

CAPTURING THE ESSENCE OF BEING HUMAN:
TWO MARKETING TOOLS THAT RELY ON ANTHROPOMORPHIZATION TO
WORK

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DEDICATION

To my parents, whose infinite belief in me gives me the courage to never stop trying.

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ABSTRACT

Technology has facilitated production processes that are mechanized and impersonal. With the increasing mechanization and automation of the value chain, marketers may find it valuable to remind consumers that there is a human source behind marketing activities. My dissertation comprises of two essays that focus on subtle, but impactful, marketing cues that make the human source salient. Specifically, I identify handwritten fonts (essay 1) and round-numbers (essay 2) as means by which the essence of being human can be captured and examine when, and why, these cues lead to positive (essay 1) versus negative (essay 2) consumer response.

Essay 1 (chapter 2) investigates how product packaging using handwritten (vs. typewritten) fonts can increase product evaluation. It argues that the favorable evaluation stems from a response to handwritten fonts as subtle anthropomorphic cue. The extant literature has relied largely on overt anthropomorphic cues (e.g. human form and features) that evoke the tendency to anthropomorphize. In the current work, I propose that from a visual standpoint, anthropomorphism may occur also from activating the salience of a human source and introduce handwritten fonts as one such cue.

Essay 2 (chapter 3) examines the role of numerical precision in surge pricing and its impact on consumer's price fairness perception. I show that the surge price in the form of round (vs. precise) numbers will decrease consumer's fairness perception in circumstances where ease of justification is low and thus the motivation to anthropomorphize (attribute to a human source) is high. I argue that the effect stems from the human tendency to round-off numbers, and such inference is particularly

magnified in occasions where there is need to justify and make sense of one's choice by attributing the surge to a human (versus non-human) source.

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CHAPTER 1
DISSERTATION OVERVIEW

Overview of Dissertation: Key Constructs.

This dissertation comprises of two essays that deal broadly with the notion of anthropomorphism. The schematic below highlights the relationships between the different constructs in this dissertation. While each individual essay will build on the constructs in the context of the essay, the current chapter delves into the extant literature regarding each of the key constructs.

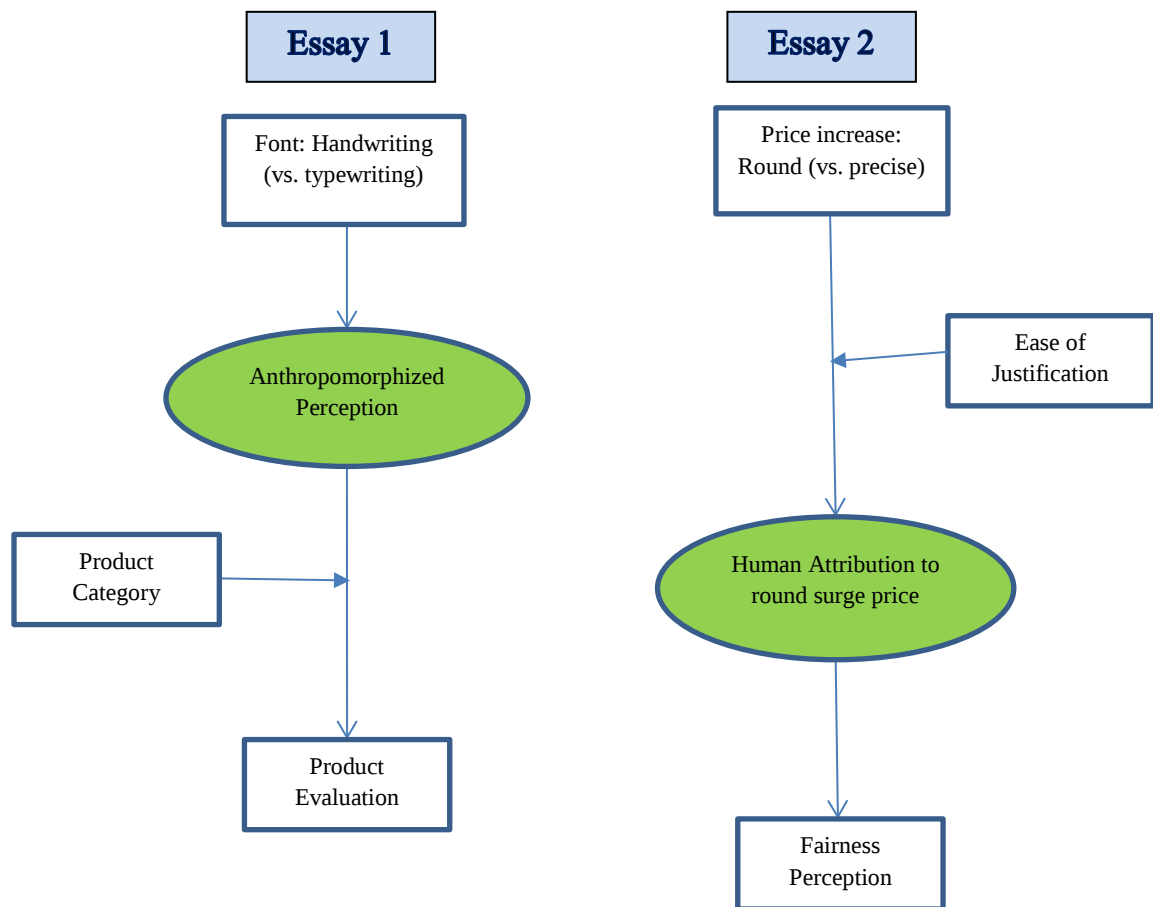


FIGURE 1

SUMMARY SCHEMATIC: ANTHROPOMORPHISM TIES THE TWO
ESSAYS TOGETHER

In this chapter, I will first focus on handwriting and then on numerical precision as the main constructs that activate the notion of “human-ness”. I will then outline an overview of the anthropomorphism literature, which is the construct that ties the two essays together. This chapter will then conclude with the outline of research questions and key hypotheses for each essay.

Handwriting

Handwriting began being used as a communication tool around 3000 BC, and soon ancient cultures around the globe began to record history, document events, and communicate information using the handwritten word (www.britishmuseum.org). At first, handwriting was just simple pictographs, used to represent people, locations, and objects, but later different pictographs combined to represent more abstract ideas. As the price of parchment rose, a denser style of writing developed to save time and space. These concerns led to the cursive form of handwriting developed by Italians around the 15th century (Cohen 2012). At around that time, elegant handwriting emerged as a sign of social status. Before 1800 and the democratization of handwriting, one could associate a person’s handwriting with his/her profession or social rank. It is apparent that handwriting had evolved over the centuries to become not just a communication tool, but a social status symbol and a representation of an individual’s identity (Kettle and Häubl (2011). As this evolution continues in an increasingly digitized world, it seems that handwriting is distinguished by the manner it is generated and therefore by how it is associated with being human.

Before getting deeper into the connection between handwriting and being human, I allocate a few paragraphs talking exclusively about handwriting, its history, what we know about it and why it has a unique character.

Handwriting: What It Says about Us versus What It Says to Us

Over the years, people have been interested in the question of whether the appearance of one's handwriting signals something beyond legibility and penmanship, such as personal identity or human expression. Many scholars are skeptical of graphology and refer to it as a pseudoscience, and there is no scientific research to my knowledge that shows a relationship between handwriting style and personality traits. However, there is research that suggests a correlation between handwriting style and subjective attributions of personality (Aiken Jr and Zweigenhaft 1978; Warner and Sugarman 1986). Warner and Sugarman (1986) found that handwriting was more consistently judged as providing information on the potency dimension of personality. Indeed, it is often natural to try and guess someone's gender or personality from a sample of handwriting. Interestingly, new medical studies show that age and emotional state influence the physical appearance of our writing (Dresbold 2008; Engel-Yeger, Hus, and Rosenblum 2012). For instance, age appears to influence the level of handwriting pressure as well as spatial (letter size) measures and sensory-processing abilities has been suggested to mediate this effect (Engel-Yeger et al. 2012).

While the majority of the academic discussion so far has focused on what handwriting signals about us, the current work focuses on our response to handwriting as a stimulus. So what do we know about how we respond to handwriting? There are two

main sets of literature to draw on: the marketing literature on fonts and the neuropsychology literature on recognition of handwriting.

Research on fonts has interested marketers for decades, especially in the context of brands and logos (Childers and Jass 2002; Doyle and Bottomley 2006; Grohmann, Giese, and Parkman 2013; Hagtvedt 2011; Henderson, Giese, and Cote 2004; Li and Suen 2010; Oosterhout 2013; Orth, Campana, and Malkewitz 2010; van Rompay and Pruyn 2011). Henderson et al. (2004) categorized font design into six prominent dimensions: three universal dimensions (elaborateness, naturalness, and harmony) and three specific design dimensions. These authors then examined the relationship between these dimensions and consumer responses. For instance, they found that naturalness and harmony had a large effect on how pleasing the type font was. Naturalness includes how active, curved, organic, slanted, and typed (negative load) the font is, and handwriting is typically characterized as high on the naturalness dimension (Henderson et al. 2004). Grohmann et al. (2013) also examined type font characteristics to see how they can influence brand personality perception. They found that naturalness was a dominant driver of brand personality perceptions that favorably influenced how exciting, sincere, sophisticated, rugged, and competent a brand appeared to be. In another study, van Rompay and Pruyn (2011) demonstrated that the symbolic meaning connoted by typefaces and shapes influenced the perception of brand credibility. Specifically, they showed that the congruence between product shape and typeface (e.g. tall bottle with a luxurious typeface) positively affected perceived brand credibility. All of these studies support the idea that font characteristics can affect the perception and evaluation of a brand. There is also another stream of research that examines fonts from the readability

(fluency) perspective mainly in health related contexts (Shrank et al. 2007; Song and Schwarz 2008). For example, pregnant women found a maternal health program easier to understand when it was written in an easier font (Manley, Lavender and Smith 2014). The current research focusses on a specific type of font – handwriting - and conceptualizes it as a natural font that is endowed with humanlike elements.

Table 1 summarizes the key papers and insights from the typeface literature that inform this dissertation.

TABLE 1: OVERVIEW OF THE TYPEFACE LITERATURE AND KEY FINDINGS

Study by (chronological order):	Key Insights
Childers and Jass (2002)	Visual properties of typeface influenced the brand perceptions depending on the level of product involvement.
Henderson et al. (2004)	Giving empirically based and systematic guidelines to managers to choose a right typeface for a specific impression (exploratory study)
Doyle and Bottomley (2006)	The appropriateness of a font is a function of the consistency between the product and connotative meaning of the font.
Shrank et al. (2007)	Literature review on the effect of prescription labels' content and format on readability, comprehension and health outcomes
Song and Schwarz (2008)	Difficulty of fonts affected estimation of effort needed to execute a behavior and thus negatively influenced willingness to engage in the behavior,
Li and Suen (2010)	Correlation between typeface design and their personality traits is studied.
Hagtvedt (2011)	Incomplete typeface logos have been shown to have a negative

Study by (chronological order):	Key Insights
	influence on perceived firm's trustworthiness, but a positive impact on perceived firm's innovativeness.
van Rompay and Pruyn (2011)	The importance of shape-typeface congruence on brand perception is demonstrated.
Grohmann et al. (2013)	The effect of type font design characteristics on brand personality has been shown, with naturalness, flourish and harmony as being the significant predictors.
Manley, Lavender and Smith (2014)	Pregnant women rated the interventions as more complex when presented with difficult-to-read fonts (less fluent) than easy-to-read ones.

Wired to Respond to Handwriting

Neuropsychological literature finds that the recognition of handwritten versus printed characters can be disturbed following a brain lesion (van Atteveldt, Blomert, and Schwarzbach 2002; Williams 1984). Corcoran and Rouse (1970) demonstrate that brain lesioned patients found it harder to recognize words when handwritten and printed exemplars were mixed in the same session than when they were presented separately. These findings suggest that the cognitive architecture relied upon for processing handwriting might be different than that used to process machine-produced fonts (Grainger, Rey, and Dufau 2008).

Longcamp and her colleagues (Longcamp et al. 2003; Longcamp et al. 2008; Longcamp, Hlushchuk, and Hari 2011; Longcamp, Tanskanen, and Hari 2006) use fMRI data to demonstrate that recognizing handwritten letters might rely on distinct processes, possibly related to motor knowledge. For instance, Longcamp et al. (2011) showed that

the supplementary motor area (SMA), an area that is involved in planning and control of voluntary actions, becomes more active when exposed to handwriting than typewriting. Based on the brain activation patterns, these authors conclude that handwriting may activate the memory representations of the actual letter formation and might also engage the reader to simulate the hand actions associated with writing.

This notion that handwriting is a developmental milestone and intrinsically linked to a unique cognitive architecture is supported by research which shows that handwriting helps school children develop not only relationship skills, but hand-eye coordination and visual-motor skills as well (Kaiser, Albaret, and Doudin 2009; Summit; Weil and Amundson 1994). In fact, new research shows that the benefit by writing with hand is not restricted to children. Adults were taught how to produce some new characters either by a computer keyboard or pen and paper writing. Those who had written by hand were found to have a longer lasting recognition of graphic shapes and letters (Longcamp et al. 2008). Handwriting has also been shown to have connection with generation of thoughts and ideas (Berninger et al. 2006). Using the hand to write is posited to be a whole body experience (Wilson 1998). Mueller and Oppenheimer (2014) found that taking notes by laptop (vs. by hand) can result in shallower processing. Students who take notes by hand have been found to perform better on conceptual questions. Handwriting, thus, is more than just a font exemplar, but “a complex perceptual-motor skill encompassing a blend of visual-motor coordination abilities, motor planning, cognitive, and perceptual skills as well as tactile and kinesthetic sensitivities” (Feder and Majnemer 2007, 313).

Numerical Precision

The presence of numerical information is not only ubiquitous in pricing and marketing, but also in our everyday communications. That is why the psychology behind the numbers has attracted many researchers over the years. The numerical cognition literature, which encompasses research related to various aspects of numerical markers have enhanced our understanding of how numbers are represented in people's minds. One of the most investigated numerical properties is numerical precision, which is going to be the focus of this section.

Previous research has defined round and precise numbers in different (though still similar) ways. Round numbers can be defined either in terms of their mental salience, such as 10, 20, and 15 (Dehaene and Mehler 1992; Schindler and Kirby 1997; Schindler and Yalch) or as their precision, which relates to the number of decimal places or zeros at the end (Janiszewski and Uy 2008; Thomas, Simon, and Kadiyali 2010; Yan 2016). Scholars have also used different terms to refer to the same idea. For instance, round numbers have sometimes been referred to as imprecise numbers and precise numbers have been referred to as sharp numbers in many instances. In this dissertation, round numbers are operationalized as those that are presented as digits without decimal points while precise numbers as those presented with decimal points.

According to prior literature, consumers respond differently to round versus precise numbers. For instance, Thomas, Simon and Kadiyali (2010) show that in large pricing contexts (e.g. housing prices), buyers underestimate the magnitude of precise (vs. round) prices and this leads them to negotiate less. Mason et al. (2013) arrive to the same conclusion about the effect of price precision in a negotiation context, but with different

reasoning. They argue that such an effect can be partially explained by the perception that negotiators who use precise offers seem to be more informed than ones who use round offers. Precise (vs. round) numbers have also been shown to signal competence (Xie and Kronrod 2012) and to be perceived as more objective (Schindler and Yalch 2006) in domains such as in advertising claims. In contrast, ample evidence from the fluency and conversational norms literature supports the advantage of simplification and shows the upside of using round numbers. For instance, Wieseke, Kolberg and Schons (2016) demonstrate that in purchase settings where convenience is of high importance, round (vs. nonround) prices increase sales. The tendency to select round prices is also strong in pay-what-you-want situations (e.g. leaving tip at restaurants; Lynn, Flynn and Helion 2013) and when the purchase decision is driven by feelings (e.g. luxurious or recreational purchases; Wadhwa and Zhang 2015). Yan and Pena-Marin (2017) show that in a negotiation setting, precise (vs. round) offers does not always lead to a win situation for offer makers because it can result in a reduction in the magnitude of counteroffers). In fact, when negotiators think about closing a deal, they are more likely to accept the offer when presented with a round (vs. precise) number.

The general assumption underlying the aforementioned literature is that round numbers are frequently used as an approximation and are more mentally salient and in general more frequent (Mason et al. 2013; Schindler and Yalch 2006). There is ample evidence that shows the extent to which round numbers are frequently used in verbal and written language (Dehaene and Mehler 1992; Jansen and Pollmann 2001). The system of number approximation is so innate that it doesn't necessitate the language-based counting system and can rely fundamentally on nonverbal "number sense" (Pica et al. 2004).

Although the assumption makes perfect sense in many settings, we should note that in the age of computers and apps, consumers are frequently exposed to precise numbers as well. Thus, maybe the assumption can be more precisely put as the following: round numbers are more frequent only in human communication. What is also missing from the prior literature is that it has mainly focused on contexts where the communication derives from a human being, e.g. in negotiations (Yan and Pena-Marin 2017). An exception is the work by Zhang and Schwarz (2013), which shows that participants' estimates were more strongly influenced by precise (vs. round) numbers, but only when the speaker was assumed to be cooperative (e.g. message coming from a human communicator rather than a computer program). In this research, I will focus on surge prices (a type of price increase) that are offered in a collaborative consumption setting. Although these prices are commonly communicated by an app, which is intuitively assumed to be calculated by an algorithm, I believe that the nature of surge pricing in the online marketplace can affect people's intuitions about the source of the price setting and make them susceptible to external cues such as price precision.

TABLE 2: OVERVIEW OF THE NUMERICAL PRECISION LITERATURE AND KEY FINDINGS

Study by (chronological order):	Key Insights
Schindler and Yalch (2006)	Advertising claims using precise (vs. round) numbers are less likely to be perceived as estimates and thus more believable.
Janiszewski and Uy (2008)	Precise (vs. round) anchors leads to estimates closer to the anchor value, because they are represented along a fine-resolution (vs. coarse-resolution) scale.
Thomas, Simon, and Kadiyali (2010)	Being unaccustomed to seeing large precise prices, leads to a bias in magnitude judgement of precise (vs. round) prices.

Study by (chronological order):	Key Insights
Xie and Kronrod (2012)	When numerical information used in advertising claim is more precise (vs. round), the advertised company is perceived to be more competent.
Zhang and Schwarz (2013)	Precise (vs. round) numbers were more influential on subsequent estimates, only when they were presented by a cooperative communicator consistent with Gricean maxim of conversation norms.
Mason et al. (2013)	Precise (vs. round) offers imply a greater level of knowledge in negotiations, and thus negotiators who use these numbers are more likely to anchor their counterparts.
Loschelder, Stuppi, and Trotschel (2014)	In negotiations, precision moderates the effect of anchor extremity, meaning that the anchoring potency of first offers is magnifies by precise offers.
Jerez-Fernandez, Angulo, and Oppenheimer (2014)	Precise (vs. round) numbers can be interpreted as confidence signals, and thus increase the likelihood of seeking advice from communicators who use precise (vs. round) numbers.
Backus, Blake and Tadelis (2015)	Some sellers use round (vs precise) numbers to signal their weak bargaining position (e.g. willingness to cut prices) and sell faster.
Wadhwa and Zhang (2015)	Round prices encourage reliance of feelings, whereas precise prices encourage reliance on cognition. They attribute the effect to the fluency in which the round (vs. precise) numbers can be processed.
Wieseke, Kolberg and Schons (2016)	Since consumers perceive round (vs precise) numbers as more cognitively accessible, in purchase situations where convenience is highly desirable, round (vs. precise) prices increase sales.
Yan (2016)	People project gendered meanings to precise (masculine) versus round (feminine) numbers.
Yan and Pena-Marin (2017)	In a negotiation, when the concept of closure is made salient, the likelihood of accepting an offer is higher when it is presented with round (vs. precise) numbers.

Anthropomorphism

In order to understand anthropomorphism better, let's first define a highly related construct called dehumanization. Dehumanization is a psychological process where another human being is viewed as less human and denied human capacities such as

thoughts and emotions (Waytz, Epley, and Cacioppo 2010). Although pioneering work on dehumanization centered on blatant dehumanization characterized by overt hostility and conflict which facilitates violence and aggression against the dehumanized group, recent conceptualizations of dehumanization have also focused on more subtle expressions to examine everyday instances of dehumanization, characterized by attributing less human emotions and traits to the other group. Factors like similarity and distance can influence the tendency to dehumanize. For instance, socially distant out-groups or ones that are seen as most dissimilar, like homeless people, are frequently dehumanized. In contrast, there are times when we attribute human traits, where none actually exist. The literature calls this form of attribution anthropomorphism. My dissertation seeks to explore the latter issue, in a marketing context where production and consumption processes are viewed as largely automatized and impersonal. I am specifically interested in subtle cues in the environment that are able to activate the human source behind the marketing activities.

As briefly mentioned in the previous sections, marketing cues such as handwriting and round numbers are associated with being human. To understand the consequence of such associations, a focus on anthropomorphism becomes important. In the section that follows, I will explain how and why we attribute human characteristics to non-human agents.

Anthropomorphism is comprised of two Greek words *anthropos* and *morphe*: former meaning human and latter meaning form or shape. The Oxford Dictionary (Soanes & Stevenson, 2005) defines anthropomorphism as the “attribution of human characteristics or behavior to a god, animal, or object” (p. 66). Epley, Waytz, and

Cacioppo (2007) similarly argue that anthropomorphism entails “attributing humanlike properties, characteristics, or mental states to real or imagined non-human agents and objects.” It is a capacity that we all share as humans. It is generally considered an automatic psychological process in human judgment (Stewart, 1993) and can range from attributing a natural disaster to an intentional agent (e.g. god¹), to occasionally treating one’s car or computer like a human. However, we do not see human in the non-human everywhere or all the time. For instance, we sometimes treat our pets as if they have minds, but not always. We seem to be bothered by the thought of killing some animals, but not vegetables. It is evident that we are sometimes triggered to engage with the mind of others, but not always. The question then is what factors lead one to see a mind in a non-human entity? Anthropomorphism basically entails an induction inference, which starts with highly accessible knowledge and is affected by three key psychological determinants (Sociality, Effectance, and Elicited agent Knowledge) according to the SEEK model proposed by Epley, Waytz, and Cacioppo (2007a). Before describing each determinant, it should be noted that each of these determinants can get activated by a broad arrays of variables, including dispositional variables (stable personality traits), as well as situational variables (temporary aspects of environment), developmental factors, and cultural influences, which vary across time and place. For instance, need for cognition is a dispositional factor that influences the degree to which we rely on readily accessible self-knowledge and decrease the extent to which we make anthropomorphic inference. Another dispositional factor, chronic loneliness, influences the motivation to

¹ New Orleans Mayor Ray Nagin famously explained the impact of Hurricane Katrina in anthropomorphic terms, “Surely God is mad at America. Surely he’s not approving of us being in Iraq under false pretense. But surely he’s upset at Black America, too. We’re not taking care of ourselves” (Martel, 2006, p. A04).

seek social connection. For instance, a group of researchers (Epley 2014; Epley, Waytz, and Cacioppo, 2007b) found that people who are chronically lonely (a dispositional variable), and so are in desperate need for social connection, are more likely to see intention and mindfulness in the universe and their pets. However, since my dissertation specifically focuses on subtle environmental factors, I will explain each of the psychological determinants with the focus on how they are influenced by situational variables.

The first determinant is a cognitive determinant called elicited agent knowledge, which means that the knowledge about humans in general serves as the basis of induction about the characteristics of an unknown agent. As the knowledge about the non-human agent grows, it is less likely that knowledge about humans is used as the basis of induction. This determinant is concerned about the cognitive factors that increase the chance of anthropomorphic representation of non-human agents. From a situational standpoint, this essentially means anthropomorphism can be triggered by our perception of how much the stimulus looks like a mind. For instance, we are so supersensitive to eyes, that even a picture of human eye can makes us behave differently. This has nicely been shown by (Bateson, Nettle, and Roberts 2006), who put an honesty box in their department coffee room showing either a picture of a human eye or a flower over a period of ten weeks. What they found out was that a picture of human eye (vs. a flower) was sufficient to make professors pay roughly three times more for their coffee. Another study by Morewedge, Preston, and Wegner (2007) has shown that a robot's speed needs to be close to human speed in order for the robots to be humanized.

The second determinant is a motivational factor called effectance. Effectance describes the motivation to reduce the uncertainty related to agent's behavior and be able to predict its action. When effectance motivation is high, anthropomorphism is more likely to be utilized in order to resolve uncertainty, increase predictability and seek meaning. Perceptual cues cannot explain why we may attribute minds to hurricanes, why we imagine gods responsible for the natural disasters or even why we get mad at our computers when they malfunction. An interesting study by (Waytz et al. 2010) asked participants to evaluate Clocky, an alarm clock with a humanlike face, on how much it appears to have intentions and mind of its own. In one condition, Clocky was described as a predictable gadget, where as in the other condition, it was described as an unpredictable gadget, e.g. running away from you when you press snooze. It turned out that unpredictable (vs. predictable) gadgets were seen to be more mindful. It seems that perceiving such subjects as mindful provides as intuitive explanation for behaviors that are difficult to explain or hard to make sense.

The third determinant, again motivational, is sociality. It is basically the need of social connection. People especially anthropomorphize, when the social connection with other humans is absent. Even momentary feelings of rejection and isolation have been shown to increase the tendency to anthropomorphize (Epley, Akalis, Waytz, and Cacioppo 2008; Chen, Wan, and Levy 2016). In one experiment, they showed that those who were induced to feel lonely (compared to afraid or neither) were more likely to pick supportive anthropomorphic traits to describe their pets. This motivation can explain why social disconnection, such as the loss of a loved one, can increase the strength of one's religious beliefs (Glick, Weiss, and Parks 1974; Michael et al. 2003).

Since the first determinant is based on cognitive (perceptual) factors that increase the likelihood of anthropomorphization, the first essay of this dissertation solely concentrates on the first determinant (Elicited agent Knowledge) as a building block to justify how handwriting (an unconventional anthropomorphic cue) elicits anthropomorphic tendencies. The second essay also argues that round (vs. precise) numbers are more likely to make a human mind salient (Elicited agent Knowledge), but mainly uses the second determinant (effectance motivation; the motivation to resolve uncertainty and make sense of the situation) to specify when round surge prices activate the human knowledge.

Consumer's response to Anthropomorphism

As mentioned previously, from a cognitive standpoint, when we talk about situational influences, similarity of the target to the human/self is an important factor. Any perceived similarity of targets to one's concept of human or self should influence the accessibility of anthropomorphic knowledge (Mussweiler 2003). One of the dimensions of similarity that is particularly important is morphological similarity, the extent to which the observable features of a non-human agent look humanlike. For instance, very young children assign intentions to an action only when it is performed by a humanlike hand, but not by a wooden rod (Woodward 1999). In fact, using human-like features appears to be widespread between marketers (e.g. Siri, Michelin Man). This might be one of the reasons as to why marketing researchers have become interested in better understanding this phenomenon in recent years (Aggarwal and McGill 2007; Chandler and Schwarz 2010; Landwehr, McGill, and Herrmann 2011). As MacInnis and Folkes (2017) discuss, in consumer research, human-like features have typically induced by either visual, verbal

or rhetorical devices. Some researchers have used features in their brands that resemble the human face or body (visual cues; Hur, Koo, and Hofmann 2015; Kim and McGill 2011), others have labeled their brand as gendered or gave it a human name (verbal cues; Chandler and Schwarz 2010; Waytz, Heafner, and Epley 2014), while some have given their brand a human character or role without necessarily using any visual or verbal cues (rhetorical devices; Mark and Pearson 2001)

Now, the question is how do consumers respond to these human-like features? Research has suggested that people respond to a car's front similarly to a human's face (Landwehr, McGill, and Herrmann 2011; Windhager et al. 2010). Recently, Wan, Chen, and Jin (2016) found that anthropomorphism can affect consumer's information processing, leading them to have a greater preference for products with superior appearance. However, the response to anthropomorphic design is not always cognitive. In fact, Miesler, Leder, and Herrmann (2011) have shown that the detection of facial features in design activates an affective response. They showed that people have a more innate evolutionary-based positive affective response to car fronts with baby-face design than to the original design.

Interestingly, our response to anthropomorphized objects is not even limited to affective, but extends to behavioral response. For the liked brands that are seen as partner instead of servant, anthropomorphizing the brand would result in a behavior assimilative to the brand's image (Aggarwal and McGill 2012). For instance, participants who liked the Krispy Kreme brand (unhealthy partner brand) were less likely to take the stairs (unhealthy behavior) when they were asked to anthropomorphize the brand as opposed to ones in the object condition. The behavioral response is also evident in works that

investigate the sociality motivation of anthropomorphism. It has been shown that people with a high preference for solitude are more likely to create companionship tendencies toward a book with a human face on the cover compared to a book with geometrical pattern. However, no such pattern has been shown for people with a low preference for solitude (Valenzuela and Hadi 2011). On the other hand, Mourey, Olson, and Yoon (2017) found that interaction with anthropomorphic products following social exclusion reduced the need for social assurance leading to reduction in the effects of social exclusion.

Although there is ample evidence on the positive side of anthropomorphism, prior research has also shown the other side of the coin. Aggarwal and McGill (2007) for instance, demonstrated how presenting the products in human terms might backfire. If the presentation schema is congruent with product features (the features are readily seen as human), then it will lead to satisfaction; otherwise, it could lead to less positive product evaluation. Anthropomorphism can undermine self-control as well. In a series of studies, Hur, Koo, and Hofmann (2015) showed that anthropomorphizing a temptation (e.g. a cookie) impaired self-control and increase indulgence by decreasing the experience of conflict toward product consumption. Anthropomorphism may not be an all positive feature in the entertainment industry. Also, despite the fact that digital assistants with human features are prevalent as part of a help system in computers, Kim, Chen, and Zhang (2016) found that consumers enjoyed a computer game less when they got help from such assistants as opposed to help features construed as mindless, because they felt that their autonomy was undermined. The negative consequence of anthropomorphism has also been demonstrated in the context of poor outcomes, such as when a brand faces

negative publicity (Puzakova, Kwak, and Rocereto 2013) or when it raises prices (Kwak, Puzakova, and Rocereto 2015).

Consumer response to anthropomorphism also depends on individual characteristics. For instance, materialists seem to respond more favorably than nonmaterialists to servant brands that are anthropomorphized (Kim and Kramer 2015). People low in interpersonal trust have also been shown to be more persuaded by anthropomorphic messengers (vs. human spokespeople), while this pattern does not hold for people with a high levels of interpersonal trust (Touré-Tillery and McGill 2015).

The first essay of this dissertation mainly explores consumers' response to anthropomorphism in a positive/neutral environment (product packaging). However, the second essay looks into this subject in a relatively negative context (surge price).

Research Questions and Hypotheses for Essay 1 and 2

Essay 1

Research Questions and Hypotheses

Essay 1 explores consumers' response to handwritten product labels. Does a handwritten (vs. a typewritten) product label lead to higher product evaluation? If so why? Does it have to do with the way we encode handwriting?

Hypotheses:

H1: A handwritten product label is more likely to be encoded as an anthropomorphized stimulus than a typewritten one as indicated by approach tendency and anthropomorphic perception scales.

H2: A handwritten product label (vs. a typewritten one) will lead to more favorable product evaluation.

H3: The effect of the handwritten (versus typewritten) product label on evaluation is mediated by anthropomorphic perceptions of the stimulus.

H4: The effect of the handwritten (versus typewritten) product label on evaluation is moderated by the inherent approach-avoidance motivation associated with the product category.

Essay 2

Research Questions and Hypotheses

Essay 2 investigates consumers' response to numerical information in surge prices. Does surge price precision (round vs. precise) influence consumers' price fairness perceptions and their subsequent behaviors? When does such information make a difference? And what is the underlying mechanism?

Hypotheses:

H1: When ease of justification is low, a round (vs. precise) surge price will lead to a higher perception of an intentional agent, human being (vs. computer) as the one responsible for setting the price.

H2: In cases where ease of justification is low, a surge price in the form of a round (vs. precise) number will lead to lower fairness perception. However, when ease of

justification is high, numerical precision of a surge price will not affect fairness perception.

H3: When ease of justification is low, a round (vs. precise) surge price will lead a higher likelihood of consumers to choosing an alternative option and this is mediated by their fairness perceptions. When ease of justification is high, numerical precision of a surge price will not affect the likelihood of choosing an alternative option.

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CHAPTER 2

THE POWER OF THE PEN: SUBTLE ANTHROPOMORPHIZATION FROM THE USE OF HANDWRITTEN FONTS ON PRODUCT PACKAGING

Abstract

Four experiments demonstrate that consumers anthropomorphize products that use handwritten (vs. typewritten) fonts on their packaging. We theorize that a handwritten (versus typewritten) font acts as a subtle anthropomorphic cue that elicits favorable product evaluations. A pilot study quantifies the use of handwritten fonts in four grocery product categories to establish that the study of handwritten fonts on packaging is a worthy one with managerial significance. Study 1 uses real products to show that a product label with a handwritten font elicits an approach tendency indicative of anthropomorphization, and, more favorable product evaluations, compared to a product label with a typewritten font. Studies 2 and 3 demonstrate that this effect stems from a response to handwritten fonts as a subtle anthropomorphic packaging cue. In addition, study 3 identifies inherent approach-avoidance motivation associated with the product category as a boundary condition for the effect and rules out alternative explanations such as attractiveness and uniqueness. Study 4 uses a simulated store setup with actual products to illustrate the preference for handwritten (typewritten) fonts when choosing approach (avoidance) product categories. The implications of this research for marketing practitioners, contributions to marketing theory, and directions for future research are discussed.

When the grocery chain HEB decided to launch its private label Primo Picks, it chose a handwritten font to signify the brand name, to use on product packaging and for in-store signage. Perhaps this choice of a handwritten font as part of the new brand's visual identity was to communicate the warmth and friendliness of the brand and to personalize the brand message. Perhaps it was a competitive move to match Trader Joe's, which uses a handwritten typeface in its logo, on price labels in store and on packaging. Many brands, including Trader Joe's, Disney and Kellogg's choose to use a handwritten font as part of their visual brand identity. Brands like Wendy's, Gatwick Airport and Pizza Hut have recently undergone a brand revitalization exercise in which they have moved away from regular typewritten fonts to distinctly handwritten ones (de Castella 2010; Munukutla 2013; see Appendix A that visually documents these examples). In a recent article on modern typeface design (Rhodes 2015), Type Supply founder Tal Leming emphasized the importance of font design in the current digital environment saying "Three tech behemoths – Apple, Google, and Microsoft – recognize the crucial role typography plays in the user experience, which is why each has invested in designing a homemade font for its operating system." Common intuition by marketers, supported by research on typeface design, would categorize handwritten fonts (also referred to in the industry as cursive, script, penmanship or freehand fonts) as natural fonts that exude warmth, friendliness and authenticity.

The current research asks three key research questions to expand our understanding of this issue: (1) Can a handwriting font used on packaging elicit a different behavioral response than its typewritten counterpart? (2) If so, what is the basis

and scope of this response? (3) And, for which product categories would this response be particularly advantageous?

The theorizing is based on the product anthropomorphism literature, which shows that the salience, or addition, of human-like physical features to products can potentially enhance product value (Aggarwal and McGill 2007; Landwehr, McGill, and Herrmann 2011; MacInnis and Folkes 2017). In a manner similar to how humans respond to faces – whether dogs or human (Blonder et al. 2004), anthropomorphic products (Aggarwal and McGill 2007, 2012; Miesler, Leder, and Herrmann 2011; Touré-Tillery and McGill 2015; Valenzuela and Hadi 2011) and even emoticons (Churches et al. 2014) –we suggest that product packaging that uses handwritten fonts is anthropomorphized by consumers. As such, this research extends the product anthropomorphism literature to include design features (in this case handwritten fonts) that can act as *subtle* anthropomorphic cues by virtue of making their human origin salient.

The current research shows that the use of handwritten fonts on packaging leads to the product being anthropomorphized and results in a more favorable evaluation of the product, than the use of typewritten fonts. While we can easily relate to the notion that a handwritten font lends warmth and a personal touch to the items with which it is associated, the current research goes beyond mere personalization to suggest that a handwritten font elicits a deep-rooted approach response that printed type cannot replace. Notably, this effect is limited to safe and risk-free product categories (e.g. air freshener or jam that inherently elicit an approach motivation and where humanization is desirable) but not for unsafe and high-risk product categories (roach spray or hot sauce, that

inherently elicit an avoidance motivation and where humanization is undesirable). See Figure 2 for the conceptual model.

To test these hypotheses I present a pilot study and a series of four experiments. The pilot study was designed to demonstrate the prevalence of the use of handwritten fonts in product packaging in the marketplace and underscore the importance and potential contribution of the current research. The first study sought to provide evidence that handwritten (versus typewritten) fonts elicit an approach tendency that characterizes anthropomorphized stimuli such that individuals are more likely to touch a product that has a handwritten (vs. typewritten) label and evaluate it more positively. Study 2 tested whether a product with handwritten label is encoded as an anthropomorphized stimulus compared to one with a typewritten label, and whether that can explain the enhanced product evaluations. Study 3 attempted to replicate the mediating role of anthropomorphism and to provide support for the role of product category as a boundary condition for the hypothesized effect such that handwritten fonts results in higher purchase likelihood for safe and risk-free products (e.g. room fresheners), but not those that are risky and dangerous (e.g. roach spray; Kahn and Isen 1993; Stewart and Martin 1994). Study 4 tested the effect of handwritten (vs. typewritten) fonts on brand choice in two product categories (jams and hot sauces) using a simulated store environment. Taken together, the results suggest that HEB's decision to use a handwritten font for their new private label grocery product brand Primo Picks might invite consumers to reach out and pick up these new products off the shelves, evaluate them more favorably and place them into their shopping baskets before heading out to the checkout counter.

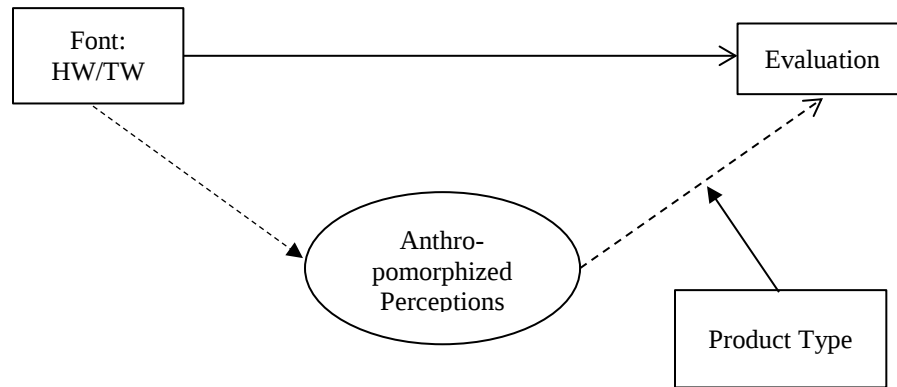


FIGURE 2: CONCEPTUAL FRAMEWORK

This research makes three key contributions. First, it contributes to the product anthropomorphism literature (Aggarwal and McGill 2007, 2012; Hur, Koo, and Hofmann 2015; Landwehr, McGill, and Herrmann 2011; Miesler, Leder, and Herrmann 2011) that has typically investigated overt anthropomorphic cues, to introduce a design characteristic – handwritten font - that acts as a subtle anthropomorphic cue by virtue of its human origin. Second, it contributes to the relatively scant academic literature on fonts to investigate a specific, yet commonly used font: handwriting. It demonstrates *how*, *when* and *why* a handwritten font elicits a positive response compared to a typewritten one. Third, it contributes to the literature on product packaging design (Krishna, Cian and Aydinoglu 2017; Deng and Srinivasan 2013) to identify a novel mechanism by which product packaging can be anthropomorphized and elicit favorable consumer response. For marketers, this implies that instead of overt anthropomorphic cues (like smiles, eyes and faces), packaging can be anthropomorphized using subtle design elements that are associated with human origins, like the fonts that are the focus of this work.

The remainder of the paper is organized as follows: First, the literature on fonts with a specific focus on handwriting and the response it elicits is reviewed. The paper then proceeds to describe the conceptual arguments, develop the hypotheses, and present a set of studies to test these hypotheses. The paper concludes with a discussion of managerial implications and future research directions.

Conceptual Development

Handwriting as a Typeface Design Category

Font design, especially in the context of brands and logos, has received some attention in recent years (Childers and Jass 2002; Doyle and Bottomley 2006; Grohmann, Giese, and Parkman 2013; Henderson, Giese, and Cote 2004; Orth, Campana, and Malkewitz 2010; van Rompay and Pruyn 2011). Perhaps the most comprehensive analysis (Henderson, Giese, and Cote 2004) categorized typefaces or fonts along twenty-three design characteristics (e.g. symmetry, angularity), summarized them into six dimensions: three universal dimensions (elaborateness, naturalness, and harmony) and three design dimensions specific to typefaces (weight, flourish, and compression), and examined the relationship between these design dimensions and consumer responses. For example, one universal dimension identified was the naturalness dimension, which included the following design characteristics: active, curved, organic, slanted, and handwritten appearance. Fonts, like the handwritten fonts that are the focus of this paper, were characterized as high on “pleasing” and “engaging” consumer responses but not on the “reassuring” and “prominent” dimensions. This supports the intuition of marketers

that handwritten fonts are warm, pleasing and friendly, but not authoritative and commanding.

Other research on natural fonts has shown that font naturalness is positively correlated with specific brand personality perceptions such as how exciting, sincere, sophisticated, rugged and competent a brand appears to be (Grohmann, Giese, and Parkman 2013). Notably, while these researchers (Grohmann, Giese, and Parkman 2013; Orth, Campana, and Malkewitz 2010) have studied font naturalness, no research has focused specifically, and systematically, on the causal effects of handwritten (versus typewritten) fonts on product evaluation. While this is the case, it is also worth noting, that when Grohmann, Giese, and Parkman (2013) investigated a set of predominantly handwritten fonts, they found that of all the font dimensions, naturalness was the dominant driver of brand personality perceptions. This finding corroborates the expectation that when handwritten fonts are utilized, brands are perceived much like human beings are perceived.

Drawing on the aforementioned typology presented by Henderson, Giese, and Cote (2004), a handwritten font is a natural font that scores high on the “looks handwritten” design characteristic. As will be observed in the pretests, this characteristic is independent of, but often correlated with other design characteristics that typify natural fonts like slant, curvature, legibility, etc. The theorizing is based on the premise that a handwritten font is specifically encoded as one that “looks like handwriting”, makes human-source accessible and thus elicits a behavioral response that distinguishes it from typewritten fonts.

Handwritten Fonts are Anthropomorphized

Research has found that human origins matter. Artifacts are often evaluated based on their creator's intent and how they originated (Bloom 1998). In fact, these objects are often perceived to embody the essence and properties of their creator (Newman, Diesendruck, and Bloom 2011; Rozin, Millman, and Nemeroff 1986) making the source of an object matter enough to influence individuals' mental processes and behaviors.

Other research has found that a primary cognitive determinant of anthropomorphism is the extent to which the knowledge about, and similarity to, humans is accessible (Epley, Waytz and Cacioppo 2007). Anthropomorphism is defined in the literature as “attributing humanlike properties, characteristics, or mental states to real or imagined non-human agents and objects” (Waytz, Cacioppo, and Epley 2010). Research in this area finds that when human features - like smiles, faces, or, random movement – are salient and recognizable, an inanimate object is more likely to be anthropomorphized (Epley, Waytz, and Cacioppo 2007). In fact, most of the previous literature has focused on either visual (e.g. a human face), verbal (e.g. using a human name) or rhetorical devices (e.g. giving human roles to brands) to activate a human schema and induce anthropomorphic tendencies (MacInnis and Folkes 2017). The notion of “human association” may thus stem from readily observable similarity between the features of a target object (e.g. its human origin) and the self (or human form), which influences the accessibility of anthropomorphic knowledge structure.

The present work links the prior work on human origins with anthropomorphism to argue that a handwritten font on product packaging is associated with having human

origin and consequently results in the anthropomorphization of the product. The notion that visual product features connote meanings or associations to consumers is well-established (Childers and Jass 2002; Henderson, Giese, and Cote 2004; van Rompay, Hekkert, Saakes and Russo 2005). Relevant to the present work, are the associations conveyed by the font used on the packaging. For instance, Childers and Jass (2002) have shown that typeface design can influence the degree to which a product is classified as casual or luxurious. The present work proposes that the handwritten font on packaging humanizes the packaging and moves it along an inanimate (non-human) – animate (human) continuum from being an inanimate object to being perceived as having human characteristics (see Touré-Tilley and McGill (figure 1, 2015) for similar arguments regarding anthropomorphized messengers).

This form of product anthropomorphization based on the human association (and not overt human features) is both novel and important, as it expands the prior literature on anthropomorphization that has relied on largely on overt anthropomorphic cues (e.g. faces, human form and features, movement) that evoke the tendency to anthropomorphize.

In addition, the current work suggests that other visual features may also be important for anthropomorphism to occur. This means that from a visual standpoint, anthropomorphism may occur from two different pathways. The first one is by *adding* human-like elements or features to inanimate stimuli, which has been the primary focus of the literature. The second way is by activating the salience of a human source, which is the explanation behind the handwriting effect and a contribution of this research to the literature. For instance, we anthropomorphize a cookie that is in the shape of a human

face and the reason for this anthropomorphism has nothing to do with the activation of the source. However, a handwritten font on an inanimate object could as well lead to anthropomorphism, because as soon as one looks at a handwritten font, the human source becomes activated, though handwriting does not have visible human features. This suggests that physical features of a stimulus that activates the concept of human source can be as well lead to anthropomorphism.

In sum, because handwriting is deeply connected to what it means to be human, it is thought that individuals respond to a handwritten font on a product package in a manner similar to how they would respond to other anthropomorphic stimuli. But, what is the nature of that response?

The Effects of Anthropomorphization on Consumer Response to Products

The recent research in marketing has established that the presence of anthropomorphic features or cues in product design can influence consumers' preference. Miesler, Leder, and Herrmann (2011) demonstrated that people show more positive affective response to car fronts with baby-faced design as opposed to the original version. Research also demonstrates the automatic behavioral effects of priming anthropomorphized brands (Aggarwal and McGill 2012; Wang and Mukhopadhyay 2016). Aggarwal and McGill (2012) find that non-human stimuli (brands) that have been endowed with humanlike qualities have greater social influence than those that are not anthropomorphized. These authors show that an anthropomorphized brand, when seen as a partner, can elicit approach behavior and the desire to socially engage. Wang and Mukhopadhyay (2016) have similarly demonstrated in the context of cute products that

anthropomorphized stimuli are associated with a spontaneous behavioral approach tendency. Indeed, people are more likely to feel affinity for and consider the welfare of non-human entities when they are anthropomorphized (Butterfield, Hill and Lord 2012). Even concepts like nature, when anthropomorphized (by using a label like “Mr. Nature”) result in the enhanced “assignment of human qualities to nature” (Tam, Lee and Chao, 2013, p. 514), which fosters conservation behavior due to greater sense of connectedness. Indeed, taken together, the anthropomorphization literature suggests that the tendency to anthropomorphize (i.e., see human-like qualities in non-human entities) results in the enhanced humanization of products and brands, enhancing the feelings of connectedness and attachment consumers feel towards them (Tam, Lee and Chao 2013; Timpano and Shaw 2013, MacInnis and Folkes 2017).

In sum, it is expected that packaging with a handwritten font is more likely to be anthropomorphized and result in more favorable product evaluations, but only for certain product categories, as will be discussed next.

The Moderating Role of Product Type

Anthropomorphization of products and brands is not always preferred. For instance, when a brand faces negative publicity, anthropomorphization can lead to negative brand evaluations (Puzakova, Kwak and Rocereto 2013). In the realm of computer games, individuals enjoy the gaming experience less when they receive assistance from an anthropomorphized helper versus a mindless entity. Individual differences also matter: people with high (vs. low) interpersonal trust are more persuaded by a human spokesperson rather than an anthropomorphized messenger (Touré-Tillery

and McGill 2015). Overall, the literature is in general agreement that in order for anthropomorphism to be effective, it is crucial that the characteristics of the product are congruent with the proposed human schema that anthropomorphizes it (Aggarwal and McGill, 2007).

The general notion that congruency amongst marketing mix elements positively influences a variety of consumer responses is well-known (Aggarwal and McGill 2007; Bottomley and Doyle 2006; Doyle and Bottomley 2006; Erdem and Swait 1998, 2004; van Rompay and Pruyn 2011). In the realm of packaging design, consumers consider it more appropriate when functional (sensory) products are presented using functional (sensory) colors (Bottomley and Doyle 2006) and when the connotations of fonts utilized on packaging fit with the product being described (Doyle and Bottomley, 2006).

Stemming directly from this notion of font-product congruity, I propose the congruency between font (handwritten versus typewritten) and the motivation that a product category inherently elicits (approach versus avoidance; Kahn and Isen, 1993; Stewart and Martin 1994). Specifically, the congruency argument suggests that the positive effect of using a handwritten font on packaging is limited to product categories that are inherently approachable because they feel safe (e.g. air fresheners or jams) and low risk, and anthropomorphization of such product categories translates into more positive evaluations. In contrast, when the product category is one that inherently elicits an avoidance motivation because it is perceived as high-risk or poses a possibility of danger (roach spray or hot sauce), handwritten fonts that anthropomorphize an avoidance product backfire resulting in more negative product evaluations. In sum, it is proposed

that the congruency between font type and product category influences product evaluations.

Prior work can be relied on to substantiate this argument. Kahn and Isen (1993) argue that positive affect (vs. control) increases variety seeking only when the features of an item are positive or neutral (safe and enjoyable). However, when a negative feature of a product is made salient, the effect gets washed away. They described negative materials or products as those that people anticipate unpleasant or dangerous/risky experiences (Isen, Niedenthal, and Cantor 1992; Kahn and Isen 1993). In a similar manner, approach product categories can be classified as those that are safe and avoidance product categories as those that are dangerous, risky and/or harmful. Avoidance products are typically the ones that consumers need to handle with caution and vigilance at least in the first encounter. Such products typically carry warnings on their packaging in order to signal the possible risk or harm associated with them (Stewart and Martin 1994). Typically, their function is to interrupt consumers' action by providing information on potential negative outcomes that could rise from such actions (Stewart, Folkes and Martin 2001). Warnings can be communicated through alternative designs ranging from the use of signal words to use of symbols, lettering and colors (Lehto 1992; Stewart and Martin 1994).

Notably, both hedonic and functional products can be perceived as safe or inherently risky. Thus, the approach-avoidance motivation a product category elicits can be relied on as the theoretically relevant divide between the effectiveness of handwritten fonts and when they might backfire.

Overview of the Empirical Investigation

A pilot study and four experiments seek to support the proposed theorizing. The pilot study establishes the prevalence of the use of handwritten fonts on the product packaging. The pretest illustrates the similarities and differences in the design characteristics of the handwritten and typewritten fonts chosen for the studies. Four experiments test whether (1) a handwritten product label results in more favorable consumer response (evaluations; choice) compared to a typewritten one (study 1 - 4), (2) the effect of a handwritten font on consumer response is mediated by anthropomorphic perceptions (study 1- 3), and, (3) moderated by the inherent approach-avoidance motivation a product category evokes (study 3 and 4).

Pretests and Alternative Explanations

Extensive pretesting was needed to ensure that the fonts on the product labels used as stimuli in the empirical investigation were both perceived as computer-generated fonts that differed primarily in their visual appearance as either handwritten versus typewritten fonts. In addition, the pretests were designed to match the fonts utilized in the studies in terms of legibility and other standard font characteristics. The pretests are described in Appendix F.

It is also worthwhile at this stage to discuss two alternative process explanations touched upon by prior research and related to the focus of the current paper: fluency from font legibility and font pleasantness.

Font legibility and fluency

Illegible fonts that look like handwriting (e.g. the doctor's prescription scrawl) have been utilized in prior as a stimulus to manipulate disfluent processing (Manley, Lavender and Smith 2015; Pocheptsova, Labroo, and Dhar 2010; Song and Schwarz 2008). This stream of research would argue that disfluent stimuli trigger expectations of value (Pocheptsova, Labroo, and Dhar 2010) and could potentially enhance product evaluation. In the main studies, therefore, the fonts that are utilized (based on pretests reported) are legible and easy to read and process thus avoiding issues of fluency.

Aesthetic Appeal and other potential drivers

One might also argue that handwritten fonts are more aesthetically pleasing than typewritten fonts leading products with handwritten product labels to be evaluated more favorably. Aesthetically pleasing stimuli do typically activate favorable consumer responses (Homburg, Schwemmler and Kuehnl 2015; Norman 2004), but this research suggests that it is not merely the aesthetic appeal that drives the effect of handwritten fonts on product evaluation. Arguably, typewritten fonts might also be aesthetically appealing. To deal with this issue in the empirical investigation, I pretested fonts that were visually very similar and utilized these fonts in the studies. Moreover, aesthetic appeal and other variables such as uniqueness and authenticity were measured and controlled for. While, it is likely that the effect of handwritten fonts cannot be fully attributed to anthropomorphization of the product, this research tested whether it is a significant driver.

Pilot Study

Designers typically have about 200,000 fonts available to choose from and there is a popular trend amongst designers to increasingly use handwritten fonts (de Castella 2010). While this observation is somewhat substantiated by market place trends and design analyst reports, it is essential to quantify at the outset that the study of handwritten fonts is a worthy one with significant managerial relevance.

Following the methodology of Deng and Srinivasan (2013), (1) selected a set of product categories were selected based on a set of pre-specified criteria (described below), (2) packages of each product category from two different grocery stores (one mainstream and one specialty (organic)) were photographed, and, (3) an independent coder was recruited to evaluate the prevalence of handwritten fonts on the packaging. The four product categories selected – chips, laundry detergents, lotions and baby food - represented both food (chips, baby food) and non-food categories (laundry detergents, lotions), typically impulse (chips) versus habitually purchased product categories (laundry detergents), and were categories with many brands (chips) versus relatively fewer brands (lotions).

Coding and Analyses: The packaging at the sub-brand level was the unit of analysis. For instance, Ruffles Original potato chips would be considered as one sub-brand of the Ruffles brand (cheddar, sour cream and onion flavors, were not separately considered since the package designs of this variant are all virtually identical), but Ruffles Deep Ridged would be considered another sub-brand (along with its set of flavors). Duplicate brands from each store were discarded to provide a comprehensive

and representative set of brands in each of the four chosen product categories. An independent coder, blind to the hypotheses, was then trained to recognize both cursive and script-based handwritten fonts and distinguish them from typewritten ones. This coder identified whether or not a handwritten font was used on the package and then estimated the percentage of handwritten font use on the package compared to the total font use on the package. Table 3 presents the findings from this analysis.

As Table 3 illustrates, the range of use of handwritten fonts in the overall packaging varied according to product category. Handwritten fonts were most prevalent in the packaging of baby foods (76%) and chips (72%) but less used for lotion (38%) and laundry detergents (24%). Examining specifically the use of a handwritten font for the brand name, this analysis found 19% of all sub-brands had a handwritten brand name (about one in five) but this also varied by category with the highest prevalence in the chip category (26%) compared to the laundry category (9%).

The intuition of marketers is apparent in these product categories and is supported by the current research. Baby category is warm and personable and elicits an approach tendency, the chip category is an impulse category and it behooves marketers to create packaging that invites a consumer to pick it up and buy. Least use in the laundry category also makes sense given the functionality of this category, the chemical nature of the product along with the vigilance needed to correctly use the detergent, and, also the habitual nature of its purchase. Most important however, for our purposes, is that across food and non-food categories and impulse and habitually purchased grocery product categories, the prevalence of handwritten fonts was notable on product packaging.

TABLE 3: PILOT STUDY: USE OF HANDWRITTEN FONT ON PACKAGING ACROSS DIFFERENT PRODUCT CATEGORIES AT TWO GROCERY STORES

Product Category	Total number of sub-brands (n)		% Use of HW in brand name			Use of HW on front of the package (%)		
	HEB	Whole Foods	HEB	Whole Foods	Total	HEB	Whole Foods	Total
Chips (n=68)	47	21	36.2	4.8	26.5	63.8	90.5	72.1
Baby food products (n=34)	13	21	30.8	4.8	14.7	84.6	71.4	76.5
Laundry detergents (n=33)	17	16	11.8	6.2	9.1	23.5	25	24.2
Lotions (n=13)	9	4	22.2	0	15.4	22.2	75	38.5
Total (148)	86	62	29.1	4.8	18.9	54.6	66.1	59.5

Study 1

The objective of this study was to test whether a handwritten product label is more likely to (1) elicit an approach tendency, characteristic of anthropomorphized stimuli, and, (2) result in favorable product evaluations compared to a typewritten product label.

Method and Procedure

Eighty-four undergraduates (42% male) participated in the study for extra credit. One participant was removed from the analysis because of missing answers on the variables of interest. The experiment was a one-way handwriting vs. typewriting between-subjects design. The fonts were pretested to be equally legible and identical on all relevant design features except the naturalness dimension that characterizes handwritten fonts (see Appendix F, pretest 2). The participant completed the study individually in a lab with a one-way mirror and they were video recorded as they interacted with the stimuli. Each participant was exposed to three kinds of teas in small glass jars (all black and similar in texture), either with handwriting or typewriting labels depending on which condition he/she was in (see Appendix B for stimuli). They were then asked to evaluate the teas on a 5-item scale (favorable/positive/good/ pleasant/like), later combined into an evaluation index ($\alpha = .97$). They finally reported aesthetic appeal in terms of the extent to which they agreed that the labels were aesthetically pleasing, attractive, and unique (1 = strongly disagree, 7 = strongly agree; $\alpha = .80$). Participants were video recorded throughout the whole experiment. Two independent coders blind to the hypothesis were trained by the experimenter and did trial batches of coding (the coding protocol was adapted from Patrick, Chun and MacInnis 2009).

It was expected that if handwritten fonts were anthropomorphized they would elicit an approach tendency, captured by enhanced haptic engagement. Haptic engagement was measured by counting the number of times they opened the jars and the length of time they held the jars at different points in time within the experimental conditions. The video for each participant was viewed numerous times to accurately

count the number of times the individual opened any of the tea jars within the first 3 minutes of starting the survey. Since haptic engagement is an exploratory and spontaneous response, the three minute window was chosen not only to give participants sufficient time in order to engage with the products, but more importantly to capture the natural tendency of this response. Due to the objective nature of the coding (number of times the container of tea was opened or how long it was held), there were no discrepancies expected in the coding. In addition, since the typical sensory evaluation of tea come from its color and smell, the number of times participants smelled the tea in different groups was coded as an additional indicator of approach behavior.

Results

Evaluation. An ANOVA with font style (handwritten vs. typewritten) as the independent variable and the evaluation index as the dependent variable revealed the expected main effect ($M_{HW} = 5.33$, $SD = 1.16$ vs. $M_{TW} = 4.71$, $SD = 1.60$, $F(1, 81) = 4.22$, $p = .043$). Handwritten product label resulted in more positive product evaluations than a typewritten label.

Evidence of Anthropomorphization. Drawing on previous research, haptic engagement (extent of touch) is presumed to be an indicator that the product is anthropomorphized. The videos were coded for haptic engagement in terms of opening the jars to inspect the teas. A one-way ANOVA with the number of openings within three minutes from the starting point as the dependent variable revealed that the handwritten font led to more haptic engagement than the typewritten font ($M_{HW} = 3.02$, $SD = 2.41$ vs. $M_{TW} = 1.94$, $SD = 2.37$, $F(1, 81) = 4.10$, $p = .046$). Notably, no one jar of tea within the set

was more likely to be touched, so cumulative haptic engagement across all three jars of tea are reported. A visual illustration of haptic engagement over time is shown in Figure 3 (first minute: $M_{HW} = 1.92$ vs. $M_{TW} = 1.20$, $F(1, 81) = 3.08$, $p = .083$; first 2 minutes: $M_{HW} = 2.50$ vs. $M_{TW} = 1.66$, $F(1, 81) = 3.22$, $p = .077$; first 3 minutes: $M_{HW} = 3.02$ vs. $M_{TW} = 1.94$, $F(1, 81) = 4.10$, $p = .046$).

A one-way ANOVA with the extent of holding in seconds within three minutes from the starting point as the dependent variable revealed that the handwritten font led to more haptic engagement than the typewritten font ($M_{HW} = 31.50$, $SD = 19.62$ vs. $M_{TW} = 25.11$, $SD = 17.20$, $F(1, 81) = 2.37$, $p = .13$). A visual illustration of haptic engagement over time is shown in Figure 3. (first minute: $M_{HW} = 20.56$ vs. $M_{TW} = 15.89$, $F(1, 81) = 1.95$, $p = .17$; first 2 minutes: $M_{HW} = 26.58$ vs. $M_{TW} = 21.74$, $F(1, 81) = 1.68$, $p = .20$; first 3 minutes: $M_{HW} = 31.50$ vs. $M_{TW} = 25.11$, $F(1, 81) = 2.37$, $p = .13$).

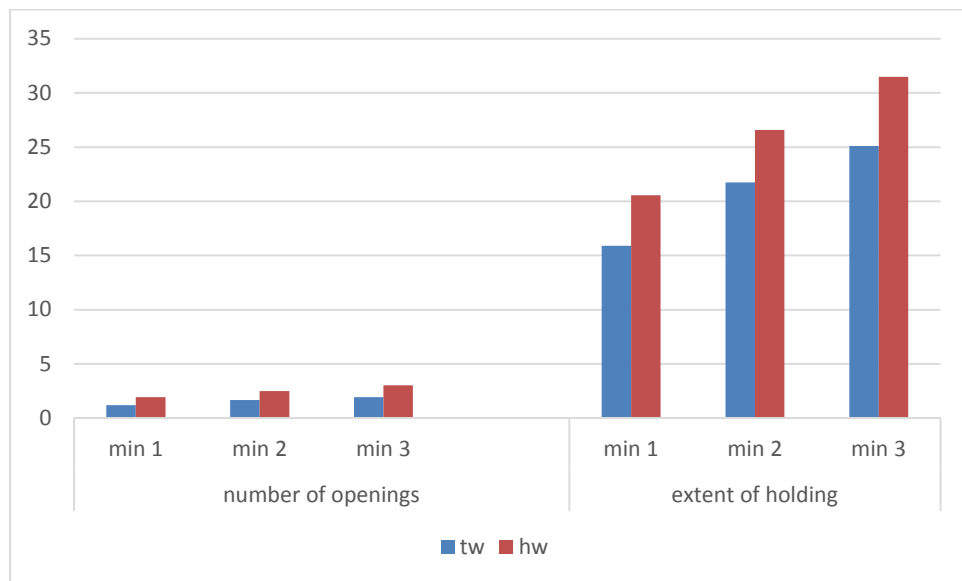


FIGURE 3

STUDY 1: IMPACT OF HANDWRITING ON HAPTIC ENGAGEMENT

Since earlier and more haptic engagement could reflect a stronger approach behavior, the analysis can be supplemented by combining timing and actual touch into a single measure, where each opening (and holding) in the first minute receives 5 points, each in the second minute receives 4 points and each in the third minute receives 3 points. A one-way ANOVA with the measure of opening as the dependent variable revealed that the handwritten font led to more haptic engagement than the typewritten font ($M_{HW} = 13.48$, $SD = 10.75$ vs. $M_{TW} = 8.69$, $SD = 10.17$, $F(1, 81) = 4.21$, $p = .04$). A one-way ANOVA with the measure of holding as the dependent variable also showed the same pattern of results ($M_{HW} = 141.65$, $SD = 85.69$ vs. $M_{TW} = 112.97$, $SD = 76.66$, $F(1, 81) = 2.47$, $p = .12$).

Since one of the dependent variables was count data with nonnegative integer (number of opening) that is often highly skewed, a Poisson regression was used to analyze the data. A dummy variable representing the type of font was included as an independent variable. As predicted, the effect of font type on the measure of opening was significant and positive ($\beta = .44$, $\chi^2(1) = 39.94$, $p < .001$); individuals in the handwritten font condition opened the jars of teas more than participants in the typewritten font condition.

The engagement with the product carried over to smell as well. As shown in Figure 4, the number of times participants smelled the tea over the period of product exposure was higher in the handwriting condition than the typewriting condition (first minute: $M_{HW} = 4.93$ vs. $M_{TW} = 2.51$, $F(1, 81) = 5.03$, $p = .028$; first 2 minutes: $M_{HW} = 6.64$ vs. $M_{TW} = 3.83$, $F(1, 81) = 4.33$, $p = .041$; first 3 minutes: $M_{HW} = 7.94$ vs. $M_{TW} = 4.34$, $F(1, 81) = 4.93$, $p = .029$).

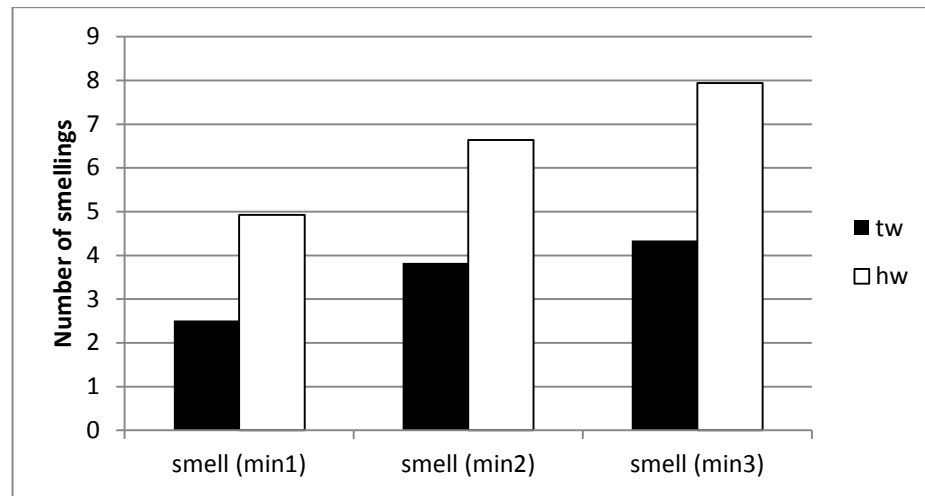


FIGURE 4

STUDY 1: IMPACT OF HANDWRITING ON SMELL OVER TIME

Aesthetic Appeal. An ANOVA with font style (handwritten font vs. typewritten font) as the independent variable and aesthetic appeal as the dependent variable revealed that handwritten fonts are considered more appealing than typewritten fonts ($M_{HW} = 3.33$, $SD = 1.41$ vs. $M_{TW} = 2.46$, $SD = 1.25$, $F(1, 81) = 8.12$, $p < .01$). It might be argued that handwritten fonts are simply more aesthetically pleasing and it is aesthetic appeal that drives favorable evaluation (Henderson, Giese, and Cote 2004). To rule out the effect of aesthetic appeal, a mediation analysis was conducted to determine whether aesthetic appeal of the product labels mediates the influence of font style on product evaluation. However, the indirect effect was not significant ($M = .09$, $SE = .10$, 95% CI = -0.06, 0.37). Aesthetic appeal will also be controlled for in the mediation analysis.

Mediation Analysis: Bootstrap estimation with 10,000 resamples (PROCESS model 4: (Hayes 2012) and aesthetic index as a covariate confirmed that the tendency to open the jar (haptic engagement) mediates the influence of font style on product evaluation ($M = .39$, $SE = .18$, 95% CI = 0.12, 0.83).

The theorizing is based on the premise that anthropomorphization of the product (characterized by approach behavior in this study) leads to favorable product evaluations. To tease out the causal order of approach behavior and evaluation, an additional mediation analysis conducted with haptic engagement as the outcome variable, font as the predictor variable, product evaluation as the mediator and aesthetic appeal as the covariate revealed that this alternative model of font - evaluation – approach was nonsignificant ($M = 1.78$, $SE = 1.14$, 95% CI = -.11, 4.47).

Discussion

This study lends support to the central hypothesis underlying the current work: using actual products, this study supports the notion that products with handwritten fonts on their packaging are likely anthropomorphized as evidenced by the fact that consumers are significantly likely to approach these products (in this case jars of tea) by touching and smelling them. In addition, participants evaluate the products more favorably. We found support for the mediating role of anthropomorphism using the indirect measure of haptic engagement. The next study builds on this one by directly implicating anthropomorphism as the driver of the tendency to approach products with handwritten fonts, and the favorable evaluations that subsequently ensue.

Study 2

The focus of the study that follows is to provide direct empirical evidence that handwritten fonts are anthropomorphized, and consequently result in more favorable product evaluations. Moreover, since this study simultaneously displays products with handwritten and typewritten fonts, it more accurately simulates the actual store environment in which the consumer interacts with products.

Method and Procedure

One hundred and eleven undergraduate students (54% male) took part in an online experiment in exchange for extra credit, in which they were randomly assigned to one of two conditions. Participants were asked to imagine that they were shopping in a store and they came across the display of two jars of tea. They were shown a picture of two identical jars of teas next to each other (see Appendix C for stimuli). The two tea names chosen for the labels – Keemun and Nilgiri - were pretested to be equally unfamiliar to participants. In each condition, Keemun was on the left and Nilgiri was on the right, but the two jars were counterbalanced such that participants were randomly assigned to either having a jar with handwritten label on the left or on the right. This was done (1) to obtain a relative comparison between the two teas based on the font used when the two font categories (handwritten and typewritten) were simultaneously presented, and, (2) to rule out a hemispheric lateralization explanation (Janiszewski 1988).

Anthropomorphization of the products was assessed on the following scale (adapted from Aggarwal and McGill 2007; Epley, Waytz, and Cacioppo 2007; Waytz, Cacioppo, Epley 2010) by asking participants to compare the two jars of tea in terms of

which jar of tea (1) looked human (2) looked alive (3) had human elements (4) had mind of its own (5) had free will, on a 7-point scale (1= Keemun, 4= no difference, 7= Nilgiri) later combined into anthropomorphic perceptions index ($\alpha = .73$). Finally participants were asked which tea they would evaluate (1) more favorably (2) more positively, and, would be (3) more likely to purchase on a 7-point scale (1= Keemun, 4= no difference, 7= Nilgiri), combined into evaluation index ($\alpha = .89$). They finally completed two manipulation check questions, in which they reported their agreement with the following statements of a 7-point scale (1 = strongly disagree, 7 = strongly agree; $r = .75$) (1) the label on the left looks like it is handwritten (2) the label on the right looks like a standard mechanical (typewritten) font.

Results

Manipulation checks. Participants were able to identify the difference between the handwritten and typewritten fonts. Those who saw the handwritten label on the left ($M = 5.62$, $SD = 1.01$) more strongly agreed to the manipulation check question than did participants who saw handwritten label on the right ($M = 2.44$, $SD = 1.29$; $F(1, 109) = 210.41$, $p < .001$).

Anthropomorphic perceptions. A one-way ANOVA with the anthropomorphic perceptions index as the dependent variable revealed that the jar with the handwritten product label was anthropomorphized to a greater extent than the identical jar with the typewritten product label ($M_{HW} = 4.40$, $SD = 1.02$ vs. $M_{TW} = 3.53$, $SD = 1.06$, $F(1, 109) = 19.50$, $p < .001$). Specifically, participants who saw Keemun/Nilgiri in a handwritten font

were more likely to anthropomorphize the product than those who saw the identical jar, but with Keemun/Nilgiri in a typewritten font.

Tea Evaluation. A one-way ANOVA with the tea evaluation index as the dependent variable revealed that main effect of the handwritten font ($M_{HW} = 4.70$, $SD = 1.51$ vs. $M_{TW} = 3.58$, $SD = 1.81$, $F(1, 109) = 12.56$, $p < .01$) as hypothesized.

Mediation Analysis. The conceptual model predicts that individuals anthropomorphize products with handwriting on the packaging, leading them to evaluate it more positively. Bootstrap estimation with 10,000 resamples (PROCESS model 4: (Hayes 2012) with the evaluation index as the outcome variable, handwriting as the predictor variable, and anthropomorphic perceptions as the mediator confirmed that anthropomorphic perceptions mediate the influence of font on product evaluation ($M = .18$, $SE = .11$, 95% CI = 0.028, 0.465).

Discussion

The results of this study provide direct evidence of the prediction that handwritten fonts anthropomorphize a product and this mediates the effect of font on product evaluation. Further, because participants viewed the products with different fonts simultaneously, it is clear that the tendency to anthropomorphize the handwritten font and not the typewritten font stems from the association of the handwritten font with a human origin. In the next study, we rely on a between-subject experiment to test the complete conceptual framework and demonstrate the moderating role of product category as well as the mediating role of anthropomorphic perceptions on the relationship between font style and product evaluation.

Study 3

The first objective of this study was to test the moderating role of the approach-avoidance motivation a product category inherently elicits. Demonstrating this has managerial implications since there are product categories for which the use of handwritten fonts on packaging could potentially backfire. This study tested the hypothesis that handwritten fonts are more effective for safe and non-risky products that are congruent with the approach tendency that handwritten fonts evoke, but are less effective for products that are risky and potentially dangerous, that one might naturally want to avoid. The second objective was to replicate, using a between-subjects experiment, the role that anthropomorphism plays in explaining the effects.

Method and Procedure

Two hundred and thirty seven undergraduate students (48% male) took part in an online experiment for extra credit, in which they were randomly assigned to conditions in a 2 (font style: handwritten vs. typewritten) $\times$ 2 (product category: approach (air freshener) vs. avoidance (cockroach spray)) between-subject experiment.

Pretest: A pretest was designed to identify product categories that elicit either an approach or avoidance motivation because of the inherent risk associated with the product category (Stewart and Martin 1994) or the promotion-prevention goals that the product category elicits (Higgins 2002). It was important to ensure that the approach-avoidance motivation was not simply because the category was hedonic-utilitarian, respectively. This is addressed in study 4 as one can imagine a hedonic product (hot sauce) that might also elicit an avoidance motivation since consumers need to use the

product with care and be vigilant during its use. Two pairs of approach-avoidance products were identified for the pretest (1) air freshener - cockroach killer sprays and (2) jam - hot sauce.

One hundred and seventy five individuals recruited from Amazon's Mechanical Turk (53.1% female, 46.9% male; $M_{Age} = 34.98$, $SD_{Age} = 11.23$) were randomly assigned to assess one of the four product categories. The pretest assessed the extent to which they perceived the products to elicit an approach-avoidance response using the following items (How risky do you perceive the product to be?; To what extent would you pay attention to the message/picture on this product's packaging to alert you to any harmful or damaging consequences you might experience by using the product; How cautious/vigilant you are when you interact with this product? 1=not at all, 7= very much). We also assessed the extent to which the participants perceived the product to be hedonic (How hedonic do you perceive the product to be? Hedonic is defined as "pleasant and fun, something that is enjoyable and appeals to your senses) and utilitarian (How utilitarian do you perceive the product to be? Utilitarian is defined as "useful, practical, functional, something that helps you achieve a goal. 1=not at all, 7= very much). The pretest results for the product category dyads used in study 3 and 4 will be presented accordingly.

For the air freshener/ cockroach killer spray product categories, the cockroach killer spray category was perceived to be significantly riskier than the air freshener category ($M_{roach_killer} = 5.16$, $SD = 1.10$ vs. $M_{air_freshener} = 3.50$, $SD = 1.29$, $F(1, 86) = 42.15$, $p < .01$). Also, the cockroach killer was also perceived to be significantly less hedonic than air freshener ($M_{roach_killer} = 1.66$, $SD = 1.29$ vs. $M_{air_freshener} = 4.20$, $SD = 1.46$, $F(1, 86)$

= 75.19, $p < .01$), but significantly more utilitarian than air freshener ($M_{\text{roach_killer}} = 5.77$, $SD = 1.58$ vs. $M_{\text{air_freshener}} = 4.41$, $SD = 1.60$, $F(1, 86) = 16.11$, $p < .01$).

Main study: Participants were told that the study involved the evaluation of a new product line of home sprays. Participants were shown an image of the spray (either cockroach killer or air freshener) with either a handwritten or typewritten font on the product label (see Appendix D for stimuli). They were then asked questions regarding their purchase likelihood, on a 7-point scale (How likely are you to purchase this product? 1= not at all likely, 7= very likely; I would feel good about buying this product. 1=strongly disagree, 7=strongly agree) later combined into purchase likelihood index ($r = .84$) Anthropomorphic perceptions were measured after the main dependent variable, on a 7-point scale (1= not at all, 7=extremely) by asking participants to indicate the extent to which the product represents or make them think of words indicative of (1) human (2) object (3) alive (4) machine . The “object” and “machine” items were reverse-coded and later combined with the other two items to create anthropomorphic perceptions index ($\alpha = .64$). Finally, several other control variables (uniqueness, attractiveness, quality, authenticity, effort) were measured on 7-point scales (1=strongly disagree, 7=strongly agree) based on the notion that these could potentially underlie the handwritten font effect. Uniqueness was measured by two items (The spray looks unique to me; The spray is one-of-a-kind). Attractiveness was measured by two items (The spray is aesthetically pleasing; The spray looks attractive; $r = .91$). Authenticity was also measured by one item (The spray looks authentic). Quality was measured by the following item (The product is most likely of : 1=low quality, 7=high quality). Finally, effort was measured by two items (not effortful/effortful to produce, not difficult/difficult to produce).

Results

Purchase likelihood. A 2 (font style: handwritten vs. typewritten) $\times$ 2 (product category: approach (air freshener) vs. avoidance (cockroach spray)) ANOVA on the purchase likelihood index, produced a significant interaction ($F(1, 233) = 9.81, p = .002$). Consistent with the proposed hypothesis, a positive effect in favor of the handwritten font was observed for the approach category (air fresheners; $M_{HW} = 3.01, SD = 1.52$; $M_{TW} = 2.34, SD = 1.09$; $F(1, 233) = 6.41, p = .01$), but not for the avoidance category (cockroach spray; $M_{HW} = 2.74, SD = 1.56$; $M_{TW} = 3.23, SD = 1.48$; $F(1, 233) = 3.59, p = .06$). All other effects remained insignificant.

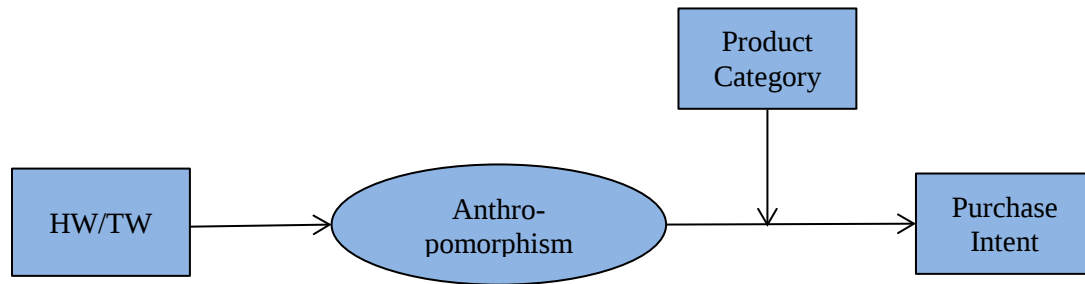
Anthropomorphic perceptions. A similar 2×2 ANOVA with anthropomorphic perceptions as the dependent variable revealed a significant main effect of handwritten (vs. typewritten) fonts ($F(1, 233) = 8.26, p = .004$). Participants in the handwritten font condition ($M_{HW} = 3.55, SD = 1.02$) perceived the spray as more anthropomorphized than participants in the typewritten condition ($M_{TW} = 3.15, SD = 1.15$). There was also a main effect of product category on anthropomorphic perceptions. Participants in the cockroach condition ($M_{cockroach\ spray} = 3.52, SD = 1.05$) perceived the spray as having more human characteristics than participants in the air freshener condition ($M_{air\ freshener} = 3.18, SD = 1.13$; $F(1, 233) = 5.97, p = .015$), which could be due to the fact that cockroach is a living creature. The interaction effect was insignificant.

Alternative explanations. As expected, some main effects of handwritten (vs. typewritten) font on some of the control variables were also observed. Products with handwritten (vs. typewritten) fonts were associated with greater uniqueness ($M_{HW} = 3.63$,

$SD = 2.00$; $M_{TW} = 2.66$, $SD = 1.89$; $F(1, 233) = 14.58$, $p < .001$), were perceived to be more one-of-a-kind ($M_{HW} = 3.53$, $SD = 1.86$; $M_{TW} = 2.93$, $SD = 1.87$; $F(1, 233) = 6.16$, $p = .01$), and more attractive ($M_{HW} = 3.00$, $SD = 1.77$; $M_{TW} = 2.49$, $SD = 1.73$; $F(1, 233) = 5.22$, $p = .02$). The effects were not significant on the other control variables: quality, effort and authenticity. Note that all VIF statistics were below 3, so multicollinearity was not a concern in this study. Importantly, none of these control variables could adequately explain the effect of font style on product evaluation as tested in the moderated mediation analysis.

Moderated mediation. It was predicted that the effect of handwritten fonts on purchase likelihood would be stronger for safe product categories that naturally elicit an approach response. In contrast, when the product category naturally elicits an avoidance response, the handwritten font backfires, presumably because it is not advantageous to anthropomorphize an avoidance category that is risky and unsafe. Thus, a pattern of moderated mediation was expected in which anthropomorphism interacts with product category to affect purchase likelihood. To test for moderated mediation, purchase likelihood index was entered as the outcome variable, handwriting as the predictor variable, anthropomorphic perception index as mediator and the following variables (uniqueness, attractiveness and being one-of-a-kind) as covariates. A bootstrapping analysis (Hayes 2012; PROCESS model 14) with 10,000 resamples supported the predicted moderated mediation ($M = .09$, $SE = .07$, 95% $CI = .005, .289$), meaning that the indirect effect of handwritten font (vs. typewritten font) on purchase likelihood through anthropomorphic perceptions was significantly stronger ($M = .07$, $SE = .05$, 95%

CI = .005, .209) in the air freshener product category than in the cockroach spray category ($M = -.03$, $SE = .04$, 95% CI = $-.134, .031$) (See Figure 5).



($\beta = .09$; 95% CI = 0.005, 0.289)

Air freshener: ($\beta = .07$; 95% CI = 0.005, 0.209)

Roach Killer: ($\beta = -.03$; 95% CI = $-.134, .031$)

FIGURE 5

STUDY 3: MEDIATION ANALYSIS

Discussion

The results of study 3 provided additional evidence that products using a handwritten (vs. typewritten) font are anthropomorphized. This study also demonstrated the role of the inherent approach-avoidance of the product category as a moderating factor. Specifically, participants in the approach (air freshener) condition had a higher purchase intent when the product used handwritten (vs. typewritten) font in the front of the package. The effect was reversed in the avoidance (cockroach killer) condition, where participants showed lower intentions of purchase when the product used handwritten (vs.

typewritten) font in the front of the package. Finally, this study also helped to rule out several alternative accounts.

Study 4: Font Preference as a Function of Product Category

The studies reported so far have illustrated the effect of handwritten fonts using a variety of behavioral approach tendencies and assessed product evaluation in laboratory set-ups. While informative, these studies did not involve real products and real-world choice behaviors. Therefore, this study was designed to measure a more managerially relevant outcome, brand choice, when one has the freedom to select amongst real brands with prominent handwritten or typewritten fonts on the front of the package. The second goal was to add supporting evidence of the moderating condition of product category demonstrated in study 3. Two different products were used: approach (jam) versus avoidance (hot sauce) based on a pretest described next. Another reason for selecting these two categories is that it was important to demonstrate that it is the inherent approach-avoidance motivation that the product category elicits and not simply a hedonic- functional product divide that moderates the effect. This procedure for the pretest was described above in study 3, the results of the pretest follow here.

Pretest: For the jam-hot sauce product categories, participants perceived hot sauce to be significantly more risky than jam as a product category ($M_{jam} = 3.51$, $SD = 1.24$; $M_{hot_sauce} = 4.23$, $SD = 1.30$; $F(1, 85) = 6.83$, $p = .01$). Further, jam and hot sauce were considered equally utilitarian ($M_{jam} = 3.74$, $SD = 1.35$; $M_{hot_sauce} = 3.63$, $SD = 1.52$; $F(1, 85) = .14$, $p = .70$) and hedonic ($M_{jam} = 4.46$, $SD = 1.43$; $M_{hot_sauce} = 5.04$, $SD = 1.62$; $F(1, 85) = 3.05$, $p = .08$). In sum, these two product categories were no different from

each other in hedonicity, but did differ in terms of the approach-avoidance motivation they elicit.

Main study: One hundred and fourteen undergraduate students (45% male) participated in a between-subjects laboratory experiment for extra credit. Participants were randomly assigned to one product category condition, either hot sauce or jam. They were then asked to imagine the following scenario:

“You are going to a friend's place for a get together (picnic with your friends), and your friends have asked you to pick up a hot sauce (jam) to go with the food you will be eating that evening. You stop at iBurn (Chatham jam and jelly shop), a speciality store that sells "all things spicy (jam and jelly)". Here, they were provided images of the store. .

You enter the store and look around. There are hot sauces and spices (jams and jellies) on the aisles. Here, they also looked at a picture from inside the store.

You move towards the center store display and look at the range of hot sauce (jams). The store manager comes up to you and tells you that these are the most popular hot sauces (jams) in the store.

Now look at the four bottles of sauces (jars of jams) in front of you and spend a minute or two deciding which one to choose exactly like you would in the store.”

Real hot sauces (and jams) were chosen in a way that the prominent font used on the front of the package was either handwritten or typewritten. Three bottles (jars) in each condition prominently used handwritten fonts and the other three used prominently typewritten fonts (see Appendix E). Although it was impossible to choose hot sauces (jams) that were similar in all other visual characteristic except the font on the bottle (jar), they were chosen in a way that other explanations could be ruled out as much as possible.

For instance, all hot sauce bottles had the same height and volume. There were also two hot sauces in red color and two in yellowish color (one of each in either handwritten or typewritten font). The same criteria were also applied to jams. They were chosen in a similar height and volume. Moreover, they all had blueberry flavor. In each condition the four bottles (jars) were located on a display, so as to simulate the store environment as much as possible. The order of the bottle presentation was counterbalanced during the experiment.

Results

Consistent with the proposed hypothesis, participants in the jam condition were more likely to choose a product with handwritten (55.24%) than typewritten (44.76%). Conversely, participants in the hot sauce condition were more likely to choose a product with typewritten font (58.06%) than handwritten font (41.94%; $\chi^2(1) = 4.03, p = .04$).

Discussion

When making a choice in a category in which the products were inherently approachable (safe and risk-free), participants were more inclined to select products with handwritten font on their packaging. However, for avoidance categories, participants were less inclined to choose products with handwritten font and more willing to choose products with typewritten font. This finding replicates studies 2 and 3 above, where products with handwritten versus typewritten fonts were simultaneously displayed (study 2) and that the handwritten font is preferred for the approach product category, but not the avoidance product category (study 3).

General Discussion

The global consumer packaging market is valued at approximately US\$400bln (Neil-Boss and Brooks 2013). Marketers increasingly rely on packaging to create brand distinctiveness and visual authenticity on the store shelf to grab consumer attention and share of wallet (Bo 2009; Orth and Malkewitz 2008). This has translated into an academic interest in packaging wherein researchers have begun to investigate both material features (e.g. transparency; Deng and Srinivasan 2013) and specific design elements (e.g. use of art (Hagtvedt and Patrick 2008) or logo placement (Sundar and Noseworthy 2014) utilized in packaging to understand the impact that these packaging elements have on consumer response. The current research falls squarely within this line of inquiry.

The focus of this research is on a specific design element – the type of font – utilized in packaging to demonstrate a novel consumer response elicited by the use of a handwritten (versus typewritten) computerized font on product packaging. The present research builds on, and extend, early work by Henderson et al (2004) to show that packaging utilizing handwritten fonts is more likely to be anthropomorphized by consumers (endowed with human-like characteristics) indicated by the desire to engage with the product, which translates to more favorable product evaluations. A pilot study and four experiments test the proposed hypotheses. The pilot study provides a conservative estimate that at least one-fifth of the packaging on grocery shelves is likely to utilize a handwritten font on their packaging. This finding, coupled with industry trends (e.g. de Castella 2010; Munukutla 2013), underscores the importance of studying handwritten (versus typewritten) fonts as a design element in packaging. Study 1 used

real products to show that products with handwritten (vs. typewritten) fonts on their packaging elicit approach tendency indicative of anthropomorphization. Moreover, these products were evaluated more favourably compared to the ones with typewritten fonts. In Study 2 and 3, the goal was to pin down the basis of this effect. It was found that handwritten fonts on packaging tend to result in the product being anthropomorphized and this mediates the effect of font on product evaluation. Study 3 also demonstrated inherent approach-avoidance motivation associated with the product category as a moderating factor. Though handwritten fonts could work well in conjunction with the approach product category (e.g. safe), they could backfire when used with the avoidance product category (e.g. risky). Finally, study 4 builds up on study 3 to illustrate the boundary condition in a simulated store setup.

Managerial Implications and Directions for Future Research

Beyond the theoretical contributions to existing research outlined in the introduction, the current research has considerable managerial significance. First, it demonstrates that a nuanced change in label design such as simply changing a font can have a profound influence on approach behavior. Although participants knew that the label was not really handwritten, they still associated human elements with the product. Thus, firms do not need to create handwritten labels but rather can choose an appropriate font, which looks natural and similar to actual handwriting. In fact, although legible handwritten fonts do not come with standard software packages, like Microsoft Word, designers have at their fingertips a multitude of computer-generated fonts that they can download with interesting names like Ribiohead and Ænigma Scrawl.

Marketers have notably used visual, verbal, or rhetorical devices suggested by anthropomorphism literature in designing their products. Brands such as Michelin have used human form (the Michelin Man) as a visual cue that activates human schema. Many others have incorporated verbal cues such as a human name to induce anthropomorphic tendencies (e.g. Amazon's Alexa). And there are others who have used rhetorical devices by e.g. giving their brands human characters. For instance, Nantucket Nectar's label "with only a blender and a dream" portray the brand as an underdog brand. Although incorporating such features in the brand have been shown to evoke anthropomorphism, they are not always desirable due to their visibility (being overt and explicit) and the cost they exert on companies. In this research a subtle anthropomorphic cue was introduced that was inexpensive, easy to implement and less obtrusive.

The current research raises the question about whether handwriting possesses particular identifiable visual features that signal its anthropomorphic nature. Does handwriting have a special kind of style or is it the imperfection of handwriting that makes it appear human? Wallner (1975) argued that the physical act of writing is controlled by the central nervous system and is unique for each individual. Thus, unlike machine output, human written output is unique to the individual and is often imperfect. While a machine produces the same exact perfect "R" each time, a human being is not able to. An interesting extension of this work would be to have a handwritten label that is perfect – or as close to perfect as possible – and compare that with an imperfect mechanical font. It is likely that the latter imperfect mechanical font would be more likely to be encoded as having human origins than the former.

Another fruitful direction for further research relates to the specific kind of situations, where handwriting can have larger influence. Kettle and Häubl (2011) have shown that signatures can act as a general self-identity prime and lead to more engagement in a domain with which consumers closely identify. Drawing on this basic effect, one might expect that the corollary is also true; simply viewing a signature can similarly activate associations related to self and identity. It would be expected that a parallel pattern applies to handwriting. More specifically, reading a handwritten message is speculated to act as a human prime, increase the interpersonal nature of the message and lead to more engagement in socially responsible domains.

The neuropsychological literature has also provided interesting findings regarding handwritten fonts. Longcamp and her colleagues (Longcamp et al. 2003; Longcamp et al. 2008; Longcamp, Hlushchuk and Hari 2011; Longcamp, Tanskanen and Hari 2006) use fMRI data to demonstrate that recognizing handwritten letters might rely on distinct processes, possibly related to motor knowledge. For instance, Longcamp, Hlushchuk and Hari (2011) showed that the supplementary motor area (SMA), an area that is involved in planning and control of voluntary actions, becomes more active when exposed to handwriting than typewriting. Based on the brain activation patterns, these authors conclude that handwriting may activate the memory representations of the actual letter formation and the knowledge related to hand-movement execution. It would be interesting to test if the activation exists in the new generation where learning handwriting is not emphasized and it is likely that the memory representation of letter formation does not form in their brain.

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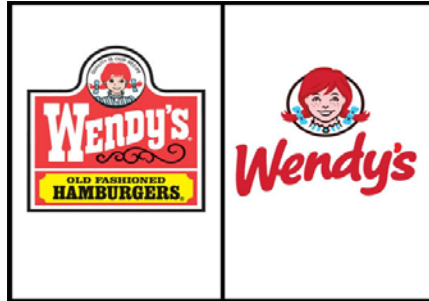
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APPENDIX A

Wendy's



Gatwick airport



Pizza Hut



APPENDIX B

STUDY 2: VISUAL STIMULI

Teas in the handwritten font condition



Teas in the typewritten font condition



APPENDIX C

STUDY 3: VISUAL STIMULI

Condition in which the handwritten font is on the left



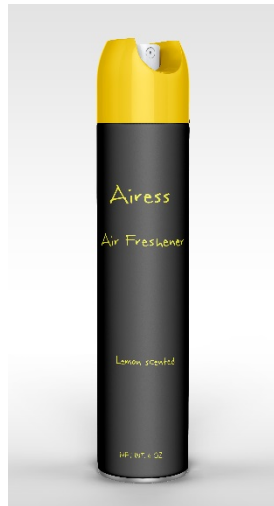
Condition in which the typewritten font is on the left



APPENDIX D

STUDY 3: VISUAL STIMULI

Air Freshener with handwritten font



Air Freshener with typewritten font



Roach Killer with handwritten font



Roach Killer with typewritten font



APPENDIX E

STUDY 3: VISUAL STIMULI

Hot Sauce condition



Jam condition



APPENDIX F

FONT PRETEST: STUDY 1

A pretest was designed to compare and contrast the specific computerized fonts (handwritten versus typewritten) used in the first experiment on a battery of standard design features to establish the source of the hypothesized effects.

Eighty-one individuals recruited from Amazon's Mechanical Turk (54% female, 46% male; $M_{\text{Age}} = 36.81$, $SD_{\text{Age}} = 10.83$) were either presented with a sample of computerized handwritten font or a computerized typewritten font, specifically a white label with the words "white table salt". Henderson, Giese, and Cote (2004) demonstrated that handwritten fonts are categorized as natural fonts and the evaluation of "looks handwritten" is strongly correlated with other naturalness design characteristics. In contrast, natural fonts might be equivalent on other design characteristics like legibility, weight, etc.

To assess how the choice of fonts used in the studies are visually encoded, participants were given fonts that were generated based on equivalent standard design characteristics (e.g. heavy, condensed, etc.) and asked to evaluate the font on the label along a set of natural design characteristics (looks typewritten/handwritten, passive/active, geometric/organic, straight/slanted, angular/curved) and perceived legibility. As Table 4 reveals, both fonts were equally legible, but there were significant differences in the design characteristics that relate to the naturalness dimension (e.g. active/passive; curved angular). Note that although handwritten fonts correlate highly

with naturalness dimensions, a font high on any other naturalness dimensions is not necessarily high in handwritten look. This pretest confirms that the font used for the Experiment 1 was likely to be encoded as a handwritten font.

TABLE 4: PRETEST1: COMPARISON OF HANDWRITTEN VERSUS TYPEWRITTEN FONTS ON DESIGN CHARACTERISTICS

Design Characteristics	Handwritten Font	Typewritten Font
Heavy/light	Equal*	Equal
Repeated/no repeated elements	Equal*	Equal
Serif/sans serif	Equal*	Equal
Ascenders pronounced/not pronounced	Equal*	Equal
Descenders pronounced/not pronounced	Equal*	Equal
Readable/not readable (legibility)	6.25	6.71

* Pre-specified when computer generated

Natural design characteristics	Handwritten Font	Typewritten Font
Active/passive (1=passive, 7=active)	4.78	2.83*
Slanted/straight (1=straight, 7=slanted)	4.13	1.51*
Curved/angular (1=angular, 7=curved)	4.83	2.61*
Organic/geometric	5.10	2.41*

(1=geometric, 7=organic)		
Looks handwritten/typed (1= typed, 7=handwriting)	5.43	1.12*

* $p < .001$.

FONT PRETEST: STUDY 2 & 3

In order to ensure that the effect proposed is not limited to the fonts used in study 1, a different handwritten font was used in the second and third experiments. An identical pretest to study 1 was designed to compare and contrast the handwritten and typed fonts used in study 2 and 3. Eighty-one individuals from Amazon's Mechanical Turk (54% female, 46% male; $M_{\text{Age}} = 36.81$, $SD_{\text{Age}} = 10.83$) were recruited. Table 5 illustrates that both fonts were equally legible, but there were (as expected) significant differences in the design characteristics under the naturalness dimension.

TABLE 5: PRETEST 2: COMPARISON OF HANDWRITING AND TYPEWRITING ON DESIGN CHARACTERISTICS

Design Characteristics	Handwritte n Font	Typewritten Font
Heavy/light Short and fat/tall and thin	Equal*	Equal
Repeated/no repeated elements	Equal	Equal
Serif/sans serif	Equal	Equal
Ascenders pronounced/not pronounced	Equal	Equal
Descenders pronounced/not	Equal	Equal

pronounced		
Readable/not readable (Legibility)	5.71	6.03

* Pre-specified when computer generated

Natural design characteristics	Handwritten Font	Typewritten Font
Active/passive (1=passive, 7=active)	3.97	2.77*
Slanted/straight (1=straight, 7=slanted)	5.51	3.03*
Curved/angular (1=angular, 7=curved)	4.33	3.09*
Organic/geometric (1=geometric, 7=organic)	4.51	2.90*
Looks handwritten/typed (1= typed, 7=handwriting)	3.96	1.51*

* $p < .001$.

CHAPTER 3

THE “ROUND = MAN, PRECISE = MACHINE” INTUITION: THE IMPACT OF ROUND VERSUS PRECISE NUMBER SURGE PRICE ON PERCEPTIONS OF FAIRNESS

Abstract

The present research investigates the impact that the surge price precision can have on fairness perception and its important downstream consequences. With a set of a pilot and four experiments, it is demonstrated that when the ease of justification is low, surge price in the form of round number as opposed to precise number diminishes one's perception of price fairness and will consequently lead to greater likelihood of choosing alternative options. The pilot study demonstrates the potential underlying mechanism, which is that round (vs. precise) surge price are more likely to be attributed to a human source as opposed to a computer program. Studies 1- 2a&b show the effect of surge price precision on fairness perception and demonstrate the moderating impact of ease of justification (measured and manipulated). Study 3 delves further into the underlying mechanism by showing that the hypothesized effects hold only when the knowledge about source of the surge price is ambiguous leaving room for attribution to a human or non-human source.

According to Keith Chen, the Head of Economics Research at Uber, consumers are more receptive to surge prices when the surge is conveyed using precise numbers (e.g. 1.2, 2.7) as opposed to typical round numbers (e.g. 1.5, 2). While this is an interesting marketplace observation, it is not clear what the psychological mechanism underlying this phenomenon might be.

The current research aims to expand our understanding of this issue by asking 1) whether surge price precision can impact consumer perceptions of fairness and influence their behavioral response, 2) when this might occur (moderating conditions), and 3) why (mediator).

The present work theorizes that not all surge prices are susceptible to external cues such as number precision and argues that such cues are only relevant in circumstances in which it is not easy for people to justify their choices. This type of situation where there is need to explain and make sense of events, is also when the motivation to anthropomorphize the source of the surge price is heightened. We base the theorizing on the anthropomorphism literature and suggest that since humans tend to round-off numbers, surge prices in the form of round (vs. precise) numbers are attributed to intentional agents, e.g. human being with negative intentions. As such, round (vs. precise) surge prices lead to decreased fairness perceptions and the higher likelihood of not accepting the suggested fare.

The remainder of this paper proceeds as follows. First, a conceptual framework is presented that guides the development of the theorizing and the subsequent set of studies. It then follows with a set of pilot and four studies that provide converging evidence in

support of the theorizing. Last, the paper concludes with a discussion of theoretical contributions and practical implications for marketers and consumers

Conceptual Development

Price fairness

Price fairness generally refers to a perceived fairness judgment by a buyer of a seller's prices (Xia, Monroe, and Cox 2004). For a price fairness judgement to happen, there needs to be a comparative transaction. This could include multiple references such as firm costs, prior prices or competitor prices (Bolton, Keh, and Alba 2010; Bolton, Warlop, and Alba 2003; Xia, Monroe, and Cox 2004). Previous research has demonstrated that the similarity between the current and reference transaction influences fairness judgment. The general rule is that as the similarity between the transactions decreases, so does the level of perceived price unfairness (Gershoff, Kivetz, and Keinan 2012; Xia, Monroe, and Cox 2004). Although such a comparative context is necessary for fairness judgment to happen, it is not a sufficient condition. This means that any price discrepancy is not always deemed to be unfair to consumers. Early research on price fairness (Kahneman, Knetsch, and Thaler 1986) introduced a principle called dual entitlement (DE), arguing that consumers and vendor are entitled to a reference price and a reference profit respectively and price increases corresponding to cost increases are perceived as fair. This demonstrates the importance of procedures and processes that lead to price perceptions. Since then, several researchers have introduced nuances to the general DE principle and have deepened our understanding of a variety of factors that affect consumer's fairness perception. For instance, (Bolton and Alba 2006) show that the

aforementioned principle holds more strongly when the cost associated with the price increase is alignable, meaning that consumers perceive the price increase for a good as more fair when there is an increase in the costs associated with the good itself as opposed to the costs associated with the service. It has also been widely known that consumers underestimate the impact of inflation, and thus not all cost increases are seen as equally fair (Bolton, Warlop, and Alba 2003). The recent literature on price fairness has also investigated numerous factors beyond the DE framework that lead to different perceptions of price unfairness, factors such as the firm's reputation (Campbell 1999) and individual states (e.g. power states; Jin, He, and Zhang 2014). However, the role of perceptual elements that are less intrinsic to the price discrepancies have rarely been explored. This work contributes to the literature by investigating an incidental factor, numerical information presentation, on price fairness perception. More specifically, it explores the role of round (vs. precise) surge prices (e.g. 2.50 vs. 2.47) on judgment of fairness of the price.

As previously explained, consumers are likely to be sometimes sensitive to static prices when they compare unfavorably with a reference point already established in their minds (Bolton, Warlop, and Alba 2003). However, the sensitivity and thus the judgment of price fairness reach its highest level when there are explicit changes in the price. For this reason, this work only concentrates on a specific – less investigated - form of price increases. As mentioned above, prior research on price fairness has explored price increases in the form of absolute value (e.g. price change from \$10 to \$13). However, in some instances price increase is indicated by a *factor* increase (e.g. the price is doubled). With the increasing use of dynamic pricing in the online marketplace (also known as

demand pricing, or surge pricing), it is becoming a common practice for marketers to rapidly increase or decrease prices in accordance with customer demand. Surge prices are different from other price increases because they (1) are not indicated as absolute price increases, but are factor-based price increases, (2) are in response to increased customer demand, and, (3) change frequently and thus entail a degree of uncertainty since the surge often involves an expiration time to accept the surge price, after which the consumer might get a higher or lower surge.

Numerical Precision

Prior research has shown that precise (vs. round) numbers are perceived as more credible (Jerez-Fernandez, Angulo, and Oppenheimer 2014; Schindler and Yalch 2006), signal competence (Jerez-Fernandez, Angulo, and Oppenheimer 2014; Xie and Kronrod 2012), motivate cognitive (vs. affective) processing (Wadhwa and Zhang 2015), bias magnitude judgment (Thomas, Simon, and Kadiyali 2010) and are seen as more masculine (Yan 2016). Thomas, Simon, and Kadiyali (2010) investigated the role of precision on magnitude judgment. Larger magnitudes are usually rounded and therefore have many zeroes, whereas smaller magnitudes are usually expressed as precise numbers; so relying on the representativeness of digit patterns can make people incorrectly judge a price of \$391,524 to be lower than a price of \$390,000. Schindler and Yalch (2006) have shown that the use of precise (vs. round) numbers in the advertising claim makes the claim more believable, since the precise numbers are seen as more factual. Their hypothesis is based on the argument that round numbers are mentally salient and are more likely come to mind when making an estimation. This is possibly why round numbers are assumed by consumers to be an approximation that is far from true. On the

other hand, sharp numbers are perceived to be objective and thus more accurate (empirically based). Mason et al. (2013) also arrive to a similar conclusion about the effect of price precision in a negotiation context. They argue that precise (vs. round) offers imply a greater level of knowledge in negotiations, and thus negotiators who use these numbers are more likely to anchor their counterparts. Yan and Pena-Marín (2017), however, show the roundness advantage in a negotiation setting, meaning that negotiators are more likely to accept a round (vs. precise) offer when they think about closing a deal (vs. making counteroffers).

Numerical Precision and Human Agency

The present work introduces a new theoretical perspective by proposing that individuals attribute round-form surge prices to human agency and precise-form surge prices to a machine-based algorithm. Such attribution has its root in the human tendency to round numbers off. Lynn, Flynn and Helion (2013) have found that 56% of sales in gas stations, where one pumps his/her own gas, end in .00. Parole ineligibility decisions tend to be clustered around round numbers, without justifiable reasons (Jones and Rankin 2014).

We believe that this effect occurs in situations where the ease of justification is low. Previous literature suggests that consumers seek to justify their choices, especially when there is conflict and uncertainty associated with those conflicts (Sela, Berger, and Liu 2009). If the option that a consumer wants to select has increased in price (a type of conflict), then the person's mind is focused on the need to justify the decision. When the price increase is self-explanatory and consumers can easily justify their choice, there is

not much conflict left to be resolved. However, in circumstances where the ease of justification is low, consumers may look for other cues to justify their choices. This work suggests that the precision of a surge price (round vs. precise), is one of many cues that consumers use to justify their choices. Anthropomorphism literature can help us understand this process better.

Previous literature on anthropomorphism suggests that people are more likely to anthropomorphize stimuli where effectance motivation is high; situations where the motivation “to make sense” and the desire for understanding and predictability is high (Epley et al. 2008). To understand this, we draw on another phenomenon: According to Colin Angle, the co-founder and CEO of iRobot in Bedford, nearly 80% of people who own a Roomba give it a name and might even dress it up (Biever 2014). Why is this? Epley et al. (2008) have shown that when effectance motivation is high, e.g. when a dog behaves relatively unpredictable (vs. predictable), participants attribute more anthropomorphic perceptions to the dog. Waytz et al. (2010) found that situational uncertainty and unpredictability would increase the tendency to anthropomorphize non-human agents. Thus, since the Roomba tends to move around in what appears an unpredictable manner, consumers are more likely to give it a name than they are to name their toaster. Similarly, it is predicted that in circumstances where the reason for price increase is not certain/obvious and individuals look for ways to justify their choices (ease of justification is low), they are more likely to attribute human agency to round (vs. precise) numbers relative to when the ease of justification is high. In turn, such attributions could lead to differences in price fairness perceptions. Prior research has found that when there is a negative outcome, evaluation of a human agent (vs. non-

human agent) is more negative due to perception of humans as causal agents (Campbell 2007). The present research makes a similar argument in that prices containing round (vs. precise) numbers may result in less price fairness, due to the perception that the price is set by a human with motives and intentions.

Human agency and Price Fairness

Previous research has investigated the role of anthropomorphism on price fairness. Kwak, Puzakova, and Rocereto (2015) showed that brand anthropomorphization could influence the perceived fairness of price increases depending on whether the consumer is agentic (vs. communal) in their orientation. More specifically, brand anthropomorphism led to greater perceived price unfairness for agentic-oriented consumers. In contrast, for communal-oriented consumers, brand anthropomorphism led to greater perceived fairness. They built on the study by Campbell (2007), in which the author investigated the source (human vs non-human) on the perceptions of price fairness. She found that when the source of information is human (vs. non-human), the price increase is perceived as more unfair. While previous research has established a link between anthropomorphism and price fairness, this work differs from these previous studies, by focusing on numerical precision as a factor that influences the accessibility perception of human/non-human agents. To the best of my knowledge, only the work by Zhang and Schwarz (2013) has made some indirect connections between numerical precision and human agency. It has shown that participants' estimates were more strongly influenced by precise (vs. round) numbers, but only when the speaker was assumed to be cooperative (e.g. message coming from a human communicator rather than a computer program). In this research, however, the goal is to test whether in certain conditions,

consumers make inferences about the source of the price setting based on the precision of the surge price.

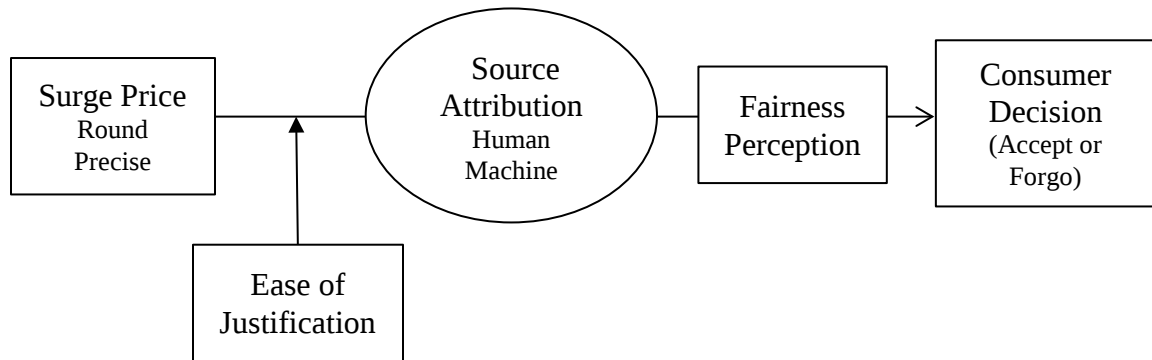


FIGURE 6

CONCEPTUAL FRAMEWORK

Overview of the Empirical Investigation

A pilot and four studies tested the prediction that, in the realm of surge prices, numerical precision (round vs. precise) can influence fairness perceptions and lead consumers to either accept or forgo the offer. We predicted that this effect occurs because people attribute round numbers to human agents and precise numbers to accurate computations and further hypothesized that the effect only holds when it is not easy for people to justify their choice. As predicted, participants who were given a round-form (vs. precise-form) surge price, were found to perceive it as more unfair (studies 1, 2a, 2b, and 3) and consequently less likely to accept the suggested fare (studies 2a, 2b, and 3) only when it is relatively difficult for them to justify their choices. Furthermore, it was shown that the effect is based on the attribution that people make regarding the numerical

precision: they attribute round surge prices to intentional agents (e.g. human) and the corollary precise surge prices to computers or algorithms (pilot study and study 3).

Pilot Study

The goal of this study was to provide initial evidence of the human/non-human attributions that people make regarding numerical precision. Specifically, the study tested the prediction that under circumstances where ease of justification for a surge price is low, those who were presented with round (vs. precise) surge pricing would attribute the surge price to a human agent as opposed to a computer.

To make sure that the scenario used in this study evoked a low ease of justification, the scenario was first pretested.

Pretest: Forty three undergraduate students (58.1% female; $M_{Age} = 20.98$, $SD_{Age} = 1.55$) participated in exchange for extra course credit and were randomly assigned to assess one of the two scenarios.

Low ease of justification:

Imagine that you are going to stay a night at a neighboring city for a concert of your favorite band.

It is Friday night – around 11 pm - and the concert has just ended and you need a ride to get back to your hotel. You request a ride using the GetMe app (a new alternative to Uber in the city). The app, however, gives you a surge price of 2x, meaning that you need to pay two times what is normally charged for this ride. Given the time and the number of people outside the venue, you think you might have some other options as well. You have 30 seconds before this fare expires.

High ease of justification:

Imagine that you are going to stay a night at a neighboring city for a concert of your favorite band.

It is Friday night – around 11 pm - and the concert has just ended and you need a ride to get back to your hotel. You request a ride using the GetMe app (a new alternative to Uber in the city). Given the time and the number of people outside the venue, you think this might be your only option. The app, however, gives you a surge price of 2x, meaning that you need to pay two times what is normally charged for this ride. You have 30 seconds before this fare expires.

The rationale for this manipulation was that when people are told that the described ride could be their only option (vs. they seem to have other options) they feel less guilty and more justified about taking the ride. Right after the imagination task, participants were first asked a question on the likelihood that they will accept the fare on a 7-point scale (1= not at all likely, 7= very likely). They then reported the extent to which they will feel the following emotions if they accept the suggested fare “regretful, hesitant, reluctant, sorry, uneasy” on a 7-point scale (1= not at all, 7= a lot). The items were then combined to a guilt index ($r = .91$) (adopted from Choi et al. 2014).

Participants in the high ease of justification condition were more likely to accept the suggested fare than participants in the low ease of justification condition ($M_{\text{high}} = 4.90$, $SD = 1.51$ vs. $M_{\text{low}} = 3.23$, $SD = 1.66$, $F(1, 41) = 11.96$, $p < .01$). They also felt less guilty about their choices and thus were able to justify their choices much easier ($M_{\text{high}} = 3.16$, $SD = 1.50$ vs. $M_{\text{low}} = 4.67$, $SD = 1.35$, $F(1, 41) = 12.11$, $p < .01$).

Main study: Sixty-eight undergraduate students (52.9% female; $M_{\text{Age}} = 21.00$, $SD_{\text{Age}} = 2.45$) participated in exchange for extra course credit. Based on the propose model, the effect of numerical precision is not relevant in circumstances, where ease of justification for a surge price is high. Thus, in this study the proposition was only tested in a circumstance that people did not find easy to justify. The study manipulated surge

price precision (round vs. precise) in a between-subjects design using the following scenario:

Imagine that you are in going to stay a night at a neighbor city for a concert of your favorite band. It is Friday night – around 11 pm - and the concert has just ended and you need a ride to get back to your hotel. You request a ride using the GetMe app (a new alternative to Uber in the city). The app, however, gives you a surge price of 2x (vs. 2.04x), meaning that you need to pay two times (vs. about two times) what is normally charged for this ride. Given the time and the number of people outside the venue, you think you might have some other options as well. You have 30 seconds before this fare expires.

Participants were then asked questions about the extent to which they attribute human intention to the surge price. The items were as following: “To what extent can you imagine a human being deciding the surge price?”; “To what extent do you attribute the surge price you were given in the scenario to a human decision?”; “To what extent did it feel like you were being taken advantage of by another human being?” (1= not at all, 7= very much) and “To what extent did it feel like you were being taken advantage of by (please indicate below)” (1= a flawed computer system, 7= a deceptive human being). The items were later combined into a human index ($\alpha = .76$). They were also asked about who they attributed the surge price in the scenario to and were given a choice between “A human being” and “A computer”.

Results

Human attribution. An ANOVA with numerical precision (round vs precise) as the independent variable and the human index as the dependent variable revealed the expected main effect ($M_{\text{Round}} = 4.93$, $SD = .94$ vs. $M_{\text{Precise}} = 4.42$, $SD = 1.08$, $F(1, 66) = 4.31$, $p = .042$). This supported the proposition that participants are more likely to attribute a human source to a round surge price than a precise surge price.

A chi-square test on participants' choices of a human being or a computer as the source of the surge price revealed a significant difference across the precise and round conditions ($\chi^2(2) = 4.49, p = .034$). Participants in the round surge condition (67.57%) were more likely to choose a human source compared to the precise surge condition (41.93%).

Discussion

The pilot study offered preliminary evidence that in situations where it is not easy for people to justify their choice, the numerical precision of the surge price can in fact matter. More specifically, participants in the round (precise) number condition attributed the surge price to a human (non-human) source. The main studies tested whether numerical precision could affect downstream consumer decisions to accept or forgo the service and the conditions under which the effect was likely to hold.

Study 1

The primary objective of study 1 was to explore whether ease of price justification could alter the effect of numerical precision on price fairness perception. In this study, a frugality scale was relied on as a measure of the ease of justification. Researchers speculate that tightwads (closely related to high frugality) are more likely than spendthrifts (closely related to low frugality) to show strong cost-benefit associations (Prelec and Loewenstein 1998; Kivetz 1999), which in turn increase the need for justification (Heath and Fennema 1996). The effect of numerical precision on fairness perception was expected to only hold for frugal individuals, who are more likely to attend to surge prices and for whom spending more on a surge price is hard to justify. In other

words, frugal individuals do not find it easy to justify the decision to accept an increased-price option and try to resolve the internal conflict this causes by relying on external cues such as numerical precision. In contrast, no effect was expected when an individual's sense of frugality is low (high in ease of justification).

Participants and Procedure

Pretest: A pretest was designed to test whether participants would have a much easier (more difficult) time to justify their choices when the surge price was unpredictable (predictable). Eighty one individuals recruited from Amazon's Mechanical Turk (55% female, 45% male; $M_{\text{Age}} = 37.09$, $SD_{\text{Age}} = 12.62$) were randomly assigned to assess one of the two scenarios.

Predictable scenario (Low ease of justification):

Imagine that you are in Austin for a concert of your favorite band.

It is Friday night - around 11 pm - and the concert has just ended and you need a ride to get back to your hotel. There are a lot of people standing outside the concert venue waiting for a cab or GetMe. You request a ride using the GetMe app (a new alternative to Uber in Austin). It gives you a surge price of 2x, meaning that you need to pay two times what is normally charged for this ride. You have 30 seconds before this fare expires.

Unpredictable scenario (High ease of justification):

Imagine that you are in Austin for a concert of your favorite band. The concert is scheduled for Friday night.

It is Thursday night - the day before the concert – around 11 pm - and you have just had dinner with some friends and need a ride back to your hotel. You request a ride using the GetMe app (a new alternative to Uber in Austin). It gives you a surge price of 2x, meaning that you need to pay two times what is normally charged for this ride. You have 30 seconds before this fare expires.

Right after the imagination task, participants were first asked a question on the likelihood that they would give up on GetMe and try to find an alternative option on a 7-point scale (1= not at all likely, 7= very likely). They were then asked the following questions “How easy is it for you to justify your decision (your decision to take/not take the GetMe ride)? How difficult is it for you to make sense of your decision? Do you think you made the right choice?” on a 7-point scale (first two items: 1= not at all, 7= very much; the third item: 1= not at all, 7= definitely). The second item was reverse coded and combined with other two to make ease of justification index ($r = .71$).

Participants in the high ease of justification condition were more likely to give up on GetMe and go for an alternative option than participants in the low ease of justification condition ($M_{\text{high}} = 5.15$, $SD = 1.05$ vs. $M_{\text{low}} = 3.90$, $SD = 1.77$, $F(1, 79) = 14.76$, $p < .01$). They also confirmed that they were able to justify their choice much easier ($M_{\text{high}} = 5.97$, $SD = 1.00$ vs. $M_{\text{low}} = 5.44$, $SD = 1.14$, $F(1, 79) = 4.90$, $p = .03$).

Main study: Ninety three undergraduate students (33.3% female; $M_{\text{Age}} = 20.87$, $SD_{\text{Age}} = 6.21$) participated in exchange for extra course credit. The study was a 2 (surge price precision: round vs. precise) between-subjects design. Moreover, frugality was assessed on the frugality scale (Lastovicka et al. 1999), in order to investigate the possible interaction as hypothesized. Since the effect of numerical precision is not relevant in circumstances, where ease of justification for a surge price is high, this study only used the predictable condition (low ease of justification) described in the pretest to manipulate numerical precision. Fairness perception was measured on a 7-point scale (fair/just/reasonable/acceptable) later combined into a fairness perception index ($\alpha = .91$).

Results

A regression with numerical precision, mean-centered frugality scale, and their interaction term as predictors and fairness perception index as the dependent variable revealed a significant interaction between numerical precision and the frugality scale ($\beta = -.73$, $t(89) = -2.73$, $p < .01$). To explore the direction of the interaction, a spotlight analysis was performed at plus and minus one standard deviation from the mean of frugality scale, revealing that participants in the round (vs. precise) number condition reported lower fairness when subjective frugality was high ($\beta = -1.23$, $t(89) = -3.18$, $p < .01$), but not when the subjective frugality was low ($\beta = .36$, $t(89) = .90$, NS) supporting the hypothesis.

Discussion

The results of study 1 demonstrate the effect of numerical precision on fairness perception. Specifically, and as predicted, study 1 revealed that round (vs. precise) surge price leads to lower fairness perception, when the ease of justification is low. In this study, frugality scale was used as an internal proxy for ease of justification. Study 2a and 2b will manipulate ease of justification to test the model.

Study 2a

The objective of study 2a was to replicate the effect of numerical precision in surge pricing on fairness perception and to provide support for the predicted effect on downstream consequences, e.g. the likelihood of forgoing the presented option and choosing an alternative option. Specifically, this study tested the prediction that under circumstances where ease of justification is low, those who were presented with a round (vs. precise) surge pricing would perceive it as less fair and would be more likely to opt

for an alternative option. However, in situations where ease of justification is high, numerical precision does not impact fairness perception or opting for an alternative. In this study, ease of justification was manipulated by presenting participants with scenarios in which the surge price was predictable and thus difficult to justify (vs. unpredictable and thus easier to justify).

Participants and Procedure

Two hundred and fifty four undergraduate students at a public university (59% female; $M_{\text{Age}} = 22.05$, $SD_{\text{Age}} = 2.94$) participated in an online experiment in exchange for course credit. The experiment was a 2 (numerical precision: round vs. precise) $\times$ 2 (ease of justification: high vs. low) between-subjects design. Participants in the low (vs. high) ease of justification scenario were asked to imagine the scenarios described in the pretest of study 1. The surge price was either round (2x) or precise (2.04x).

Participants were then asked a question on the likelihood that they give up on GetMe and try to find an alternative option on a 7-point scale (1= not at all likely, 7= very likely). Fairness perception was measured right after on a 7-point scale (fair/just) later combined into a fairness perception index ($r = .86$).

Since the high justification scenario is the one that is unpredictable and hard to make sense relative to the low justification scenario, the participants finally completed three manipulation check questions for the predictability factor on a 7-point scale (1 = not at all, 7 = very much; $\alpha = .84$), in which they reported the extent to which 1) they expected to get such a surge price, 2) the surge price made sense and 3) the surge price was predictable. These measure were combined into a predictability index.

Results

Manipulation checks. Participants in the high justification condition had a significantly lower predictability index ($M = 3.84$, $SD = 1.43$), compared to those in the low justification condition ($M = 4.24$, $SD = 1.50$; $F(1, 250) = 4.74$, $p = .03$). When individuals thought that they should have been able to predict the surge (peak time after a concert), they were less able to justify their choice (forgoing the presented option) and vice versa.

Fairness perceptions. A 2×2 ANOVA on fairness perception produced a significant interaction ($F(1, 250) = 3.82$, $p = .052$). Contrasting the numerical precision with justification, it was observed that the more difficult it was to justify, the more that the surge price was perceived as less fair in the round (vs. precise) condition ($M_{Round} = 3.43$, $SD = 1.69$; $M_{precise} = 4.20$, $SD = 1.53$; $F(1, 250) = 7.01$, $p = .009$). However, when it was easy to justify the choice, there was no difference in fairness perception between the round (vs. precise) conditions ($M_{Round} = 3.53$, $SD = 1.65$; $M_{precise} = 3.50$, $SD = 1.67$; $F(1, 250) = .01$, $p = .91$). A marginally significant effect of numerical precision on fairness perception ($F(1, 250) = 3.26$, $p = .07$) was also observed. More specifically, participants in the round condition perceived the surge price as less fair than the ones in the precise condition ($M_{Round} = 3.48$, $SD = 1.66$; $M_{precise} = 3.85$, $SD = 1.64$).

Alternative option. A 2×2 ANOVA on alternative option, as one of the dependent variables, produced a significant interaction ($F(1, 250) = 3.85$, $p = .051$). Contrasting the numerical precision with justification, it was observed that when it was not easy for people to justify the choice, there was a higher likelihood of going for an alternative option in the round (vs. precise) condition ($M_{Round} = 4.55$, $SD = 1.50$; $M_{precise} =$

3.90, $SD = 1.62$; $F(1, 250) = 6.04$, $p = .01$). However, the choice was easy to justify, the likelihood of choosing an alternative option was similar between the conditions ($M_{Round} = 4.54$, $SD = 1.40$; $M_{precise} = 4.62$, $SD = 1.35$; $F(1, 250) = .10$, $p = .76$).). A marginally significant effect of justification on alternative option ($F(1, 250) = 3.67$, $p = .056$) was also observed.

Moderated mediation. A pattern of moderated mediation was expected in which justification interacts with numerical precision to affect the likelihood of choosing an alternative option. To test for moderated mediation, the likelihood of choosing alternative option was entered as the outcome variable, numerical precision as the predictor variable, ease of justification as the moderator and fairness perception index as mediator. A bootstrapping analysis (Hayes 2012; PROCESS model 7) with 10,000 resamples revealed that the predicted moderated mediation ($M = .12$, $SE = .08$, 95% CI = .008, .356) , meaning that the indirect effect of precise (vs. round) surge price on alternative option through fairness perceptions was only significant ($M = .12$, $SE = .07$, 95% CI = .024, .295) when justification was low (vs. high) ($M = .00$, $SE = .05$, 95% CI = -.11, .089).

Study 2b

Experiment 2b uses a different manipulation for ease of justification to provide convergent evidence in these effects. As before, when ease of justification for a surge price is low, those who were presented with a round (vs. precise) surge pricing would perceive it as less fair and more likely to look for an alternative option. However, in situations where ease of justification is high, numerical precision does not alter fairness perception and the likelihood of opting for an alternative option.

Participants and Procedure

A total of three hundred and sixteen participants (59% female; $M_{\text{Age}} = 22.05$, $SD_{\text{Age}} = 2.94$) were recruited on Amazon's Mechanical Turk for a reimbursement of US\$0.35. The experiment was a 2 (numerical precision: round vs. precise) $\times$ 2 (ease of justification: low vs. high) between-subjects design. Three participants were excluded from the analyses due to failing to give relevant response in the open-ended question, which served as an attention check.

Participants in the high and low justification conditions were asked to imagine the scenarios that were pretested in the pilot study.

In both conditions, the surge price was either round (2x) or precise (2.04x). Participants were then asked a question on the likelihood that they give up on GetMe and try to find an alternative option on a 7-point scale (1= not at all likely, 7= very likely). Fairness perception was measured right after on a 7-point scale (fair/just/reasonable/acceptable) later combined into a fairness perception index ($\alpha = .96$).

Results

Fairness perceptions. A 2×2 ANOVA on fairness perception produced a significant interaction ($F(1, 309) = 4.20, p = .041$). Consistent with the hypothesis, contrasting the numerical precision with level of justification, it was observed that when justification was low, the surge price was perceived as less fair in the round (vs. precise) condition ($M_{\text{Round}} = 2.70, SD = 1.80; M_{\text{precise}} = 3.37, SD = 1.63; F(1, 309) = 6.27, p = .013$). However, when justification was high, the fairness perception was similar between the round (vs. precise) conditions ($M_{\text{Round}} = 2.90, SD = 1.64; M_{\text{precise}} = 2.80, SD = 1.59; F(1, 309) = .14, p = .71$).

Alternative option. A 2×2 ANOVA on alternative option, as one of the dependent variables, produced a significant interaction ($F(1, 309) = 4.47, p = .035$). Consistent with the hypothesis, contrasting the numerical precision with the level of justification, it was observed that when the justification was low, there was a higher likelihood of going for an alternative option in the round (vs. precise) condition ($M_{Round} = 5.58, SD = 1.74; M_{precise} = 4.71, SD = 1.74; F(1, 309) = 8.73, p = .003$). However, when the justification was high, the likelihood of choosing an alternative option was similar between the round (vs. precise) conditions ($M_{Round} = 4.85, SD = 1.93; M_{precise} = 4.85, SD = 1.83; F(1, 309) = .00, p = .995$). A significant main effect of number precision on alternative option ($F(1, 309) = 4.43, p = .036$) was also observed, meaning that the participants in the round number condition ($M_{Round} = 5.19, SD = 1.87$) were more likely to report choosing an alternative option than the participants in the precise number condition ($M_{precise} = 4.78, SD = 1.78$).

Moderated mediation. A pattern of moderated mediation was expected in which justification interacts with numerical precision to affect the likelihood of choosing an alternative option. To test for moderated mediation, the likelihood of choosing alternative option was entered as the outcome variable, numerical precision as the predictor variable, ease of justification as the moderator and fairness perception index as mediator. A bootstrapping analysis (Hayes 2012; PROCESS model 7) with 10,000 resamples revealed the predicted moderated mediation ($M = .29, SE = .16, 95\% CI = .017, .656$), meaning that the indirect effect of precise (vs. round) surge price on alternative option through fairness perceptions was only significant ($M = .26, SE = .12, 95\% CI = .048, .537$) when justification was low (vs. high) ($M = -.04, SE = .10, 95\% CI = -.235, .152$).

Discussion

Taken together, the results of study 2a and 2b offered additional evidence of the effect of numerical precision of fairness perception. Specifically, when showed a round (vs. precise) surge price, participants perceived the surge price as more unfair. And the effect only held when people had a hard time justifying their choice. Moreover, these studies demonstrated the effect of numerical precision on a downstream consequence, likelihood of choosing an alternative option.

Study 3

The goal of study 3 was to provide supporting evidence of the proposed underlying mechanism. Instead of asking people about their inference regarding the round versus precise surge prices as was done in the pilot study, this study tested the hypothesis by manipulating the source behind the surge price (thus manipulating the mediator; Spencer, Zanna, and Fong 2005). The study was predicted to replicate the findings in pilot study and also to illustrate that the effect wipes out when people are aware of the source (either human or computer) that set the surge price.

Participants and Procedure

Four hundred and ninety-eight undergraduate students (58.6% female; $M_{\text{Age}} = 22.78$, $SD_{\text{Age}} = 4.62$) participated in exchange for extra course credit. The experiment was a 2 (numerical precision: round vs. precise) $\times$ 3 (source: human vs. computer vs. control) between-subjects design and the same scenario for low ease of justification, described in the pilot study, was used. The source was manipulated by either telling the participants that the app is designed in a way that relies on either a human being or computational modeling to determine the price. The control condition did not provide

participants with any extra information similar to all the previous studies. Participants were then asked a question on the likelihood that they accept the suggested fare on a 7-point scale (1= not at all likely, 7= very likely). Fairness perception was measured right after on a 7-point scale (fair/just/reasonable/acceptable) later combined into a fairness perception index ($\alpha = .93$). As a manipulation check, participants were asked to identify who determined the surge price “A human being” and ”A computer”.

Results

Manipulation Check. A chi-square test (Beasley and Schumacker 1995) was conducted on participants’ choices of “A human being” and “A computer”. The analyses revealed a significant difference across the source conditions ($\chi^2(2) = 17.09, p = .00$). As predicted, participants in the human condition (58.33%) chose “A human being” as the source of the surge price significantly greater than chance levels ($p < .01$). Participant in the computer condition (35.76%) chose “A human being” as the source of the surge price significantly less than chance levels ($p < .01$). However, this comparison was not significant for control condition (46.06%; $p = .82$).

Fairness perceptions. A 2×3 ANOVA on fairness perception produced a significant interaction ($F(2, 492) = 4.29, p = .014$). Consistent with the hypothesis, contrasting the numerical precision with the type of source, it was observed that when the source was not indicated (control condition), the surge price was perceived as less fair in the round (vs. precise) condition ($M_{Round} = 3.13, SD = 1.67; M_{precise} = 3.83, SD = 1.56; F(1, 492) = 8.69, p < .01$). This replicates the findings from previous studies. However, when the source was human, the fairness perception was similar between the round (vs. precise) conditions ($M_{Round} = 3.43, SD = 1.42; M_{precise} = 3.17, SD = 1.40; F(1, 492) = 1.25,$

$p = .26$). The same trend was true when the source was attributed to an algorithm ($M_{Round} = 3.52$, $SD = 1.63$; $M_{precise} = 3.59$, $SD = 1.52$; $F(1, 492) = .63$, $p = .80$).

Accepting the fare. A 2×3 ANOVA on acceptance of the fare, as one of the dependent variables, produced a significant interaction ($F(2, 492) = 3.36$, $p = .035$). Consistent with the hypothesis, contrasting the numerical precision with the type of source, it was observed that when the source is not indicated, there was a lower likelihood of accepting the fare in the round (vs. precise) condition ($M_{Round} = 2.99$, $SD = 1.74$; $M_{precise} = 3.63$, $SD = 1.89$; $F(1, 492) = 5.36$, $p = .02$). However, when the source was human, the likelihood of accepting the fare was similar between the round (vs. precise) conditions ($M_{Round} = 3.36$, $SD = 1.70$; $M_{precise} = 3.48$, $SD = 1.82$; $F(1, 492) = .18$, $p = .67$). The same trend was true when the source was algorithm ($M_{Round} = 3.61$, $SD = 1.84$; $M_{precise} = 3.24$, $SD = 1.76$; $F(1, 492) = 1.82$, $p = .18$).

Discussion

By manipulating the source of the surge price, this study provided supporting evidence of the mechanism underlying the proposed effect. Study 3 demonstrated that the effect only held when there was no explicit knowledge about the source of the surge price, and thus people could make their own subjective inferences about the source. However, when the source was explicitly mentioned, the effect was no longer occurred. Based on the previous research (Jerez-Fernandez, Angulo, and Oppenheimer 2014; Schindler and Yalch 2006), round numbers signal approximation and precise numbers signal accuracy. One may argue that the effect of numerical precision on fairness perception in the present work could be due to accuracy attributions instead of source

attributions. If that was the case, the effect should have hold when the source was explicitly mentioned. However, this study further demonstrates that the effect of numerical precision on fairness perception goes beyond the accuracy attribution and corroborates the importance of procedures and processes that lead to price perceptions.

General Discussion

Building upon the existing literature on the role of source attribution and anthropomorphism on fairness perception (Campbell 2007; Kwak, Puzakova, and Rocereto 2015), this research examines a subtle marketing cue (numerical precision) that activates human/non-human attribution and consequently affects judgment of price fairness. Across a pilot and four studies, it was predicted and found that in circumstances where it is not easy for an individual to justify his/her choice, surge prices in the form of round (vs. precise) numbers can decrease the person's price fairness perception, and that this stems from the belief that round numbers are produced by an intentional agent and price numbers are produced by machines with no such intentions.

The pilot study provides a support for the underlying mechanism, by demonstrating that the effect of surge price precision on fairness perception stems from the belief that the round surge prices are produced by an intentional agent such as a human and the precise surge prices are produced a non-intentional agent such as a computer. Study 1 uses frugality scale to measure ease of justification and shows that people high in frugality (low in ease of justification) perceive round (vs. precise) surge price as less fair. However, people low in frugality do not perceive such difference. Study 2a and 2b each use a different manipulation of ease of justification and provide converging evidence on the role of surge price precision on fairness perception. They also

show the effect on downstream consequences meaning that when ease of justification is low, round (vs. precise) surge price tend to result in less acceptance of the suggested fare and more into choosing alternative options. Furthermore, they show that fairness perception mediates this effect. Finally, study 3 builds up on the pilot study to provide supporting evidence for the role of human attribution in numerical precision.

Theoretical and Practical Contributions and Future Research Directions

This research makes several theoretical contributions. First, it contributes to the numerical precision literature by showing that in specific conditions, a round (vs. precise) number can induce anthropomorphic tendencies, meaning that it can be attributed to an intentional (non-intentional) agent. Second, it contributes to the fairness perception literature by identifying conditions under which numerical precision influences fairness perception. It shows that numerical precision does not always impact consumer's fairness perception. It only matters when people do not find it easy to justify their choice.

Beyond the theoretical contributions to existing research, the current research has valuable practical significance for marketers and consumers. The findings can be relevant in industries where dynamic pricing is a common feature. The propositions were tested in a certain cab-sharing setting. However, dynamic pricing is commonplace strategy in different industries, such as airline, sport teams, live shows. Even some restaurants and bars are starting to pick up the practice. The Drink Exchange (a stock market pricing systems) have tested the strategy with a real-time ticker, in a bar in San Diego that shows price fluctuations minute by minute.

Collaborative consumption or sharing economy seems to be a new trend in the marketplace. One of the features of this economy is the new way in which transactions

and interactions happen between the parties. Traditionally, buyers could either build some kind of trust with the local market or would purchase from retailers with reputations. New techno-driven companies have managed to crack this trust problem e.g. by a feedback system. However, the pricing strategies are still perceived to be more arbitrary relative to transactions with traditional companies, which seems to be more standardized. Although the transactions in this new form of economy still occurs through a third party, it is basically a transaction between 2 individuals (the seller and the buyer), as opposed to buyers and a larger party (e.g. a company), and thus, there is uncertainty into how the price is set in the first place. This research is particularly relevant to this type of transaction where the boundary between human and algorithm blends. Situations where e.g. it is not clear whether the price you are given is set completely by an algorithm or it is partially controlled by a human agent. Thus, this type of collaborative consumption seems to be more susceptible to the numerical precision cue that is proposed by the current research.

In this research, it was found that when the surge price is communicated by an app, consumers make certain inferences about the source of the surge price. This raises the question about the similarity of communication and social norms between human to human and human to computer interactions. It is well established that humans' conversations are guided by tacit norms of cooperative communication (Grice 1975; Schwarz 1994). With the raise of human-computer interaction, it would be interesting to explore whether and when human beings use similar norms and assumptions when interacting with a computer as they would with a human, use different norms or such norms do not exist.

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CHAPTER 4

CONCLUSION

This dissertation consists of two essays related broadly to anthropomorphism. While each of the essays focuses on different marketing cues, they are linked together since both cues activate the notion of “human-ness” in order to influence consumer response. Essay 1 (Chapter 2) examines how and when handwritten (vs. typewritten) fonts on packaging influence product evaluation. Drawing on anthropomorphism definition, I introduce handwritten font as a subtle cue (as opposed to overt cues utilized in the previous literature) that activates the human source and evoke the tendency to anthropomorphize ultimately leading to favorable product evaluations.

Essay 2 (chapter 3) examines another cue in a different context that again relies on the activation of the human source to influence consumer behavior. I propose and show that a round (vs. precise) surge price can negatively influence consumers’ fairness perception and ultimately increase the likelihood of forgoing the proposed surge price. This can be explained by consumer’s attribution of round (vs. precise) numbers to a human (vs. non-human) source due to human’s tendency to round off numbers. Since this research is concerned about a surge price (a form of price increase), the human attribution has a negative side to it and would consequently lead to lower price fairness. Moreover, I propose that the effect only holds where ease of justification is low and one is trying to make sense of his/her choice; a situation that is also suitable to trigger anthropomorphism (based on effectance motivation).

