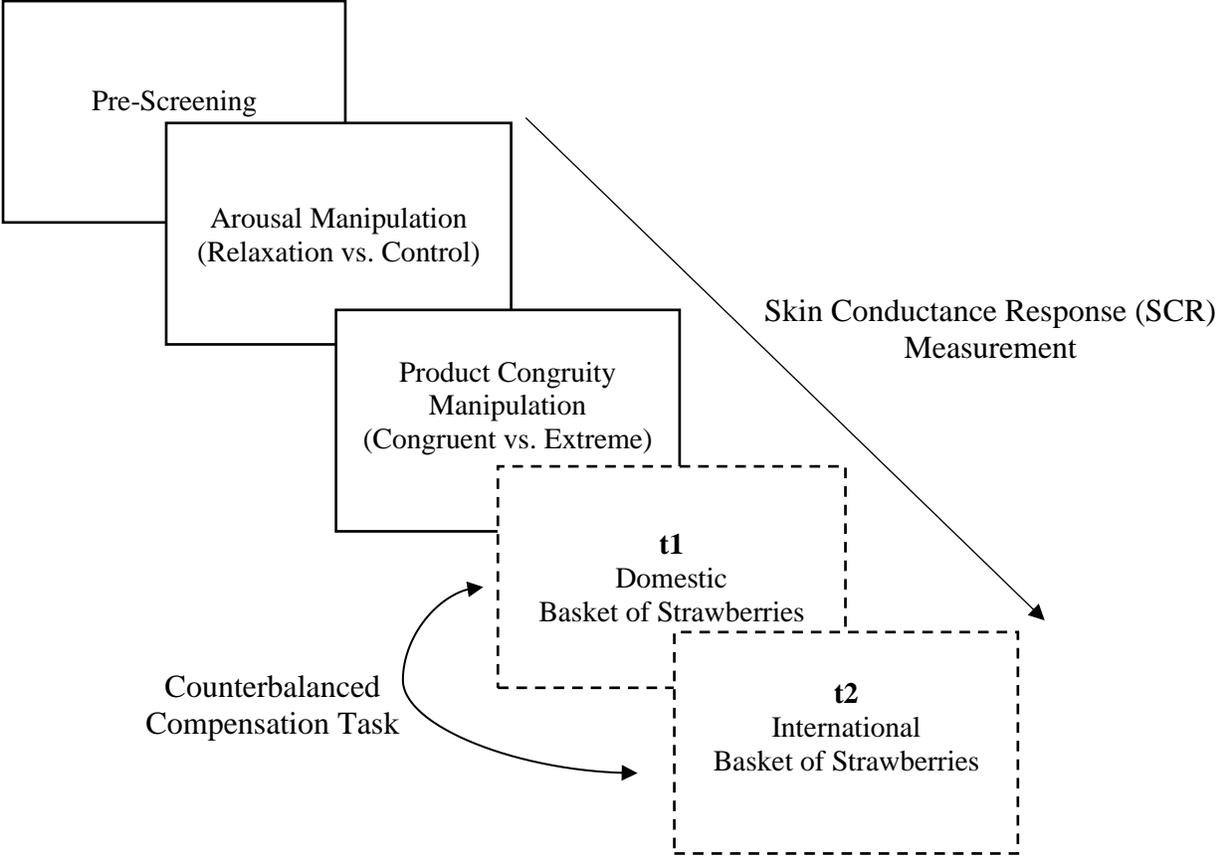
- *Stimuli for Compensation Task – Ethnocentric Product*



“Grown in [piped in cultural identification marker]!” vs. “Grown in [piped in random non - cultural identification marker]!”

Note: Because the product congruity stimuli used in Study 3 were validated by prior research in relation to the three-level operationalization of congruity, physiological arousal, and anxiety, a pilot test was deemed unnecessary for this set of stimuli.

Schematic Representation of the Procedures



Appendix D: Details for Study 4 of Chapter 2

Stimuli

Congruent



Extremely Incongruent



Pilot 1

The design for this pilot study ($N = 120$) was the same as the pilot study 1. The difference was that the set of congruent, moderately incongruent, and extremely incongruent products were adapted from the smartphone category (see below in colored format). Participants then indicated their preference for the three environmentally friendly products from study 2.

Stimuli used for Pilot 1 - Study 4

Congruent



Moderately Incongruent



Extremely Incongruent



Manipulation Checks. A one-way ANOVA on typicality ($r = .77$) confirmed a significant main effect of the congruity manipulation ($F(2, 117) = 60.96, p < .001$). Specifically, the congruent smartphone was perceived as far more typical ($M = 6.08$) than the moderately incongruent smartphone ($M = 3.28; F(1, 117) = 58.31, p < .001$), which was perceived as more

typical than the extremely incongruent smartphone ($M = 2.14$; $F(1, 117) = 9.54, p < .005$). Furthermore, one-way ANOVA on mental steps taken revealed a significant main effect of the congruity manipulation ($F(2, 117) = 46.85, p < .001$), such that participants needed to take far less mental steps to make sense of the congruent smartphone ($M = .77$) than the moderately incongruent smartphone ($M = 2.60$; $F(1, 117) = 31.66, p < .001$), which needed far less mental steps to make sense of than the extremely incongruent smartphone ($M = 3.90$; $F(1, 117) = 16.06, p < .001$). The results thus confirmed the three-level operationalization of product congruity.

State Anxiety. Controlling for trait anxiety ($F(1, 116) = 77.37, p < .001$), an ANCOVA on state anxiety ($\alpha = .88$) yielded a main effect of product congruity ($F(2, 116) = 3.60, p < .05$). Participants were more anxious after being exposed to the extremely incongruent phone ($M = 1.85$) compared to the congruent ($M = 1.53$; $F(1, 118) = 5.23, p < .05$), and the moderately incongruent phones ($M = 1.52$; $F(1, 116) = 5.59, p < .05$). No significant differences emerged between congruent and moderately incongruent conditions ($p = .94$).

Green Preference. Green preference was measured through participants' preference of three environmentally friendly items, which was subsequently combined into a composite by taking the average of the three preference ratings. A one-way ANOVA on product preference confirmed a significant main effect of the congruity manipulation ($F(2, 117) = 4.63, p < .05$). As predicted, participants preferred the green products more after being exposed to the extremely incongruent phone ($M = 7.40$) compared to evaluating the congruent phone ($M = 6.55$; $F(1, 117) = 6.48, p < .05$), and compared to evaluating the moderately incongruent shoe ($M = 6.49$; $F(1, 117) = 7.40, p < .01$). Critically, there was no difference between congruent and moderately incongruent conditions ($p = .86$).

Pilot 2

This pilot aimed to ensure that the changes in product evaluations observed in study 4 were not caused by temporal effects (i.e., a delay in time). The pilot employed the same experimental design as Study 4, but used a simplified questionnaire. Participants ($N = 190$) were presented with the congruent or the extremely incongruent smartphone. The preference task came either before (pre) or after (post) the product evaluation scale for the smartphone. For the preference task, I used the same stimuli and the same dependent variable as the pilot study 2 for study 2.

Preference. Following the procedures of Study 4, a preference composite was compiled by taking the average of the three preference ratings. A two-way ANOVA on revealed no significant effects (all $ps > .26$). Hence, in line with pilot 2 for study 2, when the task did not include a compensatory component (i.e., environmentally friendly attributes), participants' preference for the unrelated products did not vary as a function of whether they were exposed to a congruent versus extremely incongruent smartphone.

Product Evaluations. A two-way ANOVA on product evaluations ($\alpha = .97$) as a function of product congruity and order of preference task yielded a significant main effect of product congruity ($F(1, 186) = 26.94, p < .001$). As expected, participants evaluated the extremely incongruent smartphone far less favorably ($M = 3.55$) than the congruent smartphone ($M = 4.73$). Importantly, neither the order of preference task nor the order of preference task \times product congruity interaction was significant ($ps > .40$). This result thus confirmed that the changes in product evaluations observed in study 4 could not be accounted for by temporal effects.

Appendix E: Stimuli used in Study 1 of Chapter 3

- Safety-Relevant Positioning

◆ Baxtra



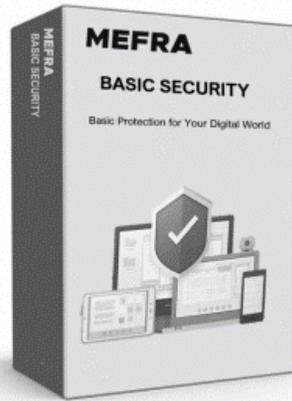
- Safety-Neutral Positioning

◆ Baxtra



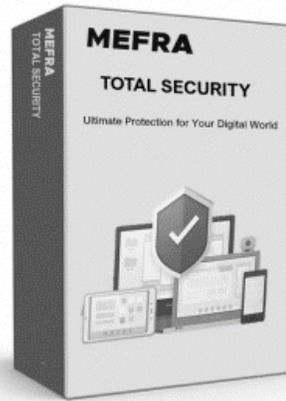
Appendix F: Stimulus used in Study 2 of Chapter 3

MEFRA



Price : \$29.99 (1 year)

- ✓ Blocks viruses, cryptolockers & other threats
- ✓ Can be installed in up to 3 devices



Price: \$49.99 (1 year)

- ✓ Blocks viruses, cryptolockers & other threats
- ✓ Can be installed in up to 3 devices
- ✓ Protects payments, with bank-grade encryption
- ✓ Secures passwords & images of personal documents
- ✓ Stops webcam spies watching you in your home
- ✓ Helps guard kids – advanced parental controls

Appendix G: Stimulus used in Study 3 of Chapter 3



ORNIA BACKPACK

Protect your money, credit cards, ID, and more



- ✓ Special fabric (Exomesh Slashguard) that helps protect against slash-and-run theft
- ✓ Multiple lockdown points for zippers that prevents pickpockets
- ✓ RFIDsafe blocking material protects IDs and credit cards from hacker scanning