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TWO ESSAYS ON TIME PERCEPTIONS AND PATIENCE

Frank May
University of South Carolina - Columbia

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by

Frank May

Bachelor of Science
New Jersey City University, 2006

Masters of Business Administration
University of Minnesota, 2010

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Accepted by:

Ashwani Monga, Major Professor

Alokparna Monga, Committee Member

Priyali Rajagopal, Committee Member

Leonard Lee, Committee Member

Lacy Ford, Vice Provost and Dean of Graduate Studies

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ABSTRACT

My dissertation examines how the properties inherent to time can affect perception of wait time and, consequently, patience. Patience, or the willingness to forgo a smaller reward in the present in order to obtain a larger reward in the future, is an important construct in the consumer behavior literature. I focus on how consumers perceive wait time when faced with an intertemporal choice between a smaller-sooner option and a larger-later one (e.g., receive less money earlier vs. more money later). In this type of situation, wait time is standing between the individual and a better option. I argue that the properties of time itself can affect wait time perception, which in turn can affect patience for a larger-later reward.

There exists scant research on how the properties of time itself can affect time perception and patience, and said research focuses on *quantitative* properties of time (duration, numeric labels of time, etc.). The focus of my dissertation is on *qualitative* properties of time—how the anthropomorphic properties of time (essay 1) and the linguistic properties of time (essay 2) can affect time perception and, in turn, patience.

Essay 1 introduces time anthropomorphism: a tendency to attribute time with humanlike mental states (e.g., time has intentions; it has a will of its own). I find that when time is anthropomorphized, it affects patience through a potency process. That is, for low power (but not high power) individuals, wait time is perceived to be more aversive when anthropomorphized, leading to a preference for a larger-later option versus a smaller-sooner one.

Essay 2 explores the notion that the language used in frames describing time may affect patience. In intertemporal settings, patience is influenced by the size of the later reward relative to the sooner one—a much-larger (vs. larger) later reward induces more patience. I show that this effect is moderated by the frame of wait time—the effect of reward size is stronger in far (vs. long) frames. Conceptualizing the later reward as a "destination" at the end of a wait time, I argue that destinations are associated more with far (vs. long) frames. Consequently, increasing the size of the destination (i.e., later reward) leads to relatively contracted time perception, and higher patience in far (vs. long) frames.

TABLE OF CONTENTS

LIST OF FIGURES

INTRODUCTION

Patience, which refers to the willingness to forgo a small reward in the present (i.e., a smaller-sooner reward) and wait to obtain a larger reward in the future (i.e., a larger-later reward), is an important construct in the consumer behavior literature. That is, one's ability to wait for something better has implications for overall well being, as future rewards are often greater than present rewards (e.g., one can spend a smaller amount of money now or invest in order to obtain a larger amount of money in the future) (Zauberman et al. 2009). Patience in the face of wait time has a number of consequences for consumers and marketers alike, as such patience affects discount rates ("Given I can receive $100 today, how much would I require to wait 1 month to receive the money?" LeBoeuf 2006), preference for expedited shipping ("Should I wait for my package, or pay extra for expedited shipping to get it sooner?" Chen, Ng, and Rao 2005), the use of credit ("Should I wait until I have enough money to purchase the item, or buy it now using a credit card and pay interest?" Mishra and Mishra 2010), and general performance in life (Mischel, Shoda, and Rodriguez 1989).

Earlier research has focused on how perceptions of the larger-later reward can affect patience (O' Donoghue and Rabin 1999; Thaler 1981)—if the larger-later reward is seen as particularly valuable, people are more likely to wait. However, more recent research has explored another aspect that may influence patience—the manner in which the intervening wait time is perceived (Zauberman et al. 2009). The literature on time

perceptions is rich in describing how factors relating to the individual (e.g., memory or mood) or an event (e.g., the valence or intensity of an event) might affect perceptions of time. However, there exists little research on how the properties of time itself can affect perceptions of time, and subsequently patience. The scant research that does exist in this area pertains to *quantitative* properties of time, or how the numerical values assigned to time affect time perceptions and patience (Read et al. 2005; LeBoeuf 2006; Monga and Bagchi 2012). This dissertation examines how heretofore unexamined *qualitative* properties of time can affect perceptions of time and patience.

The first essay introduces time anthropomorphism: a tendency to attribute time with humanlike mental states (e.g., time has intentions; it has a will of its own). I find that when time is anthropomorphized it affects patience through a potency process. That is, for low power (but not high power) individuals, wait time is perceived to be more aversive when anthropomorphized, and in turn these perceptions drive preference for a larger-later option versus a smaller-sooner one. The second essay focuses on how linguistic properties of time can influence patience levels. In intertemporal settings, patience is influenced by the size of the later reward relative to the sooner one—a much-larger (vs. larger) later reward induces more patience. I show that this effect is moderated by the frame of wait time—the effect of reward size is stronger when time is framed in terms of "far" versus "long". Conceptualizing the later reward as a "destination" at the end of a wait time, I argue that destinations are associated more with far (vs. long) frames. Consequently, increasing the size of the destination (i.e., later reward) leads to relatively contracted time perception, and higher patience in far (vs. long) frames.

In the next section, I will briefly review the literature on time perceptions in order to distinguish this dissertation from prior research. Next, in closing this general introduction, I will explicate how this research expands upon prior research on time perceptions and patience. Afterwards I will present essays 1 and 2 and finish the dissertation with an overall closing statement.

Review of Time Perceptions

Time, which is defined as "a non-spatial continuum that is measured in terms of events which succeed one another from past through present through future" (Merriam-Webster; m-w.com), is an omnipresent entity in the lives of all consumers. This dissertation explores how differential perceptions of this entity of time can affect patience in intertemporal situations. Indeed, time can be perceived in a number of ways, as this powerful entity flows, drags, and flies, acts as a container (e.g., "in two weeks") (Hernandez 2001), is treated like a medium of exchange (Okada and Hoch 2004; Soman 2001; Soster, Monga, and Bearden 2010; Rajagopal and Rha 2009), and kills indiscriminately--yet is also vulnerable (e.g., "We spent the afternoon killing time."). Given that time lends itself to a number of interpretations, "there is no unique, homogeneous time but instead multiple experiences of time" (Droit-Volet and Gil 2009). The heterogeneous nature of the experience of time calls for a brief review to distinguish this dissertation from prior research. The majority of existing research on perceptions of time has focused on how characteristics of individuals and the characteristics of a past or future event can affect perceptions of time. Next, I will briefly discuss these streams of research before delineating how this dissertation differs.

Factors related to the individual can affect perceptions of time. For example, individuals have an internal clock, or pacemaker, that keeps track of the passage of time (Gibbon et al. 1984). Factors that speed up or slow down the internal clock affect time perceptions such that speeding up (slowing down) the internal clock increases (decreases) time estimates. Researchers have found that arousal is one of the key factors that drives the speed at which the internal clock functions such that increasing arousal increases the speed of the internal clock. For example, the use of click or flicker trains can increase arousal, leading to increased duration estimates (Treisman, Faulkner, and Naish 1990; Penton-Voak et al. 1996; Droit-Volet and Wearden 2001; Ortega and Lopez 2008). However, one must pay attention to said clock for such effects to emerge (Block and Zakay 1997). In general, as less attention is paid to the temporal aspect of a task, the shorter that task seems (Macar, Grondin, and Casini 1994). For example, as processing difficulty increases, temporal estimates decrease (Zakay, Nitzan, and Glicksohn 1983; Hicks, et al. 1977). Difficult tasks require more attention, and if the temporal aspect of a task is neglected, the duration of said task is perceived to be shorter. Memory is another factor that can drive time perceptions. For example, as the number of remembered events between the present and a focal event increases (i.e., "memory markers"), estimates of the amount of time between the present and the focal event also increase (Ahn, Liu, and Soman 2009; Zauberman et al. 2010). Similarly, if asked about the duration of a specific event in the past, the number of encoded and available contextual changes during the event (Fraisse 1957/1963; Block and Reed 1978) can affect perceptions of the duration of the event. Thus, perceptions of the duration of events as well as perceptions of durations between the present and a focal event are affected by such memory markers. Mental

states can also affect perceptions of time. For instance, future time delays seem longer when in the presence of sexual cues, which in turn leads to impatience (Kim and Zauberman 2012). Additionally, a concrete or abstract mindset can affect perceptions of time, as an abstract mindset (vs. a concrete mindset) elongates task duration estimates (Kanten 2011), increases predicted enactment times (Liberman et al. 2007), and increases perceived temporal distance from past events (Kyung, Menon, and Trope 2009). Furthermore, mentally simulating temporal distances can make said distances seem longer (Ulkumen and Thomas 2013). Ulkumen and Thomas (2013) found that individuals tend to mentally simulate future durations when said durations are personally relevant, and this mental simulation lengthens time perceptions. For example, a person who believes that dieting is personally relevant will be likely to mentally simulate a one-year self improvement plan, which in turn will make one year seem longer versus if the year were not mentally simulated. Finally, mental illness can affect perceptions of time, as those with schizophrenia display distorted subjective time perceptions versus control participants (Potheegadoo et al. 2012).

Just as properties of the individual have been shown to affect perceptions of time, properties of events situated in time can also affect such perceptions. Perceptions of time since an event can be influenced by information about the age of the event (e.g., 1 year ago), its location in time (e.g., October 16, 2012), or clues that are associated with the event (e.g., I was wearing a jacket when that event happened) (Friedman 1993). Similarly, the intensity or valence of an event can affect time perceptions. Emotionally intense events tend to seem temporally closer than benign events (VanBoven et al. 2010). For example, a singing competition will seem closer for a person performing in the

competition versus a person merely observing the competition, as performing is more emotionally intense than observing is. Events may also seem closer or further away in time depending on the valence and orientation of the event (i.e., whether the event is situated in the past or the future). In terms of past events, people tend to distance themselves from negative events while drawing positive events closer (Ross and Wilson 2002). For example, we perceive our failures as more temporally distant than our successes (Ross and Wilson 2002). However, for future events, the reverse emerges—negatively valenced events loom large and appear closer than do positively valenced events (Bilgin and LeBoeuf 2010). Bilgin and LeBoeuf (2010) found that the prospect of moving to an inferior office (vs. a superior office) causes the time until the move to seem shorter. Not only do an event's valence and intensity affect perceptions of time, but the difficulty associated with the event does as well. Jiga-Boy and colleagues (2010) found that difficult (easy) tasks seem closer (further away) when there is a deadline present versus absent. That is, for difficult events, the imposition of a deadline creates the mindset of "so much to do and so little time," resulting in compressed time perceptions. Finally, the label applied to a travel destination can affect time perceptions. For instance, Raghubir, Morwitz, and Chakravarti (2011) documented the "going home" phenomenon, which refers to the fact that travelling time from point A to home is perceived as shorter than the travelling time from home to point A.

Although there has been an abundance of research on how properties of the individual or event can affect perceptions of time, there has been relatively little research on how the properties of time itself can affect perceptions of time, and in turn, patience.

In the next section, I will review what has been done in this realm and how this dissertation contributes.

The Present Research

Time is in important factor in predicting patience levels, evidenced by the fact that extensive research has been conducted on how patience may be influenced by time-related factors such as the additivity of time intervals (Read 2001; Scholten and Read 2006) and individuals' insensitivity to time (Ebert and Prelec 2007; Zauberman et al. 2009), as well as extraneous factors that affect time perception such as sexual cues (Kim and Zauberman 2013), and emotions such as awe (Rudd, Vohs and Aaker 2012). However, this research does not focus on how the properties of time itself can affect perceptions of time and patience. Time can be seen as having many different properties, as evidenced by the multitude of metaphors used to describe time (Hernandez 2001). For instance, the metaphors of time as space (Kim, Zauberman, and Bettman 2012) (e.g., "At the time of the murder" refers to the time of the murder as though it were a physical location), time as an object or resource (Devoe and House 2012) (e.g., "I need to buy some time" refers to time as a resource that one can spend), time as a container (e.g., "I'll be there in time" refers to time as a container) and time as a force (e.g., "Time hasn't been kind to her" refers to time as a force that has affected another person) are widespread in the English language. Can the properties of the malleable entity of time affect perceptions of time, and consequently, patience? Although there has not been much research that addresses this question, the answer appears to be yes. For example, the passage of time can be thought of as time moving toward the individual (e.g., "Thanksgiving is coming") or as the individual moving through time (e.g., "We're

coming up on Thanksgiving") (Boroditsky and Ramscar 2002). Boltz and Yum (2010) found that the former perspective led to longer estimates of future task durations versus the latter perspective. More central to this dissertation, there is a lack of research that explores how the properties of time can affect patience through perceptions of time. One factor that has been researched is the manner in which time is represented. A point in time may be represented by an extent of time (e.g., in 5 days) or dates (e.g., Oct 21st). When time is represented using an extent of time, discount rates are higher such that individuals demand more money to delay receipt of payment (Read et al. 2005; LeBoeuf 2006). Similarly, numbers and units can be used to convey a sense of time (e.g., 7 days vs. 1 week), and the use of one or the other can influence perceptions of temporal durations. For those in a concrete (abstract) mindset, changes in temporal distance seem larger (smaller) when using numbers versus units, which in turn can affect patience (Monga and Bagchi 2012). To my knowledge, these are the only instances of research in which properties inherent to time have been shown to affect perceptions of time and patience. Moreover, this research is constricted to the numerical values assigned to time—or the quantitative properties of time. However, time is a complex, multifaceted construct (Hernandez 2001), and this complexity has been neglected in the patience literature.

I address this lacuna in the patience literature by investigating how qualitative properties of time, or properties that are independent of the numerical values of time, can affect how individuals perceive time, and how patient they are in intertemporal choice situations—situations in which one must choose between something smaller now or something larger in the future. I investigate two such qualitative properties of time: its

anthropomorphic properties (essay 1) and its linguistic properties (essay 2), and find that these properties affect perceptions of time and patience. Each essay of this dissertation provides a number of individual contributions by showing unique moderating and mediating processes underlying these effects.

Essay 1 will be structured as follows: First, I will give a general overview of the research, my findings, and the implications. Next, the literature on anthropomorphism will be reviewed and the notion of time anthropomorphism will be explicated. Afterwards, I will discuss the power of time and the power of individuals, which will lead into my hypothesis development. Finally, I will present the results of five studies and further discuss the implications of these findings. In short, I show that the effects of time's anthropomorphic properties emerge only for low-power individuals through aversive perceptions of wait time. That is, wait time seems more aversive to low power individuals when anthropomorphized, which in turn leads to lower patience.

Essay 2 will be structured as follows: First, I will give a general overview of the research, my findings, and the implications. Next, the literature on the link between wait time and patience will be reviewed. Afterwards, the notion that the final reward in an intertemporal setting can influence perceptions of wait time and patience will be discussed. Finally, I will explicate my hypothesis that the frames "far" and "long", because they have differential associations with the concept of "destination", will differently affect perceptions of time and patience. Finally I will present six studies and discuss the implications of my findings. In short, I show unique processes regarding the linguistic properties of time. More specifically, when time is thought of in terms of "far" (vs. "long") in the context of an intertemporal choice (i.e., smaller-sooner vs. larger

later), the notion of "destination" looms large and affects perceptions of time and patience.

In addition to the individual contributions that emerge in each essay, the dissertation as a whole contributes by exploring the notion that qualitative properties of time can affect perceptions of time and patience. Prior research on how time perceptions can affect patience has examined quantitative properties of time (Read et al. 2005; LeBoeuf 2006; Monga and Bagchi 2012), ignoring the multifaceted qualitative nature of time. By investigating how qualitative properties of time can affect patience, my dissertation fills this gap. By doing so, this research introduces two properties of time that can be researched further: its anthropomorphic and linguistic properties.

ESSAY 1: WHEN TIME HAS A WILL OF ITS OWN, THE POWERLESS DON'T HAVE THE WILL TO WAIT: ANTHROPOMORPHISM OF TIME CAN DECREASE PATIENCE

1.1 ABSTRACT

This essay introduces time anthropomorphism: a tendency to attribute time with humanlike mental states (e.g., time has intentions; it has a will of its own). This tendency, which varies across individuals and may also be induced, changes patience (e.g., for regular over expedited shipping). Specifically, the anthropomorphism of wait time reduces patience for low-power (but not high-power) individuals. This happens because anthropomorphism makes the aversive force of wait time seem more potent (i.e., more aversive), but only to those who feel less potent themselves (i.e., low-power individuals). In a field study with real money at stake, and four experiments, I verify the effect on patience and confirm the process via mediation (i.e., the effect is mediated by how aversively time is perceived) as well as moderation (i.e., the effect reverses when time is made to seem beneficent). Thus, this research introduces time as a consequential anthropomorphic entity, present novel effects on intertemporal preferences, and delineates a potency process for power.

1.2 INTRODUCTION

"Old Time, that greatest and longest-established spinner of all...his factory is a secret place, his work is noiseless, and his hands are mutes." ~ Charles Dickens (Hard Times, 1854)

"Mysterious thing, time. Powerful, and when meddled with, dangerous." ~ Michael Gambon (as Albus Dumbledore, Harry Potter and the Prisoner of Azkaban, 2004)

Anthropomorphism refers to "the tendency to imbue the real or imagined behavior of nonhuman agents with humanlike characteristics, motivations, intentions, or

emotions" (Epley, Waytz, and Cacioppo 2007, 864). This tendency has been observed in the case of several entities such as plants, animals, geometric shapes, and even God (Epley et al. 2007; Epley et al. 2008; Barrett and Keil 1996; Morewedge and Clear 2008). Research on this tendency has also been fruitful for consumer research. Anthropomorphism and its consequences have been documented for products and other consumer acquisitions (Aggarwal and McGill 2007; Aggarwal and McGill 2012; Chandler and Schwarz 2010; Kim and McGill 2011; Landwehr, McGill and Herrmann 2011). Complementing this research, this research examines a barrier to acquisition: wait time.

The current research introduces time anthropomorphism as the tendency to view time in human terms—to imbue it with humanlike mental states such as "time has intentions" and "time has a will of its own." I elaborate on three reasons that make time anthropomorphism likely: the general anthropomorphizing tendency of individuals, the linguistic portrayal of time as a human, and the moving nature of time (Lakoff and Johnson 1980; 1999). A pilot study offers empirical validation; time anthropomorphism varies across individuals, and the degree of this tendency compares well to the anthropomorphism of entities examined in prior research.

This dissertation argues that time anthropomorphism has consequences for intertemporal settings. While time may be a powerful force in general (Hernandez 2001), it is an aversive powerful force in intertemporal settings; wait time stands in the way of acquiring a larger-later option rather than a smaller-sooner one. For instance, because wait time stands in the way of two marshmallows, a child may opt for a single marshmallow available sooner (Mischel and Ebbesen 1970); and because it stands in the

way of acquiring larger social-security checks, a retiree may opt for the smaller checks available sooner (Thaler and Shefrin 1981). In such situations, patience and related constructs are known to be influenced by a quantitative aspect of time: duration (Zauberman et al. 2009). This research shows that patience is influenced by a qualitative aspect of time—humanness—provided individuals perceive themselves to be powerless rather than powerful. This follows from prior research showing that the dynamics that apply to humans also apply to anthropomorphized entities (Chandler and Schwarz 2010; Aggarwal and McGill 2007). Just as power dynamics emerge between individuals (Rucker, Galinsky, and Dubois 2012), they also emerge between individuals and a powerful wait time that seems human.

The proposed mechanism relates to the potency of wait time. Low-power (vs. high-power) individuals are known to perceive a lack of control over others (Fiske 1993; Rucker et al. 2012), which can change risk perceptions of humanlike risky entities (Kim and McGill 2011). As I argue later, the risk process does not apply to the riskless context of two equally-assured options: smaller-sooner versus larger-later. A potency process applies instead. It is known that high-power individuals rely on their own selves when forming judgments, but low-power individuals attend to the characteristics of powerful others (Anderson, Keltner, and John 2003; Fiske 1993; Galinsky et al. 2006). Given this, when powerful wait time seems human, its aversive characteristic will loom large for low-power individuals—the aversive force of wait time will seem more potent (i.e., more aversive) only to those who feel less potent themselves (i.e., low-power individuals). Hence, patience will decline for low-power, but not high-power, individuals.

Five studies support my predictions. Study 1 is a field study with real money at stake. I measure time anthropomorphism and power, and observe the predicted effect on patience. Study 2 demonstrates the causal role of time anthropomorphism by manipulating it in money-related settings. Studies 3, 4, and 5 replicate the results in product-related settings and rule out a risk-based process. Studies 3 and 4 also confirm the proposed process via mediation: the potency of time as an aversive force mediates the outcome of lower patience for low-power individuals. Study 5 confirms the process via moderation. For the usual situation of wait time being an aversive force working against the larger reward, patience decreases. But when I make individuals see it as a beneficent force working in favor of the larger reward, a reversal arises: patience increases. Thus, the predicted effect and process are supported across measured and manipulated independent variables, choice and preference measures, monetary and product settings, and a variety of participants: students, on-line respondents, and store shoppers.

The results are significant for practice. This research shows show that consumers' patience might depend on their natural tendency to anthropomorphize time, even when real money is at stake (e.g., study 1), and that subtle variations in language may induce time anthropomorphism and change patience (e.g., study 3). Managers could act on these findings, but public-policy makers need to ensure that such actions are not predatory. Theoretically, this research offers three contributions. First, it introduces time as a consequential anthropomorphic entity. While anthropomorphism has been examined for consumers' acquisitions, this research demonstrates it for a barrier to acquisitions: wait time. Second, this research presents a novel effect on intertemporal preferences. Prior research suggests that patience is a function of quantitative aspects of time—how the

length of time is perceived—but the current research shows the influence of a qualitative aspect: humanness. Finally, I reveal the underlying mechanism—a potency process that is specific to the nature of wait time.

Going forward, in the first section, the literature on anthropomorphism is reviewed, and theoretical and empirical evidence for the existence of time anthropomorphism is presented. In the second section, the power of time is juxtaposed against the power of humans. Next, in the third section, my hypotheses are developed. Afterward, five studies are described and implications are discussed.

1.3 ANTHROPOMORPHISM

Anthropomorphism refers to the tendency people have to ascribe humanlike characteristics to nonhuman entities or agents (Epley, Waytz, and Cacioppo 2007). Research suggests that there are three factors that lead people to anthropomorphize non-human agents (Epley et al. 2007). The first factor, the desire to understand or explain the behavior of agents in the environment (effectance motivation), emerges quite early in life, as young infants attempt to fully understand and exert mastery over the abundance of new stimuli they encounter on a daily basis. Infants have been shown to imbue non-human agents such as a stuffed orangutan or a morphologically unfamiliar green oval with humanlike goal intentions (Johnson, Booth, and Hearn 2001; Shimizu and Johnson 2004). Waytz, et al. (2010) demonstrated that effectance motivation also drives adults to anthropomorphize non-human agents. In one study, the degree to which participants rated a computer to "have a mind of its own" increased as the number of times the computer was made to malfunction increased. Another factor that drives anthropomorphism is sociality motivation, or the desire to engage in social contact with others (Epley et al.

2007). When a person feels as though the amount of human contact in his/her life is insufficient, he/she may resort to anthropomorphizing non-human entities to fill this void. For example, people who are chronically lonely have been shown to anthropomorphize well-known pets (Epley et al. 2008). The third factor that predicts anthropomorphism is elicited agent knowledge, or the accessibility of anthropocentric knowledge (Epley et al. 2007). Given that people tend to possess egocentric biases in that they use their own personal motivations, behaviors, and opinions when trying to understand the behavior of other people (Epley et al. 2004; Irmak, Vallen, and Sen 2010), it is logical that they would, in a similar manner, utilize accessible human-centric knowledge when trying to understand non-human entities unless motivated to do otherwise (Epley et al. 2007).

The subject of anthropomorphism has also received a fair amount of attention in the marketing literature. Consumers have been shown to imbue brands with personalities (Aaker 1997) and form relationships with brands (Fournier 1998). Furthermore, the anthropomorphic qualities possessed by brands can be so strong and distinct that their use actually influences the behavior of the consumer (Fitzsimons, Chartrand, and Fitzsimons 2008; Aggarwal and McGill 2012). For example, consumers who were asked to use Apple products were found to behave more creatively than consumers who were asked to use IBM products (Fitzsimons et al. 2008). Additional research has shown the downstream effects of anthropomorphizing products as well. Aggarwal and McGill (2007) found that attitudes towards a product are more favorable when the product is anthropomorphized, but only when a human schema is primed (versus an object schema). Furthermore, the manner in which a product is anthropomorphized can affect attitudes toward the product. Products that possess both friendly (e.g., "smiling" car grille) and

aggressive (e.g., slanted, "angry" car headlights) features are perceived more favorably than products that possess only friendly or only aggressive features (Landwehr et al. 2011). Given what we know about anthropomorphism, both from the general anthropomorphism literature as well as the marketing literature, is it possible to anthropomorphize time? If so, what are the consequences? Next, I will discuss the possibilities of time anthropomorphism.

1.4 TIME ANTHROPOMORPHISM

One reason I expect time anthropomorphism to be prevalent is that anthropomorphism, in general, is highly prevalent. People frequently imbue non-human entities such as plants, animals, and even geometric shapes with humanlike characteristics, motivations, intentions or emotions (Epley et al. 2007; Epley et al. 2008). These entities need not take the complete form of a human; just partial anthropomorphism (Guthrie 1993) can evoke a human schema. Anthropomorphism may emerge due to physical resemblance to humans, such as when a donation box has "eyes" (Bateson, Nettle and Roberts 2006), but it is not necessary to see physical resemblance. Believers may not see God as human, but may still think of the Supreme Being as having humanlike will and intentions (Barrett and Keil 1996; Epley et al. 2007; Morewedge and Clear 2008). Consumer researchers have examined anthropomorphism for both physical and abstract entities. Among physical entities, slot machines and other products may have a human "smile" (Aggarwal and McGill 2007; Kim and McGill 2011), and cars may exude human "warmth" (Chandler and Schwartz 2010). Among abstract entities, a brand name such as Volvo may come to life (Aggarwal and McGill 2012), and skin cancer can have humanlike intentions to hurt (Kim and McGill 2011). Thus, consumers'

acquisitions—products, brands, and even diseases—are subject to anthropomorphism. Similarly, a barrier to acquisition—the time that one needs to wait for a superior outcome—may also be anthropomorphized.

Time anthropomorphism also seems plausible because of how time is linguistically portrayed. Consider the Dickensian quote about "old time" spinning in his factory. This view is akin to the personification of time as Aion and Chronos in ancient Greece, and "father time" in modern times. Such personification occurs in Eastern cultures too. For the televised Indian epic, Mahabharata, the narrator is time himself (Samay; Hindi: समय), presented as a faceless male with a deeply resonant voice. Sayings from China also point to a human perspective of time: "Time is like a small child, it never stops running" (Chinese: 时间像青春的孩子，奔跑不止.). A comparable saying in the west might be "time waits for no one." Even in phrases such as "killing time," time is viewed as not just a passing of minutes and hours, but a humanlike agent that must be dealt with.

Finally, time anthropomorphism seems likely because movement is central to time. This is captured in the very definition of time, which refers to a continuing succession of events: "a non-spatial continuum that is measured in terms of events which succeed one another from past through present through future" (Merriam-Webster; m-w.com). Movement is also implied by the relationship of time to space (Boroditsky and Ramscar 2002; Kim, et al. 2012), and by phrases such as "the passage of time" and "approaching deadline" (Lakoff and Johnson 1980; 1999). Movement makes time anthropomorphism likely because autonomous motion is a key characteristic of humans

(Epley et al. 2007). For instance, when toy robots move, they may be attributed with mental states (Morewedge, Preston, and Wegner 2007). Time, which is perennially in motion, thus seems to be a good candidate for anthropomorphism.

While the above discussion provides a theoretical basis for time anthropomorphism, I also conducted a pilot study for empirical confirmation. I recruited participants from an online survey panel (mturk.com), which is widely used by researchers and recognized as a valid mode of data collection (Paolacci, Chandler, and Ipeirotis 2010). I included an attention filter question in this study (and in other computer-based studies): "This question is to make sure you are paying attention. Please select choice 3." Excluding three participants who incorrectly answered this attention filter question, forty participants successfully completed the study (37% female; M_{age} = 34.3). Participants completed a time-anthropomorphism scale followed by randomly-ordered anthropomorphism scales for several other non-human entities, each of which has been considered in prior research on anthropomorphism: dogs, brands, insects, phones, mountains, robots, computers, and cars. These scales were adapted from a well-established anthropomorphism scale (Waytz, Cacioppo, and Epley 2010), the items of which relate to the imbuing of human mental states. The items for time anthropomorphism were as follows (1 = not at all; 7 = very much): To what extent do you think of time as (a) having a will of its own, (b) having intentions of its own, (c) having free will, (d) having a mind of its own, (e) having emotions of its own, and (f) as a person? The other scales were similar (e.g., To what extent do you think of dogs as…). Each scale was averaged to yield anthropomorphism scores (all $\alpha > .85$).

The means in increasing order are as follows: phone (M = 1.97; sd = 1.53); car (M = 2.10; sd = 1.44); computer (M = 2.12; sd = 1.32); robot (M = 2.24; sd = 1.32); mountain (M = 2.31; sd = 1.52); brand (M = 2.40; sd = 1.52); time (M = 3.65; sd = 1.85); insect (M = 4.72; sd = 1.31); and dog (M = 5.44; sd = 1.16). Thus, the degree of anthropomorphism for time compares well to that of entities examined earlier; the score for time was higher than all except for dog and insect (the score for time was significantly different from the other scores; all $p < .01$). Moreover, the standard deviation is lowest for dog (1.16), indicating little variance in beliefs about a dog having human mental states. The standard deviation is highest for time (1.85), suggesting a variable of less stability, but also high consequence. A large variance in individuals' beliefs about the human attribution of time may lead to a large variance in intertemporal preferences. In this research, I posit that such time anthropomorphism interacts with power to influence patience. In the next section, I will discuss the power of time and the power of individuals.

1.5 THE POWER OF TIME AND THE POWER OF HUMANS

Time is a powerful force influencing many domains of life (Haan, Millsap, and Hartka 1986; Lytle et al. 2000; Varendi, Porter, and Winberg 1997). This force is reflected in statements such as "time is pressing" and "time heals all wounds" (Hernandez 2001), and in symbolic references to time as a "pressure cooker" (Cotte, Ratneshwar, and Mick 2004). Thus, "time is a powerful force that transforms people's preferences" (Quoidbach, Gilbert, and Wilson 2013; p 96). Within intertemporal settings, this powerful force is characterized by its aversive nature—it stands in the way of acquiring a larger-later reward rather than a smaller-sooner one. If wait time were irrelevant, people would simply opt for the larger reward. However, wait time is an

aversive force standing in the way, pushing a child to opt for a single marshmallow available sooner (Mischel and Ebbesen 1970); and pushing a retiree to opt for the smaller checks available sooner (Thaler and Shefrin 1981). When wait time seems human, human dynamics can emerge.

The dynamics that apply to humans frequently apply to anthropomorphized entities. Just as individuals are flattered by compliments from other humans, they are also flattered by anthropomorphized computers (Fogg and Nass 1997), and just as individuals do not discard and replace other humans, they do not easily replace anthropomorphized objects (Chandler and Schwarz 2010). Similarly, because individuals do not want to seem cheap in front of others, they are more likely to give donations to a box with "eyes" versus one without (Bateson, Nettle and Roberts 2006). Aggarwal and McGill (2012) demonstrate this dynamic in the domain of brands. As people strive for successful social interactions with other humans, they also do so with humanized brands (Aggarwal and McGill 2012). I posit that this dynamic should also apply to anthropomorphized time. Because wait time is a powerful force, its anthropomorphism makes it akin to a powerful human standing in the way of the superior option. Therefore, power dynamics that emerge between individuals should emerge between individuals and anthropomorphized time.

Power is defined as an asymmetry in control in social relations. It is the relative ability to control the states of others, such that low-power (vs. high-power) individuals perceive a lack of control over others (Fiske 1993; Rucker et al. 2012; Russell 1938). The study of power has been very fruitful in the domain of consumer research. For example, high-power (vs. low-power) consumers pay less for status products (Rucker and Galinsky

2008). Because powerlessness is an aversive state, and status is a signal of power, lower power individuals are willing to pay more for status products in order to gain status and reduce negative feelings (Rucker and Galinsky 2008). Similarly, high power (vs. low-power) consumers have a lower preference for visible logos (Ruker and Galinsky 2009). Again, lower power individuals prefer logos because of the increase in status that they represent. Power does not only affect consumption decisions for the self, but also consumption decisions for others as well. Those who are high in power (vs. low in power), choose larger product assortments for themselves, and also spend more on themselves versus others (Rucker, Dubois, and Galinsky 2011). Power also has effects in the domain of humanlike risky entities. Kim and McGill (2011) find that an asymmetry in control leads to an asymmetry in risk perceptions, which then changes how individuals behave toward the entities. Thus, low-power individuals find a humanlike slot machine more risky, because of which they are less willing to play the machine. This effect on risk perceptions makes sense for risk-bearing entities. I, however, examine riskless situations in which two options are equally assured: smaller-sooner versus larger-later. So, I do not expect a risk-based process, but a different one that applies better to my context. In the next section, I will delineate how power and time anthropomorphism interact and develop my hypotheses.

1.6 HYPOTHESIS DEVELOPMENT

To summarize what has been discussed so far, I have posited that the anthropomorphism of time is likely due to the prevalence of anthropomorphism in general, the use of anthropomorphic language in the domain of time, and the moving nature of time. Time is a powerful entity, and this power may interact with the power of

individuals. How might individuals react when faced with a powerful anthropomorphized time entity? In this section I will flesh out my hypothesis regarding this interaction.

Because high-power individuals perceive more control, they focus on their own selves. However, low-power individuals attend to powerful others (Ellyson and Dovidio 1985), and such attention influences their judgments (Fiske 1980). As Fiske (1993, p 624) explains: "Because power is essentially control, people pay attention to those who have power…Thus, the powerless are attentive to the powerful." For instance, in the domain of stereotyping, high-power individuals make judgments based on the stereotypes that they harbor in their own minds, whereas low-power individuals make judgments by paying attention to individuating information about the target (Fiske 1993). In the domain of relationships, high-power partners continue with their own set ways, while low-power partners attend to the emotional response of their partners (Anderson et al. 2003). Finally, in research on perspective taking, high-power individuals rely on their own vantage point, but low-power individuals attend more to how others see, think, and feel (Galinsky et al. 2006). In sum, high-power individuals attend to themselves, but low-power individuals attend to the characteristics of powerful others; they attend to individuating information of others rather than their own stereotypes (Fiske 1993), to the emotional responses of others rather than their own set ways (Anderson et al. 2003), and to how others see, think, and feel rather than their own perspectives (Galinsky et al. 2006). Because characteristics that receive more attention loom larger in judgments (Fiske 1980), the characteristics of powerful others influence the judgments of low-power, but not high-power, individuals.

This theorizing applies to wait time because anthropomorphism turns it from a powerful aversive entity to a powerful aversive human. Therefore, when time is

anthropomorphized, the aversive characteristic of wait time will loom large for low-power individuals, but high-power individuals will be less affected. In other words, the aversive force of wait time will seem more potent (i.e., more aversive) only to those who feel less potent themselves (i.e., low-power individuals). Because higher aversiveness of wait time should yield lower patience, I predict that time anthropomorphism will lower the patience of low-power, but not high-power, individuals.

Stated more formally, I hypothesize that a joint effect of high anthropomorphism and low power will reduce patience for larger later rewards. Specifically, when time anthropomorphism is high, lower power will lead to lower patience. However, when anthropomorphism is low, the effect of power will not be significant. Additionally, when power is low, higher anthropomorphism will lead to lower patience. Conversely, when power is high, the effect of anthropomorphism will not be significant. I also test the underlying process of perceptions of time as an aversive force. Specifically, when time anthropomorphism is high, lower power will lead to more aversive perceptions of wait time. However, when anthropomorphism is low, the effect of power will not be significant. Additionally, when power is low, higher anthropomorphism will lead to more aversive perceptions of wait time. Conversely, when power is high, the effect of anthropomorphism will not be significant.

Five studies support my predictions. Study 1 is a field study in which I measure time anthropomorphism and power. In this real world setting, with real money at stake, my predicted effects emerge. I manipulated time anthropomorphism in study 2 and demonstrated the causal role of time anthropomorphism in the domain of money. In studies 3 and 4, I explore time anthropomorphism in a product context. In these studies, I

replicate the effects seen in study 2, provide mediational evidence for my proposed potency-based process, and rule out a risk-based process. Study 5 confirms the process via moderation by making wait time appear either beneficent or aversive. Usually, wait time is an aversive force that works against the larger reward in intertemporal settings. In this situation, the results mirrored the results of studies 1-4. However, when I make individuals see wait time as a beneficent force, the reverse emerges: patience increases for low power individuals when time is anthropomorphized.

1.7 STUDY 1

Consumers frequently choose between receiving a small discount early versus a large discount later (e.g., small instant rebate vs. large mail-in rebate). I created an analogous situation at a grocery store (Rosewood Market in Columbia, SC), with a real gift certificate that could be used to discount purchases at the store. The aim of this real-world setting was not to test a cause-effect relationship as an experiment can. It was to test how an intertemporal choice of money varies in the absence of interventions, due to the natural variance of anthropomorphism and power in regular consumers. Store shoppers were assured one of two gift certificates: a $5 gift certificate valid immediately, or a $10 gift certificate valid after one week. If they opted for the $10 (vs. $5) certificate, that would reflect higher patience. I predict that high time anthropomorphism will make people less patient, provided they are low (not high) in power.

1.7.1 DESIGN AND PROCEDURE

The study included two measured independent variables—time anthropomorphism and power—with choice of gift certificate serving as the dependent

variable. Prior to commencing the study, I procured gift certificates from the grocery store manager, who gave me flexibility in mentioning the "valid from" dates on the certificates as required by my study. (Once valid, certificates could be used anytime within one year.) Armed with those certificates, a research assistant and I solicited shoppers who were about to enter the grocery store. We introduced ourselves and our university to the shoppers, and asked them whether they would participate in a ten-minute survey in return for one of two options: a $5 gift certificate valid immediately, or a $10 gift certificate valid after one week.

Of approximately five hundred shoppers that we solicited for the study, one hundred and thirty one agreed to participate (44 % female; M_{age} = 41), chose one gift certificate, and then completed the survey. The survey included a few store-related questions that the manager wanted to ask (unrelated to my study), standard demographic questions, and the two scales. One was the time anthropomorphism scale that I described in the pilot study (Waytz et al. 2010). The other was a well-established power scale (Anderson and Galinsky 2006) that asked participants to indicate their agreement with the following 8 items (1 = strongly disagree; 7 = strongly agree): In my relationship with others: (a) I can get people to listen to what I say, (b) My wishes don't carry much weight, (c) I can get others to do what I want, (d) Even if I voice them, my views have little sway, (e) I think I have a great deal of power, (f) My ideas and opinions are often ignored, (g) Even when I try, I am not able to get my way, and (h) If I want to, I get to make the decisions.

1.7.2 RESULTS

The item scores were averaged to form a time-anthropomorphism score and a power score (α = .93 and .82 respectively). The correlation between the two measures was not significant (ρ = -.09, p > .10). The mean-centered scores and their interaction were the independent variables used in a binary logistic regression. Choice of the gift certificate reflecting more patience—$10-later—was the dependent variable (0 = $5-now, 1 = $10-later). The effect of time anthropomorphism was not significant (p > .10). There was a significant effect of power (β = 1.11, z = 3.38, p < .01), which needs to be viewed in the context of the higher-order interaction critical to my prediction: a significant 2-way interaction between time anthropomorphism and power (β = .69, z = 3.18, p < .01). I next conducted spotlight analysis (Fitzsimons 2008) at a standard deviation above and below the mean of anthropomorphism, and conducted a similar analysis for power.

Both analyses revealed the predicted driver of the interaction: a joint effect of high anthropomorphism and low power reduced patience for the $10-later (vs. $5-now) gift certificate. Specifically, the first analysis revealed that when time anthropomorphism was high, lower power led to lower patience (β = 2.39, z = 3.56, p < .01), but, when time anthropomorphism was low, the effect of power was not significant (β = -.17, z = -.56, p > .10). The second analysis was also supportive. When power was low, higher anthropomorphism led to lower patience (β = -.61, z = -2.87, p < .005). When power was high, the effect was more extreme than I predicted; the effect did not just diminish; it reversed (β = .81, z = 2.56, p < .05).

1.7.3 DISCUSSION

This study supported my theory. The choice between a smaller-sooner option and a larger-later one was driven by a joint effect of high anthropomorphism and low power. Thus, the natural variance in the population on these two measures influenced patience. Combined with the pilot-study results, the current study affirms time anthropomorphism as a real phenomenon that varies across individuals, and influences intertemporal choices involving real money. One result was unanticipated. While the anthropomorphism effect was, as predicted, stronger for low-power ($p < .005$) than for high-power participants ($p < .05$), the latter effect was in the opposite direction. I will revisit this issue after the next study in the controlled setting of an experiment.

1.8 STUDY 2

Consumers often decide between receiving less money earlier versus more money later, such as whether to encash a Certificate of Deposit prematurely or to receive a larger amount on the maturity date. The setting of this study was analogous: $100 today versus $125 in one month. To examine the causal role of time anthropomorphism, I manipulated it by adapting common sayings about time. I verified this manipulation in a pretest. Excluding three participants who incorrectly answered the attention filter question, forty nine M-Turk participants successfully completed the study (45% female, $M_{age} = 29.4$, n for low vs. high anthropomorphism: 24 vs. 25). They first expressed their thoughts about five time-related sayings that contained either non-human references (e.g., knowledge bank), or human ones (e.g., counselor). Sayings in the low-anthropomorphism [high-anthropomorphism] condition were as follows: (1) Time is the greatest knowledge bank of all. [Time is the greatest counselor of all.] (2) Time is a great resource; unfortunately it

kills all who use it. [Time is a great teacher; unfortunately it kills all of its pupils.] (3) Men talk of passing away the time, while time quietly makes them pass away. [Men talk of killing time, while time quietly kills them.] (4) The two most powerful forces are patience and time. [The two most powerful warriors are patience and time.] (5) Time—the great eraser when our judgments err. [Time—the corrector when our judgments err.] Afterward, participants completed the time anthropomorphism scale described earlier (α = .95). The manipulation worked as intended such that increasing the human element in the sayings significantly increased the time-anthropomorphism score ($M_{\text{low-anthropomorphism}}$ = 2.69; $M_{\text{high-anthropomorphism}}$ = 3.81, $F(1, 47) = 4.07$, $p < .05$). Hence, I proceeded to the main study.

1.8.1 DESIGN AND PROCEDURE

I used a 2 (time anthropomorphism: low vs. high) x 2 (power: low vs. high) design in which the first variable was manipulated between subjects, and the second one was measured. Preference for $125-later over $100-now was the dependent variable.

Excluding five participants who incorrectly answered the attention filter question, one hundred and forty three students from a large public university successfully completed the study (56% female; M_{age} = 21). Participants were exposed to the time anthropomorphism manipulation as described in the pretest. Afterward, they were asked to imagine that they had the choice of receiving $100 today or $125 in one month, and then asked "How strongly do you prefer one option over the other?" (1=strongly prefer $100 today; 7=strongly prefer $125 in one month). Next, power was measured as it was in study 1, followed by standard demographic questions.

1.8.2 RESULTS

A power score was created ($\alpha = .84$), and it was verified that this score did not correlate with the time anthropomorphism manipulation ($\rho = -.003$, $p > .10$). The mean-centered power score, time anthropomorphism (0 = low; 1 = high), and their interaction were used as the independent variables in a regression analysis. Preference for the option reflecting more patience—$125-later over $100-now—was the dependent variable. The effects of power and time anthropomorphism were not significant ($p > .10$). Critical to my prediction, there was a significant 2-way interaction between time anthropomorphism and power ($\beta = .74$, $t = 2.12$, $p < .05$).

Spotlight analyses revealed the predicted driver of the interaction: a joint effect of high anthropomorphism and low power reduced patience for $125-later (vs. $100-now). Specifically, the first analysis revealed that when time anthropomorphism was high, lower power led to lower patience ($\beta = .62$, $t = 2.56$, $p < .05$), but, when anthropomorphism was low, the effect of power was not significant ($\beta = -.12$, $t = -.50$, $p > .10$). The second analysis was also supportive. When power was low, higher anthropomorphism led to lower patience ($\beta = -.74$, $t = -1.75$, $p = .08$), but, when power was high, the effect of anthropomorphism was not significant ($\beta = .58$, $t = 1.36$, $p > .10$).

Having observed the causal effect of time anthropomorphism, I verified it in a similar setting ($100-now vs. $125-later), using a different manipulation. Just as Aggarwal and McGill (2012) asked participants to imagine an entity (e.g., Volvo) as a person, I asked participants to imagine time as a person called “Tyme.” I pretested this manipulation. Excluding three participants who incorrectly answered the attention filter

question, forty four M-Turk participants successfully completed the study (50% female, M_{age} = 33.6). Low-anthropomorphism participants read the following: "Please think about the time between now and the time at which you would receive $125. In other words, there's time standing between you and $125. What does this time seem like to you? Please describe in your own words." High-anthropomorphism participants read the following: "Please think about the time between now and the time at which you would receive $125 as a real person named Tyme. In other words, there's Tyme standing between you and $125. What does this person Tyme seem like to you? Please describe this person in your own words." Next, they completed the time anthropomorphism scale, which revealed the expected effect of the manipulation ($M_{low\text{-}anthropomorphism}$ = 2.44; $M_{high\text{-}anthropomorphism}$ = 3.53, $F(1, 42) = 4.22$, $p < .05$).

This manipulation was employed in a study with a 2 (time anthropomorphism: low vs. high) x 2 (power: low vs. high) design. Excluding three participants who incorrectly answered the attention filter question, eighty four students from a large public university successfully completed the study (60% female; M_{age} =21). Participants read the scenario, responded to the time anthropomorphism manipulation, indicated their preference for $125-later rather than $100-now, and completed the power scale. A power score was created ($\alpha = .83$), and it was verified that this score did not correlate with the time anthropomorphism manipulation ($\rho = -.03$, $p > .10$). The power score, time anthropomorphism (0 = low; 1 = high), and their interaction were used as the independent variables in a regression analysis. Before conducting the analysis for the dependent variable (preference for $125-later over $100-now), I examined the open-ended responses to the anthropomorphism manipulation.

The responses of Tyme (vs. time) participants contained more human references such as "He is somehow getting in the way of what I want" and "Tyme is aggressive and does not want me to receive the money." In line with the anthropomorphism scale used in the pretest, I used a 7-point Likert scale to code participants' use of anthropomorphic language. As intended, inducing anthropomorphism (i.e., Tyme rather than time) increased the use of anthropomorphic language (β = 1.81, t = 3.89, p <.01), while the effects of power and the 2-way interaction were not significant (both p > .10). Thus, whether I assessed time anthropomorphism from participants' scale responses (as in the pretest), or from their verbal responses (as I do here), perceived humanness was higher when participants are asked to describe Tyme versus time. As I discuss next, this variable interacts with power when participants are asked to indicate their preference between two intertemporal options.

For the main dependent variable (preference for $125-later over $100-now), the effects of power and time anthropomorphism were not significant (p >.10). Critical to my prediction, and replicating the results from the main study, there was a significant 2-way interaction between time anthropomorphism and power (β = .93, t = 2.07, p < .05). The pattern of results was also similar. Specifically, when time anthropomorphism was high, lower power led to lower patience (β = .90, t = 2.70, p < .01), but, when anthropomorphism was low, the effect of power was not significant (β = -.02, t = -.08, p > .10). The second set of analysis was also supportive. When power was low, higher anthropomorphism led to lower patience (β = -1.15, t = -2.21, p < .05), but, when power was high, the effect of anthropomorphism was not significant (β = .39, t = .74, p > .10).

1.8.3 DISCUSSION

In the field study (study 1), I had observed the predicted results, but also an unexpected effect for high-power individuals. When I conducted two experimental studies in which time anthropomorphism was manipulated (the main study and its follow-up version), the unexpected effect did not emerge, casting doubt on its robustness. What clearly stood out was the robustness of my key results. Whether I measured time anthropomorphism in the field, or manipulated it in two different ways in the laboratory, the same predicted results emerged: time anthropomorphism and power interacted to influence patience, and this interaction was driven primarily by a joint effect of high anthropomorphism and low power, which reduced patience.

1.9 STUDY 3

Many intertemporal situations involve products, such as choosing whether to receive a product sooner by purchasing with a credit card, or to get it later using a layaway option (Mishra and Mishra 2010). I consider a similar situation of product shipping: paying more for expedited shipping, or less for regular shipping. I expect time anthropomorphism to reduce the patience of low-power individuals, shifting their choice toward expedited shipping.

I also measure time perception to test the process of time anthropomorphism making the aversive force of wait time seem even more aversive to low-power (but not high-power) individuals, leading to lower patience. I also consider an alternative process of risk. Kim and McGill (2011) find that willingness to play a slot machine is mediated by how risky it is perceived to be (e.g., unlikely to win if I play). Could shipping choice

be mediated by how risky wait time is perceived to be (e.g., unlikely to receive delivery if I choose standard option)? I do not believe so. Unlike slot machines, my situation is devoid of risk as both regular and expedited shipping assure delivery. However, I measure risk to empirically examine my belief.

1.9.1 DESIGN AND PROCEDURE

I used a 2 (time anthropomorphism: low vs. high) x 2 (power: low vs. high) design in which the first variable was manipulated between subjects, and the second one was measured. Choice of standard shipping over expediting shipping was the dependent variable.

Excluding four participants who incorrectly answered the attention filter question, eighty one students from a large public university successfully completed the study (54% female; M_{age} =21). On a screen that was made to resemble an online shopping portal, participants saw several sunglasses and clicked on the pair that they selected. On the next screen, they saw their selection along with the following text: "You made a great selection! It will be some time before you receive the sunglasses. Your wait time will depend on the shipping option that you choose below. Don't you want to spend less time waiting?" Then, I manipulated time anthropomorphism by adapting the time-Tyme distinction that I pretested and employed earlier (study 2 follow-up). Low-anthropomorphism participants read the following: "Time matters! To choose the shipping option that works best for you, take a moment to think about time standing between you and the sunglasses. This time will matter less if you choose expedited shipping below." In contrast, high-anthropomorphism participants read the following:

"Mr. Tyme matters! To choose the shipping option that works best for you, take a moment to think about Mr. Tyme standing between you and the sunglasses. Mr. Tyme will matter less if you choose expedited shipping below."

Right below this text, participants chose between standard shipping ($2.75 for a 12-13 day delivery) and expedited shipping ($9.75 for a 2-3 day delivery). On the next screen, they were reminded about the delivery time and asked three questions about how aversive or beneficent they perceived the force of time to be. While I expect wait time to be aversive, I wanted to present the full scale in case participants thought of it as beneficent. The three items were as follows: Did this time seem as (a) a negative force working against you or a positive force working for you? (-4 = Working against me, 0 = Working neither for me, nor against me, 4 = Working for me), (b) a force that causes pain or causes pleasure (-4 = Pain, 0 = Neither pain, nor pleasure, 4 = Pleasure), and (c) a bad force or a good force (-4 = Bad, 0 = Neither bad, nor good, 4 = Good)? Then, I asked three questions to test for the rival process of risk perception: (a) Did you feel as though you were more likely to receive the sunglasses if you chose expedited shipping (1=Not at all, 7=Very much so), (b) How certain were you that you would receive the sunglasses if you chose standard shipping (1=Not at all, 7=Very much so (reverse coded)), and (c) To what degree do you agree with the following statement: I felt that if I went with standard shipping, I might never receive the sunglasses (1=Strongly disagree, 7=Strongly agree)? Finally, participants responded to the power scale and standard demographic questions.

1.9.2 RESULTS

A power score was created ($\alpha = .84$), and it was verified that this score did not correlate with the time anthropomorphism manipulation ($\rho = .001$, $p > .10$). The mean–

centered power score, time anthropomorphism (0 = low; 1 = high), and their interaction were used as the independent variables in a binary logistic regression. Choice of the option reflecting more patience—standard shipping—was the dependent variable (0=expedited shipping, 1=standard shipping). The effects of power and time anthropomorphism were not significant ($p > .10$). Critical to my prediction, there was a significant 2-way interaction between time anthropomorphism and power ($\beta = 1.85$, $z = 2.46$, $p < .05$).

Spotlight analyses revealed the predicted driver of the interaction: a joint effect of high anthropomorphism and low power reduced patience for standard (vs. expedited) shipping. Specifically, the first analysis revealed that when time anthropomorphism was high, lower power led to lower patience ($\beta = 1.44$, $z = 2.26$, $p < .05$), but, when anthropomorphism was low, the effect of power was not significant ($\beta = -.41$, $z = -1.02$, $p > .10$). The second analysis was also supportive. When power was low, higher anthropomorphism led to lower patience ($\beta = -1.88$, $z = -2.22$, $p < .05$), but, when power was high, the effect of anthropomorphism was not significant ($\beta = 1.58$, $z = 1.60$, $p > .10$).

For the mediation analysis, I computed a time perception score by averaging the three items described earlier ($\alpha = .94$). This score varied from -4 (aversive force) to +4 (beneficent force). The pooled mean score of -.88 was significantly lower than the midpoint of zero ($t = -5.14$, $p < .01$), suggesting that wait time was indeed perceived as an aversive force. I next examined if this aversive force became more potent as predicted, by using time perception score as the dependent measure in a regression analysis. The independent variables were the same as those used in the above analysis for choice.

The effects of power and time anthropomorphism were not significant ($p > .10$). Critical to my prediction, there was a significant 2-way interaction between time anthropomorphism and power ($\beta = .81$, $t = 2.26$, $p < .05$). Spotlight analyses revealed the same pattern of results as I observed for shipping choice (see figure 3). Specifically, the first analysis revealed that when anthropomorphism was high, lower power led to more aversive perceptions of time ($\beta = .93$, $t = 3.31$, $p < .01$), but, when anthropomorphism was low, the effect of power was not significant ($\beta = .12$, $t = .53$, $p > .10$). The second analysis was also supportive. When power was low, higher anthropomorphism led to more aversive perceptions ($\beta = -.85$, $t = -1.83$, $p = .07$), but, when power was high, the effect of anthropomorphism was not significant ($\beta = .66$, $t = 1.42$, $p > .10$).

I next conducted a mediation analysis using the PROCESS SPSS macro (Model 8; Preacher and Hayes 2004; Hayes 2012). The regression model used shipping choice as the dependent variable. The independent variables included the three independent variables used above (power, anthropomorphism, and power x anthropomorphism), as well as time perception. The effect of the hypothesized mediator, time perception, was significant ($\beta = .50$, $z = 2.10$, $p < .05$). The interactive effect of power and anthropomorphism remained significant ($\beta = 1.67$, $z = 2.04$, $p < .05$). Taken together with the regression results reported in the preceding paragraphs, and a bootstrap analysis confirming an indirect effect at 90% bias corrected CI [.02, 1.29], time perception partially mediated the effect on patience.

The data also rule out the alternative process of risk perception. For the regression analysis, the risk perception score was computed by averaging the three items described earlier ($\alpha = .71$). The independent variables, which were the same as those used earlier

(and which had a significant effect on time perception), had no significant effects on risk perception (all *p*'s > .29).

1.9.3 DISCUSSION

This study replicated my results in an intertemporal situation that consumers often encounter: product shipping. I showed that time anthropomorphism decreases the patience of low-power individuals, shifting their preference toward expedited shipping. In addition, I ruled out the process of risk perception, and observed supportive evidence for the mediational role of time perception: time anthropomorphism makes low-power (but not high-power) individuals perceive wait time to be more aversive, which lowers their patience. However, I obtained only partial mediational evidence, at 90% CI. The next study uses a dependent measure of preference, rather than choice, and assesses mediation once again.

1.10 STUDY 4

This study examines preference between two versions of an electronic product. Due to rapid innovation, companies such as Apple release new product versions with improved specifications that paradoxically cost the same as the previous generation (e.g., the new iPad costs the same as the previous one). Given the recent launch of iPad Mini, I introduced a hypothetical version, iPad Mini-2, which has better features at the same price, but requires a longer wait. I expect time anthropomorphism to reduce the patience of low-power individuals, shifting their preference toward the inferior version available sooner (iPad Mini).

This study serves two purposes. First, it tests the robustness of my effect in a setting that involves a tradeoff between time and product features, in contrast to my earlier settings involving a tradeoff between time and money. Second, this study helps examine the mediational role of time perception when the dependent measure is preference rather than choice.

1.10.1 DESIGN AND PROCEDURE

I used a 2 (time anthropomorphism: low vs. high) x 2 (power: low vs. high) design in which the first variable was manipulated between subjects, and the second one was measured. Preference for iPad Mini-2 over iPad Mini was the dependent variable.

Excluding six participants who incorrectly answered the attention filter question, one hundred and eleven students from a large public university successfully completed the study (52% female; M_{age} =21). They were presented with a scenario of two products available at the same price: iPad Mini that would be shipped right away versus iPad Mini-2 that would be shipped in 60 days. The latter product would include a faster processor, a better camera, and enhanced screen resolution. Next, time anthropomorphism was manipulated using the time-Tyme procedure. Low-anthropomorphism participants read the following: "You can either have the iPad Mini shipped right away or the iPad Mini-2 shipped after a period of time. Please think about this waiting time for iPad Mini-2. That is, there's time standing between you and the iPad Mini-2. What does this time seem like to you? Please describe in your own words." High-anthropomorphism participants read the following: "You can either have the iPad Mini shipped right away or the iPad Mini-2 shipped after a period of time. Please think about this waiting time for iPad Mini-2 as a real person named Tyme. That is, there's Tyme

standing between you and the iPad Mini-2. What does this person Tyme seem like to you? Please describe this person in your own words."

After responding to the manipulation, participants indicated how strongly they preferred one option over the other (1=Strongly prefer the iPad Mini, 7=Strongly prefer the iPad Mini-2). Next, just as in study 3, they responded to the three time-perception questions. Then, participants answered three questions measuring risk perception: (a) Did you feel that you might never be able to obtain the iPad Mini-2 if you chose to purchase it (1=Not at all, 7=Very much so), (b) How certain were you that you would be able to obtain the iPad Mini-2 if you chose to purchase it (1=Not at all, 7=Very much so (reverse coded)), (c) I felt that I needed to purchase the iPad Mini because if I chose the iPad Mini-2, I might not receive it (1=Strongly disagree, 7=Strongly agree)." Finally, participants responded to the power scale and standard demographic questions.

1.10.2 RESULTS

A power score was created ($\alpha = .85$), and it was verified that this score did not correlate with the time anthropomorphism manipulation ($\rho = -.02$, $p > .10$). The mean-centered power score, time anthropomorphism (0 = low; 1 = high), and their interaction were used as the independent variables in a regression analysis. Before conducting the analysis for the dependent variable (preference for iPad Mini-2 over iPad Mini), I examined the open-ended responses.

In line with the earlier manipulation check and open-ended responses (follow-up of study 2), Tyme (vs. time) participants contained more human references such as "Tyme seems to me to be a bodyguard or bouncer keeping me from the new iPad Mini-2" and "If Tyme was a person he would be bigger, bulkier." Coding responses on a 7-point

Likert scale indicated that inducing anthropomorphism (i.e., Tyme rather than time) increased the use of anthropomorphic language (β = 2.36, t = 6.64, p < .01), while the effects of power and the 2-way interaction were not significant (both p > .10). Thus, perceived humanness was higher when participants described Tyme versus time. As I discuss next, this variable interacts with power when participants indicate their preference between two intertemporal options.

For the main dependent variable (preference for iPad Mini-2 over iPad Mini), the effects of power and time anthropomorphism were not significant (both p > .10). Critical to my prediction, there was a significant 2-way interaction between time anthropomorphism and power (β = .55, t = 2.16, p < .05). Spotlight analyses revealed the predicted driver of the interaction: a joint effect of high anthropomorphism and low power reduced patience for iPad Mini-2 (vs. iPad Mini). Specifically, the first analysis revealed that when time anthropomorphism was high, lower power led to lower patience (β = .33, t = 2.05, p < .05), but, when anthropomorphism was low, the effect of power was not significant (β = -.22, t = -1.12, p > .10). The second analysis was also supportive. When power was low, higher anthropomorphism led to lower patience (β = -.54, t = -1.75, p =.08), but, when power was high, the effect of anthropomorphism was not significant (β = .42, t = 1.35, p > .10).

For the mediation analysis, as in study 3, I computed a time perception score (average of three -4 to +4 scales; α = .91). The pooled mean score of -.75 was significantly lower than the midpoint of zero (t = -5.73, p <.01), suggesting that wait time was indeed seen as an aversive force. Next, I examined if aversiveness changed as predicted, by using time perception score as the dependent measure in a regression

analysis. The independent variables were the same as those used in the analysis for preference. The effect of power was not significant ($p > .10$), the effect of time anthropomorphism was marginal ($\beta = -.44$, $t = -1.74$, $p = .08$), and, critical to my prediction, there was a significant 2-way interaction between time anthropomorphism and power ($\beta = .74$, $t = 2.48$, $p < .05$). Spotlight analyses revealed the same pattern of results as I observed for product preference (see figure 4). The first analysis revealed that when time anthropomorphism was high, lower power led to more aversive perceptions of time ($\beta = .39$, $t = 2.08$, $p < .05$), but, when anthropomorphism was low, the effect of power was not significant ($\beta = -.35$, $t = -1.51$, $p > .10$). The second analysis was also supportive. When power was low, higher anthropomorphism led to more aversive perceptions ($\beta = -1.09$, $t = -2.99$, $p < .01$), but, when power was high, the effect of anthropomorphism was not significant ($\beta = .21$, $t = .57$, $p > .10$).

Next, I conducted a mediation analysis using the PROCESS SPSS macro (Model 8; Preacher and Hayes 2004; Hayes 2012). The regression model used preference as the dependent variable. The independent variables included the three independent variables used above (power, anthropomorphism, and power x anthropomorphism), as well as time perception. The effect of the hypothesized mediator, time perception, was significant ($\beta = .17$, $t = 2.13$, $p < .05$). The interactive effect of power and anthropomorphism was not significant ($\beta = .42$, $t = 1.64$, $p > .10$). Taken together with the regression results reported earlier, and a bootstrap analysis confirming an indirect effect at 95% bias corrected CI [.02, .34], the overall data are supportive of time perception mediating the effect on patience.

The alternative process of risk perception was ruled out in this study as well. For the regression analysis, a risk perception score was computed by averaging the three items described earlier ($\alpha = .78$). The independent variables were the same as those used earlier. There was a main effect such that lower power led to higher risk perception ($\beta = -.24$, $t = -2.50$, $p < .05$). More pertinent to the risk process, the critical interaction of power and anthropomorphism, and the main effect of anthropomorphism, were not significant (p's $>.18$).

1.10.3 DISCUSSION

The results from this study involving a tradeoff between time and product features complemented my earlier results involving a tradeoff between time and money. They also ruled out a risk-perception process and provided evidence for a time-perception process in a preference setting, complementing the evidence I obtained in the choice setting of study 3.

1.11 STUDY 5

Following the previous two studies, the current study also considers the context of a consumer product. However, there are two key differences. First, instead of measuring power using a scale, I employ a well-established manipulation of power. Second, I test the process not by measuring time perception as a mediator, but by manipulating it as a moderator.

My potency process is based on low-power individuals attending to powerful others, whose characteristics loom large when forming judgments (Anderson et al. 2003; Fiske 1993; Galinsky et al. 2006). Because wait time is characterized as a powerful

aversive force, anthropomorphism makes it even more aversive to low-power (but not high-power) individuals, who then exhibit lower patience. Studies 3 and 4 support this process via mediation. I now test this process via moderation. Although wait time is usually an aversive force that stands in the way of a larger reward, I now make it seem as a beneficent force that works in favor of the larger reward. If my potency process is valid, a reversal should emerge as the beneficent force of wait time seems even more beneficent to low-power individuals. Just as seeing a force as even more aversive decreases patience, seeing it as even more beneficent should increase patience.

My focus is not on intense fleeting situations in which wait time may be beneficent, such as when waiting eagerly for a kiss from a movie star (Loewenstein 1987). Instead, my focus is on regular consumption situations in which wait time is usually aversive but may be made to seem beneficent. One such situation is waiting to eat a desirable product. Waiting is usually aversive in such situations, but may offer the promise of a better product, such as when cheese is ripened, or wine is aged. I relied on a cheese scenario and presented two competing forces of wait time: an aversive force that stands in the way of tasting cheese versus a beneficent force that can improve the taste. Making the aversive force salient should replicate my earlier results, but making the beneficent force salient should reverse the results.

I pretested this salience manipulation. Excluding two participants who incorrectly answered the attention filter question, sixty M-Turk participants successfully completed the study (50% female, M_{age} = 31). All participants imagined the following scenario: "Imagine that you were given a gift of imported Swiss cheese. While you would want to

eat this cheese right now rather than wait, you are aware that waiting could improve the taste of this type of cheese. Given this information, you need to decide when to eat the cheese—at this very moment or later." Then, the aversive-force participants read the following: "Think about this very moment, and in addition, the moment when you eat the cheese. Time is in the middle, making you wait. It is not letting you enjoy the cheese. Describe, as vividly as you can, this influence of time." The beneficent-force participants read the following: "Think about this very moment, and in addition, the moment when you eat the cheese. Time is in the middle, making the cheese better. It is improving the taste of the cheese so that you can enjoy it better. Describe, as vividly as you can, this influence of time." Participants then indicated their perceptions of time as an aversive or beneficent force by answering the same items that I used in studies 3 and 4 (three -4 to +4 scales; $\alpha = .91$). The mean response of aversive-force participants was significantly below the midpoint of zero ($M = -.79$, $t = -2.70$, $p < .05$), and that of beneficent-force participants was significantly above the midpoint ($M = 1.53$, $t = 4.95$, $p < .01$). Thus, the manipulation worked as intended, and I proceeded to the main study.

1.11.1 DESIGN AND PROCEDURE

I used a 2 (time anthropomorphism: low vs. high) x 2 (power: low vs. high) x 2 (time perception: aversive vs. beneficent) design in which all variables were manipulated between subjects. Preference to consume the cheese later rather than earlier was the dependent variable.

Excluding ten participants who incorrectly answered the attention filter question, two hundred and eight M-Turk participants successfully completed the study (49%

female, M_{age} = 32). First, power was manipulated using a well-established power prime (Rucker et al. 2011). Low-power participants read the following: "Please recall a particular incident in which someone else had power over you. By power, we mean a situation in which someone had control over your ability to get something you wanted, or was in a position to evaluate you. Please describe this situation in which you did not have power—what happened, how you felt, etc." High-power participants read the following: "Please recall a particular incident in which you had power over another individual or individuals. By power, we mean a situation in which you controlled the ability of another person or persons to get something they wanted, or were in a position to evaluate those individuals. Please describe this situation in which you had power—what happened, how you felt, etc." After completing this task, time anthropomorphism was manipulated using time-related sayings, as it was in study 2.

On the next screen, the Swiss cheese scenario was introduced, with the time perception manipulation embedded into it, as was done in the pretest. Participants indicated their preference for later cheese consumption on two items: (a) When would you consume the cheese? (1 = right away; 7 = in the distant future), and (b) Do you strongly prefer to eat the cheese now, or to wait and eat it later? (1 = strongly prefer to eat it now; 7 = strongly prefer to eat it later). Then, risk perception was measured using three items: (a) Did you feel as though you were more likely to be able to eat the cheese if you ate it earlier, rather than wait (1=Not at all, 7=Very much so), (b) Did you feel that you might never get to eat the cheese if you waited (1=Not at all, 7=Very much so), and (c) I felt that if I waited to eat the cheese, I might never get to eat it (1=Strongly disagree, 7=Strongly agree). Finally, standard demographic questions were asked.

1.11.2 RESULTS

Following prior research (Galinsky, Gruenfeld, and Magee 2003), I checked the power manipulation by having two independent coders read participants' responses and rate the perceived level of power on 7-point Likert scales. Given high inter-rater reliability ($\alpha = .90$), the two ratings were averaged. As expected, the mean power rating was higher for high-power participants than for low-power participants ($M_{high} = 5.64$, $M_{low} = 2.10$; $t = 32.14$, $p < .01$).

Given that the power manipulation worked as intended, an ANOVA was conducted using a between-subjects design: 2 (time anthropomorphism: low vs. high) x 2 (power: low vs. high) x 2 (time perception: aversive vs. beneficent force). Preference for the more patient option—consuming cheese later rather than earlier—was the dependent variable, which was created by averaging the two items mentioned earlier ($\alpha = .89$). No significant main effects or two way interactions emerged (all $p > .10$). Critical to my prediction, there was a significant 3-way interaction between time anthropomorphism, power, and time perception ($F(1, 200) = 8.37$, $p < .01$). Given the proposed process, the aversive-force condition should replicate earlier results, but the beneficent-force condition should reverse them. That is what I observed.

In the aversive-force condition, the anthropomorphism x power interaction was significant ($F(1, 200) = 4.44$, $p < .05$). The contrasts revealed the predicted driver of the interaction: a joint effect of high anthropomorphism and low power reduced patience for the cheese. Specifically, the first analysis revealed that when time anthropomorphism was high, lower power led to lower patience ($M_{lowpower} = 3.48$, $M_{highpower} = 4.60$; $F(1, 200) =$

5.04, $p < .05$), but, when anthropomorphism was low, the effect of power was not significant ($M_{lowpower} = 4.61$, $M_{highpower} = 4.19$; $F(1, 200) = .63$, $p > .10$). The second analysis was also supportive. When power was low, higher anthropomorphism led to lower patience ($F(1, 200) = 5.15$, $p < .05$), but, when power was high, the effect of anthropomorphism was not significant ($F(1, 200) = .57$, $p > .10$).

In the beneficent-force condition, there was again a significant anthropomorphism x power interaction ($F(1, 200) = 3.94$, $p < .05$), but the pattern of results was the opposite: a joint effect of high anthropomorphism and low power *increased* patience for the cheese. Specifically, the first analysis revealed that when time anthropomorphism was high, lower power led to higher patience ($M_{lowpower} = 5.25$, $M_{highpower} = 4.14$; $F(1, 200) = 4.30$, $p < .05$), but, when anthropomorphism was low, the effect of power was not significant ($M_{lowpower} = 4.19$, $M_{highpower} = 4.51$; $F(1, 200) = .50$, $p > .10$). The second analysis was also supportive. When power was low, higher anthropomorphism led to higher patience ($F(1, 200) = 4.10$, $p < .05$), but, when power was high, the effect of anthropomorphism was not significant ($F(1, 200) = .60$, $p > .10$).

The risk-related process was ruled out once again. For the ANOVA, the risk perception score was the average of the three items described earlier ($\alpha = .80$). The independent variables were the same as the ones I mentioned above. No significant effects emerged for risk perception (all p's >.13).

1.11.3 DISCUSSION

In the usual case of wait time being perceived as an aversive force, the same result emerged yet again: the joint effect of high anthropomorphism and low power decreased

patience. But, consistent with my process, when I induced participants to see wait time as a beneficent force, the results reversed: the joint effect of high anthropomorphism and low power increased patience. This process evidence obtained via moderation complements the mediational evidence that I observed earlier. Additionally, these results do not support the process related to risk.

1.12 GENERAL DISCUSSION

1.12.1 SUMMARY

This research introduces a tendency to view time in human terms—to imbue it with humanlike mental states (e.g., time has intentions; it has a will of its own). I argue that this tendency seems likely because of three reasons: the general prevalence of anthropomorphism, the linguistic portrayal of time as a human, and the moving nature of time. A pilot study provides empirical validation. I find that the degree of anthropomorphism for time compares well to that of other entities, and also that there is individual-level variation in time anthropomorphism. I then show that such individual-level variation, as well as situational induction of time anthropomorphism, influences intertemporal preferences: patience declines for low-power, but not high-power individuals. I also delineate a potency process. The powerful entity of wait time is usually aversive. When it is anthropomorphized, it becomes even more aversive, but only to low-power individuals. However, if wait time is made to seem beneficent, it becomes even more beneficent to low-power individuals. Thus, wait time seems more potent (i.e., more aversive, or more beneficent) only to those who feel less potent (i.e., low-power individuals).

Support emerges from five studies, including a field study with real money. Each study is analogous to a consumption setting: study 1 to instant versus mail-in rebates; study 2 to withdrawing versus investing money, study 3 to expedited versus regular shipping; and studies 4 and 5 to inferior versus superior products. These studies rule out a risk-based process, provide support for a potency process via both mediation and moderation, and establish the predicted effect on patience across measured and manipulated independent variables, choice and preference measures, monetary and product settings, and a variety of participants: students, on-line respondents, and store shoppers.

1.12.2 UNDERLYING PROCESS

The potency process needs elucidation in light of my earlier discussion of a risk process (Kim and McGill 2011). Because risk is not a central characteristic in my setting of two equally assured options, I did not expect the risk process, and did not observe it in studies 3, 4, and 5. I might have observed it if I incorporated risk into my stimuli. However, my objective was not to replicate the risk process, but to identify the process most applicable to wait time. This process pertains to potency. It is known that low-power (but not high-power) individuals attend to the characteristics of powerful others (Anderson, Keltner, and John 2003; Fiske 1993; Galinsky et al. 2006). So, when powerful wait time seems human, its aversive characteristic looms large for low-power individuals. That is, the aversive force of wait time seems more potent (i.e., more aversive) only to those who feel less potent themselves (i.e., low-power individuals), making them less patient.

My mediating process is supported by studies 3 and 4. However, because the mediator of time perception and the dependent variable of lower patience seem closely related, is the mediation really meaningful? I argue that it is, because the outcome of lower patience could have been due to factors other than time perception. In fact, studies on patience and declining impatience have traditionally implicated other factors (e.g., how the reward is viewed), and it is only recently that time perception (e.g., duration) has been implicated as a cause (Zauberman et al. 2009), and has been subsequently employed as a mediator for patience (Kim and Zauberman 2013; Kim et al. 2012). Therefore, showing that the mediator for an interactive effect of power and anthropomorphism is time perception—in fact, a specific perception of time as an aversive force—is theoretically useful. Even methodologically, the mediator and the dependent variable are distinct in my studies. I conducted a confirmatory factor analysis and established discriminant validity between the constructs via two methods: average variance extracted (Fornell and Larcker 1981), and chi-square difference (Bagozzi, Yi and Phillips 1991). The average variance extracted was greater than the squared correlation between the two constructs (study 3: .84 > .09; study 4: .79 > .05), and comparing the two models—one in which the correlation between the constructs is fixed to 1, and one in which it is estimated—the chi-square difference was highly significant (study 3: 157.82, $p < .001$; study 4: 194.1, $p < .001$). Hence, my mediation is theoretically and methodologically meaningful.

My final support for the process comes from manipulating time perception to be aversive versus beneficent (study 5). Based on a risk process, I should have observed no differences in the beneficent condition; both low- and high-power individuals should

have embraced the benefit offered by wait time. However, I do observe a difference that is consistent with the potency process. Low-power individuals see aversive time as more aversive, leading to lower patience; and they see beneficent time as more beneficent, leading to higher patience. Thus, this research presents a convincing theoretical and empirical case for the potency process in my domain, and complement the process shown in the domain of risk (Kim and McGill 2011).

1.12.3 THEORETICAL IMPLICATIONS

Anthropomorphism has been documented for several entities such as plants, animals, geometric shapes, and even God (Epley et al. 2007; Epley et al. 2008; Barrett and Keil 1996; Morewedge and Clear 2008). Within consumer research, the focus has been on products and other consumer acquisitions (Aggarwal and McGill 2007; Aggarwal and McGill 2012; Chandler and Schwarz 2010; Kim and McGill 2011; Landwehr et al. 2011). This research introduces time—which can be a barrier to acquisition—as a consequential anthropomorphic entity. Time anthropomorphism varies across individuals, and may also be situationally induced.

I also present a novel effect on intertemporal preferences. It is known that patience and related constructs may depend on time-related processes such as the subjectivity of durations (Zauberman et al. 2009), subadditivity (Read 2001; Scholten and Read 2006), insensitivity (Ebert and Prelec 2007), and description of time interval (LeBoeuf 2006; Monga and Bagchi 2012). However, all these perspectives relate to a quantitative characteristic of time: duration. I show the effect of a qualitative characteristic: humanness.

A qualitative perspective of time invokes a new role of power in intertemporal settings. Power over the self, or willpower (Baumeister and Tierney 2011; Hoch and Loewenstein 1991; Metcalfe and Mischel 1999) has been examined for decades, and recent research has considered how the power over other individuals (Rucker et al. 2012) may decrease or increase patience. From one perspective, power heightens reward sensitivity (Anderson and Berdahl 2002; Keltner, Gruenfeld, and Anderson 2003), which is known to decrease patience (Ramanathan and Menon 2006, Van den Bergh, DeWitte and Warlop 2008). From another perspective, power enhances the connection of the current to the future self (Joshi and Fast 2013), which is known to increase patience (Bartels and Urminsky 2011). I do not resolve this issue, but present situations in which low power may facilitate both a decrease and increase in patience. Specifically, when power is low rather than high, time anthropomorphism usually decreases patience (because wait time is usually aversive), but could also increase patience (if wait time is made to seem beneficent). This follows from a potency process that I advocate for the moderating effect of power, complementing the risk process demonstrated earlier (Kim and McGill 2011).

1.12.4 PRACTICAL IMPLICATIONS

Managers frequently want to influence consumers' perceptions of wait time. In some situations, it is profitable to make wait time seem more aversive. For instance, the manager of an online store wanting consumers to opt for expensive expedited shipping would want the shipping wait time to seem more aversive. Using a more sinister example, the manager of a cash advance or payday loan institution would want the wait till pay day to seem more aversive. Such offerings will seem more attractive to consumers if the wait

time seems more aversive. In other situations, it is profitable to make wait time seem beneficent. For instance, Evan Williams Bourbon uses the tagline "The longer you wait…the better it gets," while Chivas Regal Scotch brags, "We refuse to…age a drop of Chivas Regal a moment less than 12 years." Similarly, a National Bank advertisement uses a pocket watch to illustrate how savings might grow with time. Such offerings would seem more attractive to consumers if the wait time seems more beneficent.

My results suggest that, for low-power individuals, the potency of wait time can be heightened by anthropomorphism. So, if a manager is aware that the target segment comprises those who usually feel powerless in their lives (e.g., due to low income), inducing time anthropomorphism could heighten the potency of both aversive and beneficent wait time. However, since my studies usually find null results for high-power participants, managers may even ignore the power variable and just induce anthropomorphism in their communication. For instance, Amazon could promote a subscription to Amazon Prime (which offers expedited shipping) on the checkout screen that a consumer sees after shopping: "Mr. Tyme is standing between you and delivery of this product. Sign up for Amazon Prime, and spend less time waiting." While there would be no negative fallout from consumers high in power, Amazon Prime would become more attractive to those low in power. Such techniques could be abused, so public-policy makers need to ensure that managerial actions are not predatory. However, both managers and public-policy makers need to be aware that time anthropomorphism is a real phenomenon that naturally varies across individuals and influences patience even when real money is at stake (e.g., study 1). Moreover, managers can induce time

anthropomorphism via subtle linguistic variations in order to influence patience (e.g., study 3).

1.12.5 FUTURE RESEARCH

My finding about higher patience due to the beneficent force of time (study 5) needs to be distinguished from heightened reward sensitivity (Anderson and Berdahl 2002; Keltner, et al. 2003). This past research relates to a main effect of power and, as noted earlier, power might have an opposing main effect as well. This research is different because I present a moderating effect of power. Moreover, reward-sensitivity effects are driven by high-power individuals whereas my effect is driven by low-power individuals. That said, the power-reward link needs to be examined further from other perspectives. One such perspective relates to leadership. Power motivates self regulation toward effective performance if the task is deemed worthy enough for a leader (DeWall et al. 2011). So, it would be interesting to examine how my results for power are moderated by how worthy the reward seems, and how the eventual enjoyment from the reward might depend on how vivid it seems (Nowlis, Mandel, and McCabe 2004).

My results in U.S. settings may vary with cultural aspects such as power distance (Zhang, Winterich, and Mittal 2010). Given the anthropomorphism-patience link this research shows, an intriguing possibility is that cross-cultural variations in patience (Chen, Ng, and Rao 2005; Zhang and Shrum 2009) are partly driven by cross-cultural variation in time anthropomorphism. Even within the same culture, other social variables could come into play. For instance, a person high on sociability (Cheek and Buss 1981) may feel better waiting alongside a humanized version of time, than waiting "alone" with

a non-human entity. Related to this aspect, time is known to facilitate relationships and personal connections (Mogilner 2010; Mogilner and Aaker 2009). So, its anthropomorphism may strengthen personal connections if time is a seen as a partner, but may suppress such connections if time is seen as an obstructionist.

The notion of personal connection dovetails with how time is viewed when people think about themselves versus others. For example, if one says, "The meeting has been moved forward from Wednesday," this can be interpreted as movement toward either the future (e.g., Friday) or the present (e.g., Monday). Invoking a time-space relationship, Boroditsky and Ramscar (2002) find that when individuals think about themselves moving through time, they are more likely to answer "Friday" (vs. "Monday"). Given my theorizing, such a focus on one's own self may be less for low-power (vs. high-power) individuals who tend to look outside. Therefore, perhaps low-power individuals would be less likely to answer "Friday." This interaction of power with the time-space relationship could influence patience, because the time-space relationship is known to influence intertemporal preferences (Kim et al. 2012).

Time anthropomorphism may also have an effect on time-money differences. It has been shown that time (vs. money) leads to higher risk-seeking behavior (Okada and Hoch 2004), reliance on heuristics (Saini and Monga 2008), and a neglect of sunk costs (Soman 2001; Soster, Monga, and Bearden 2010). These findings are predicated on the ambiguity of time. However, a human time might seem more tangible and structured, diminishing the time-money differences observed earlier. My findings could also extend to anthropomorphized brands (Aggarwal and McGill 2012). Just as low-power people are sensitive to the characteristics of anthropomorphized time, they may also be sensitive to

the cues from a brand. Low-power consumers may be more likely to see a strong ally in a brand that functions as it should. But, if the brand experiences a failure, these consumers might be more likely to see the brand as an adversary, triggering a switch from love to hate (Gregoire, Tripp and Legoux 2009).

1.12.6 CONCLUSION

This research introduces time as a consequential anthropomorphic entity, demonstrates novel consequences for intertemporal preferences, and delineates a new process for the moderating role of power. Time is described well in the opening quote of this manuscript: "Mysterious thing, time. Powerful, and when meddled with, dangerous." I show that when the powerful force of time is meddled with a human touch, it does seem more dangerous, but only to the powerless.

ESSAY 1 FIGURES

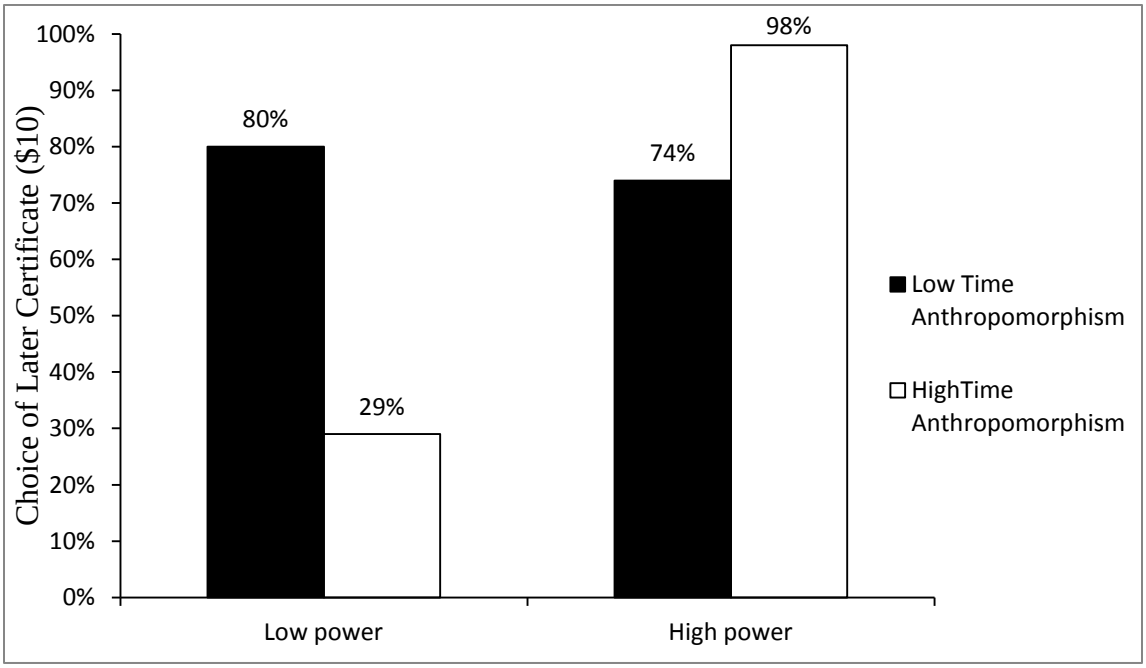


Figure 1.1: Choice share of $10 gift certificate later (vs. $5 now) (Percentages at -1/+1 sd of power and anthropomorphism)

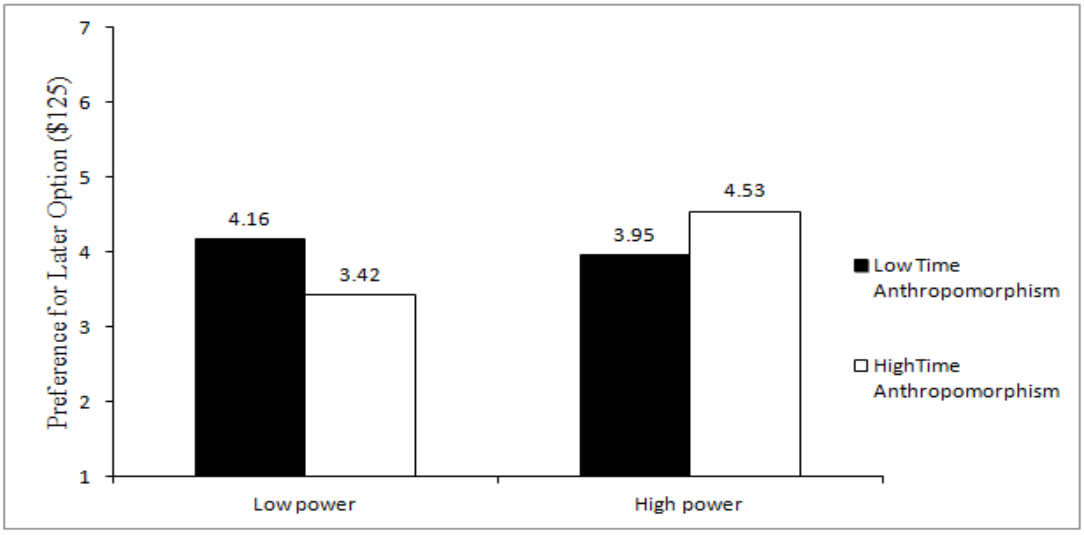
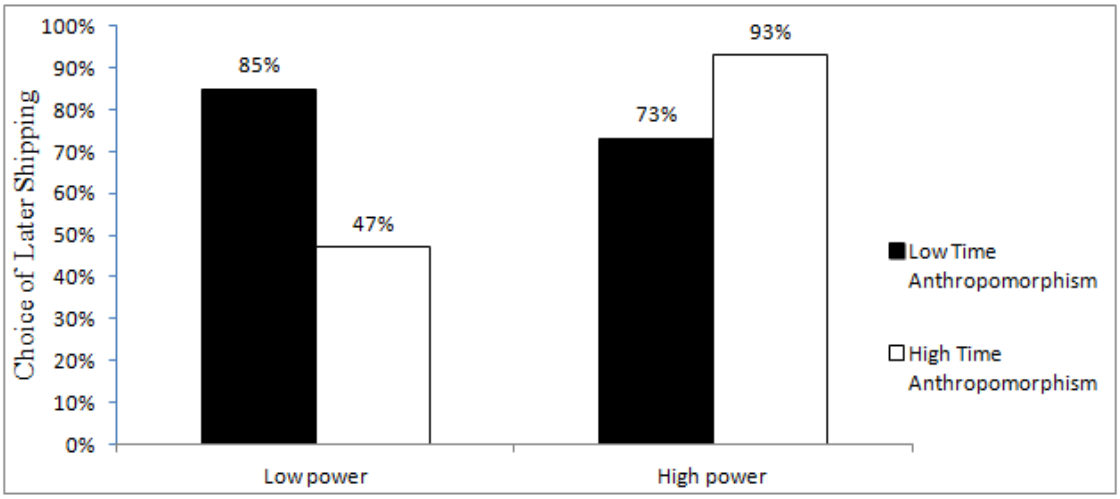


Figure 1.2: Preference for $125 later (vs. $100 now) (Means at -1/+1 sd of power)

Panel A: Choice Share of Standard over Expedited Shipping (Percentages at -1/+1 sd of Power)



Panel B: Perception of Wait Time as an Aversive Force (Means at -1/+1 sd of Power)

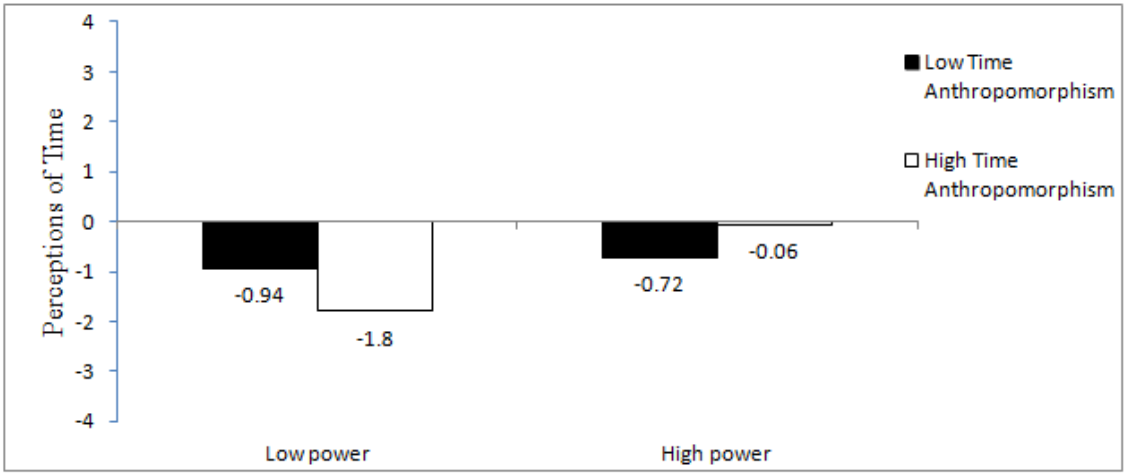
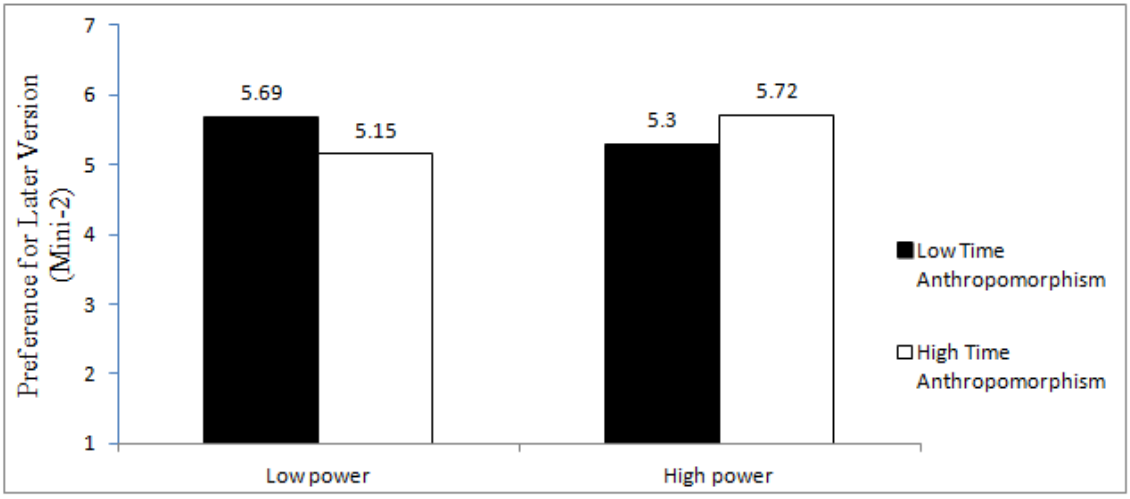


Figure 1.3: Choice share and time perception for standard (vs. expedited) shipping

Panel A: Preference for the iPad Mini-2 over iPad Mini (Means at -1/+1 sd of Powe



Panel B: Perception of Wait Time as an Aversive Force (Means at -1/+1 sd of Power)

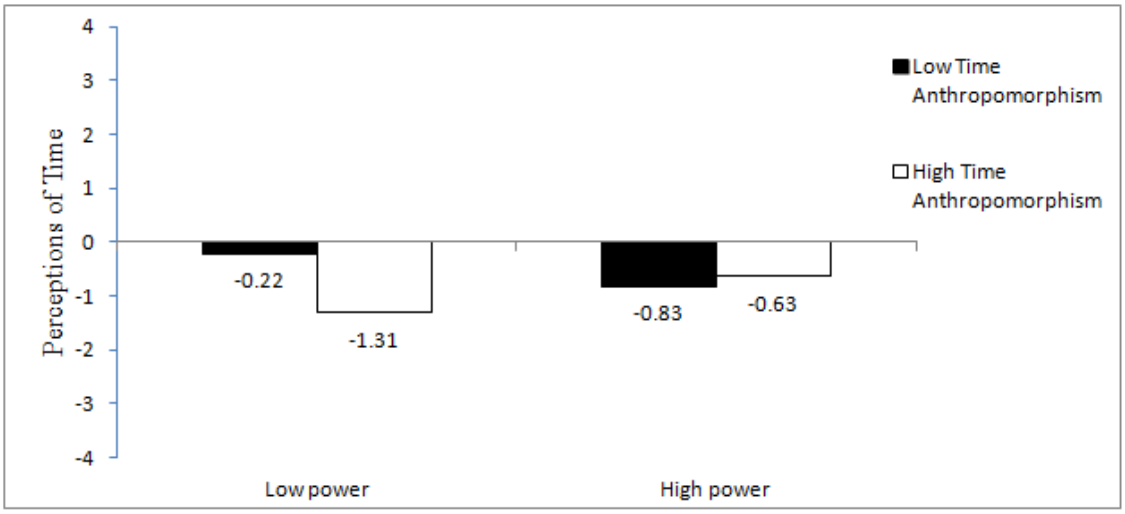
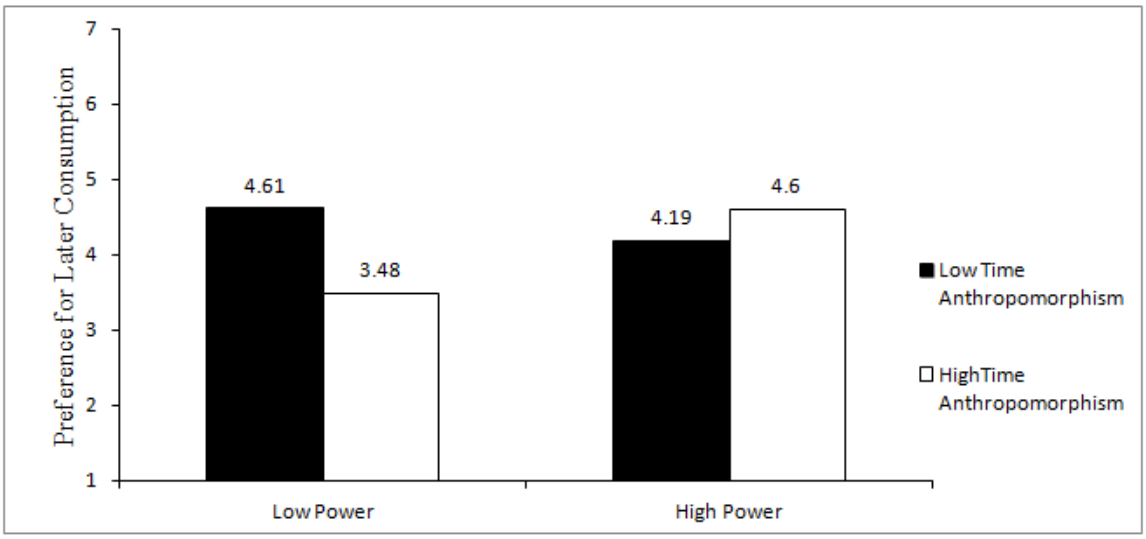


Figure 1.4: Preference and time perception for ipad mini-2 (vs. ipad mini)

Panel A: When Wait Time is perceived to be an Aversive Force



Panel B: When Wait Time is perceived to be a Beneficent Force

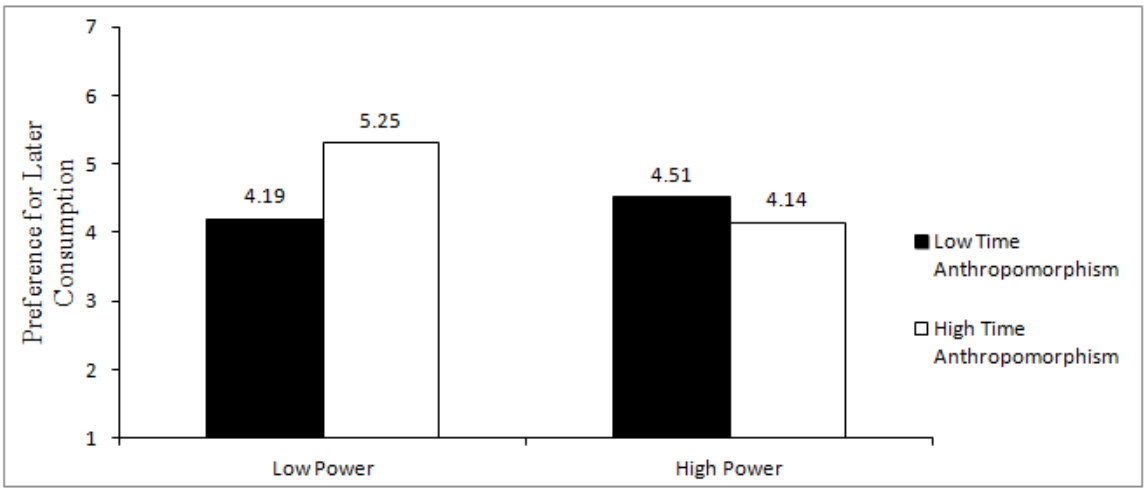


Figure 1.5: Preference for consuming cheese later (vs. sooner)

ESSAY 2: A LONG DISTANCE TO A DESTINATION NOT FAR: FRAMING TIME AS LONG VERSUS FAR INFLUENCES PATIENCE

2.1 ABSTRACT

In intertemporal settings, patience is influenced by the size of the later reward relative to the sooner one—a much-larger (vs. larger) later reward induces more patience. I show that this effect is moderated by the frame of wait time—the effect of reward size is stronger in *far* (vs. *long*) frames. Conceptualizing the later reward as a "destination" at the end of a wait time, I argue that destinations are associated more with *far* (vs. *long*) frames. Consequently, increasing the size of the destination (i.e., later reward) leads to relatively contracted time perception, and higher patience in *far* (vs. *long*) frames. In two studies, I observe the far-destination association using Implicit Association Tests. In four additional studies, I observe the consequences of this association for time perception and patience. These results add to the literature on semantic framing, time perception, and the constructive nature of patience.

2.2 INTRODUCTION

Imagine a friend who is visiting you from out of town, and looking for an outdoor swimming location. Your suggestion about the pond 50 miles away is met with a disapproving tone ("50 miles? Travel that long for a pond?"). When you clarify that "the pond" is the colloquial term for the Atlantic Ocean, the tone improves ("Just 50 miles to the ocean? I'm going!"). One obvious reason your friend is willing to travel the 50-mile distance may be that he finds the larger swimming destination more desirable. Another, less obvious, reason may be that the larger destination contracts the distance perception—"the pond" (vs. "a pond") contracts the perception of the 50-mile drive. There is support for this in the realm of physical destinations. It is known that physically larger objects seem closer than smaller ones (Sousa, Smeets, and Brenner 2013), and that a journey

seems shorter when the destination appears to be geographically larger (e.g., one's home location; Raghubir, Morwitz, and Chakravarti 2010).

Given the mapping between space and time (Boroditsky and Ramscar 2002; Hernandez 2001; Kim, Zauberman, and Bettman 2012), a similar effect may arise in intertemporal settings. Imagine that you owe your friend $100 and offer him a deal: Take $100 from me right now, or take $110 in 50 days. Thus, $110 is the "destination" available at the end of the temporal "distance" of 50 days. Your friend's tone is again disapproving ("50 days? Wait that long for $110?). However, when you clarify that you said $910, the tone improves ("Just 50 days for $910? I'm waiting!"). One obvious reason your friend is willing to wait may be that he finds the larger destination more desirable. Another, less obvious, reason may be that the larger destination contracts the distance perception—$910 (vs. $110) contracts the perception of the 50-day wait.

In the current research, I discuss how the destination—the size of the larger-later award—influences subjective time perception and, consequently, patience. In particular, I argue that this influence emerges when the frame used to view wait time is *far* rather than *long*.

In intertemporal situations, people may think of how *long* the wait time seems, or how *far* the reward day seems. Perhaps because individuals use such frames commonly, they are also used by researchers who gauge time perception across domains as diverse as time discounting, wait management, and self appraisal. Some ask "how long" (Bilgin and LeBoeuf 2010; Kim et al., 2012) and others ask "how far" (Wilson et al. 2012; Wohl and McGrath 2007). However, similar words may not evoke similar judgments (Fillmore

1976). For instance, the semantic frames of *can't* and *don't* denote a refusal, but have different consequences (Patrick and Hagtvedt 2012). I argue that even though both *long* and *far* denote time perception, *far* (vs. *long*) is associated more with destination. This is because *long* directly refers to a distance, but *far* refers to the destination that the distance leads up to. For instance, a sentence conveying time perception of 50 days to receive $110 may describe the distance directly using a distance-long pairing ("the 50-day wait seems long"), or indirectly in terms of how far the destination seems because of the distance, using a destination-far pairing ("the $110 reward seems far"). Thus, a destination is more likely to be invoked when using the word *far* (vs. *long*).

A well-known consequence of frequent pairings is that evoking one concept makes the other one salient, making it receive a higher weight in judgments (Anderson and Bower 1973; Collins and Loftus 1975; Fiske 1980; Srull and Wyer 1979). Thus, destinations should receive a higher weight when wait time is viewed using a *far* (vs. *long*) frame. Specifically, when the size of the later reward is increased (e.g., from $110 to $910), wait time (e.g., 50 days) should seem more contracted in the *far* (vs. *long*) frame. Because time contraction is known to increase patience (Kim and Zauberman 2009; Zauberman et al. 2009), the same increase in reward should lead to a stronger increase in patience in the *far* (vs. *long*) frame.

The above ideas are supported in six laboratory studies. In the first two, I employ the Implicit Association Test (IAT) to confirm that *far* (vs. *long)* is associated more with destination-related words. In the next four studies, I observe the predicted consequences for time perception and patience. My results add to the semantic framing literature. Just as prior research identifies similar words with different consequences, such as *can't*

versus *don't* (Patrick and Hagtvedt 2012) and *anytime between* versus *only between* (Cheema and Patrick 2008), I show the different consequences of *far* versus *long*. By revealing the consequences for time perception and patience, I contribute to research on how time perception influences patience and related constructs (Zauberman et al. 2009). At a broader level, implications arise for the construction of preferences (Payne, Bettman, and Johnson 1992). Although "how far" and "how long" appear to be similar procedures, they do not just elicit time perceptions, but construct them. Finally, my results have practical implications. Consider young adults impatient to withdraw retirement money, even though that is financially imprudent. A public-policy maker, or a benefits-management firm, could induce patience by making these adults think of the time till retirement more in terms of "how far" rather than "how long." That would make them more sensitive to the large award available at retirement, and induce patience.

Next, I will discuss the link between wait time perception and patience, followed by the two key pieces of my theory: how the consideration of destination influences time perception and patience; and how such consideration is more likely when wait time is framed in terms of *far* rather than *long*. I will then present six studies, and discuss the implications in detail.

2.3 PRIOR RESEARCH ON WAIT TIME PERCEPTION INFLUENCING PATIENCE

A typical intertemporal choice involves a smaller-sooner reward versus a larger-later reward, with wait time in between. The traditional research on this topic is concerned with how the later reward is viewed. For instance, if the later reward is viewed as much-larger (vs. larger) relative to the smaller one, people are likely to wait patiently

for the later reward. Moreover, longer wait times "discount" later rewards more, leading to impatience, though such impatience declines with delay (O' Donoghue and Rabin 1999; Thaler 1981).

In the above perspective, patience is a function of how the larger-later reward is viewed. In more recent perspectives, patience is a function of how the wait time is viewed. In particular, it has been shown that subjective measures of temporal distance behave differently than objective measures. For instance, Zauberman et al. (2009; p. 546) measure subjective time perception using questions such as "How long do you consider the duration between today and a day 3 months later?" and find that such subjective perceptions are not sufficiently sensitive to changes in objective duration (3 months vs. 1 year vs. 3 years). This disconnect between objective and subjective time influences patience-driven phenomena such as present bias (Kim and Zauberman 2009; Zauberman et al. 2009). Similarly, sexual cues contract perceptions of time, leading to impatience (Kim and Zauberman 2012). When exposed to sexual cues, heterosexual men feel as though the time between now and a future reward is longer (vs. when no sexual cue is present), leading to impatience, or the choice of an immediate reward over a delayed one. Finally, Kim and colleagues (2012) demonstrate that exposure to large spatial distances primes the notion of large temporal distances, leading to impatience.

Additional research supports this view of subjective time influencing patience. In the first essay of my dissertation (May and Monga 2014), I construe wait time as an aversive entity that makes young children opt for a single marshmallow available sooner rather than two marshmallows available later (Mischel and Ebbesen 1970), and old retirees opt for smaller social-security checks available sooner rather than larger checks

available later (Thaler and Shefrin 1981). I find that the same objective temporal distance seems more aversive when anthropomorphism is evoked, and that this greater aversiveness reduces patience for a larger-later option. Thus, patience is determined not just by the objective duration of wait time, but also by factors such as anthropomorphism, which introduce subjectivity. Other factors that introduce subjectivity include the additivity of time intervals, as perceptions of time differ depending on whether people view time in a subadditive versus superadditive manner (Read 2001; Scholten and Read 2006). The fragility of time also plays a role in time perceptions due to the fact that people tend to neglect the temporal aspect of intertemporal choice (Ebert and Prelec 2007). Finally, the descriptions of time intervals can affect perceptions of time (LeBoeuf 2006; Monga and Bagchi 2012). That is, people might view time differently if a stretch of time is described in terms of weeks instead of months, or in terms of days instead of weeks (Monga and Bagchi 2012).

My focus is on another factor that might influence time perception and, consequently, patience: *far* vs. *long* frames. I argue that the perception of wait time framed in terms of *far* (vs. *long*) is more likely to be influenced by the destination—the reward available at the end of the wait. Before I detail this argument regarding when the influence of destination may be higher, I will discuss why destination may have any influence at all.

2.4 DESTINATION MAY INFLUENCE WAIT TIME PERCEPTION AND PATIENCE

As discussed earlier, both larger-later rewards and wait time are known to have separate effects on patience. However, could the size of the larger-later reward influence

wait time perception and, consequently, patience? To explore this question, I construe intertemporal settings in spatial terms as has been done earlier in research on the space-time mapping (Boroditsky and Ramscar 2002; Hernandez 2001; Kim, Zauberman and Bettman 2012). That is, people tend to think of time in spatial terms (Christmas is *coming*; The deadline is *approaching*; *In* two weeks; etc.). Because people construe time in this manner, it is reasonable to assume that relationships one sees in the spatial realm will be seen in the temporal realm as well.

I view wait time as a "distance" that needs to be traveled in order to reach the "destination" of a larger-later reward. As I explained in the pond example, distance to a large destination ("the pond") may seem contracted relative to the distance to a small one ("a pond") Prior research on physical objects supports this role of the size of a destination. For instance, Sousa et al. (2013) examined the influence of objects' sizes on distance judgments. Their argument is based on the mechanism underlying vision. When retinal images are formed in the eye, physical size and distance are coupled. Therefore, when individuals see an object as small, they tend to think of it as far, and when they see it as large, they tend to think of it as near. For instance, if a building seems small from a distance, one may conclude that it is far, and if it seems large, one may conclude that it is near. A similar conclusion may be drawn from research pertaining to spatial categorization. Raghubir et al. (2010) found that individuals perceive a journey to be shorter when the destination seems geographically larger. The destination of one's home seems less far (vs. an equally-distant unfamiliar location) because the rich mental representation of the destination makes it seem geographically larger.

The above research suggests that as the size of a physical destination increases, the closer it seems to individuals, even when the objective spatial distance remains constant. A similar effect may arise for intertemporal settings in which the destination is a larger-later reward. As the size of the larger-later reward increases, the closer it may seem to individuals, even when the objective temporal distance remains constant. This analogy to physical objects aside, this suggestion also makes sense from an intuitive perspective. Given a smaller-sooner reward (e.g., $100), individuals may be willing to wait only a short time for a reward that is just a bit larger (e.g., $110). Because the willingness to wait is low, a 50-day wait may seem long. However, individuals may be willing to wait a long time for a reward that is much larger (e.g., $910). Because the willingness to wait is high, individuals may think of 50 days as not very long, and of $910 as not very far. Such phrasing relates to my second theoretical piece about when the effect of destination on wait time perception is more likely.

2.5 DESTINATION MAY HAVE A STRONGER INFLUENCE ON WAIT TIME PERCEPTION AND PATIENCE WHEN FRAME IS FAR (VS. LONG)

Given the space-time mapping, the spatial terms *far* and *long* are commonly used to gauge time perception. As Kim et al. (2012, p. 868) explain, "A metaphor often used for describing temporal duration is time as distance, for example, "this meeting was too *long*" or "that meeting is *far* in the future." Both these words, *long* and *far*, are used by researchers who gauge time perception across domains as diverse as time discounting, wait management, and self appraisal. Some ask "how long" (Bilgin and LeBoeuf 2010; Kim and Zauberman 2013; Kim et al. 2012; LeBoeuf 2006; Haddock 2004; Miller, Kahn, and Luce 2008) and others ask "how far" (Ross and Wilson 2002; Zhang and Wang 2009; Wilson and Ross 2001; Peetz , Wilson, and Strahan 2007; Lu and Chang 2009;

Lam and Buehler 2009; Wilson et al. 2012; Wohl and McGrath 2007; Jiga-Boy, Clark, and Semin 2010). As examples of "how long," Bilgin and LeBoeuf (2010, p. 522) ask, "How long does this time period until the move seem to you?" and Kim et al. (2012, p. 870) ask, "How long do you consider the duration between tomorrow and a day in three months?" As examples of "how far," Wohl and McGrath (2007, p. 1030) ask, "Please indicate how far away in time the event feels," and Wilson et al. (2012, p. 348) ask, "How far away in the future does two months from today feel to you?"

Given that there is extensive use of both *far* and *long*, perhaps researchers choose one versus the other based on personal preference, while thinking of the two as similar in meaning. To verify whether laypeople also see these as having a similar meaning, I conducted a pilot test with 44 participants from Mturk (21% female, M_{age} = 31). I asked them to imagine a friend choosing between $500 today and $700 in one month, and then imagine asking the friend about the day on which $700 may be received, using one of two questions: (a) How long does the time until that day seem? (b) How far away does that day seem? Next, participants were asked "In terms of their meaning, how similar are these two questions?" (1 = completely different; 7 = exactly the same). The mean response was closer to the exactly-the-same (vs. completely-different) end of the scale ($5.73 > 4$; $t = 9.49$, $p < .01$). Thus, laypeople also see "far" and "long" as more similar than different. However, could these terms have different consequences?

Research on semantic framing suggests that similar words may evoke different judgments (Fillmore 1976). Semantic framing refers to the use of linguistic frames that may be used interchangeably but provide different psychological feedback, which may lead to different outcomes. For instance, when an experience is labeled as "last" rather

than “next”, it is enjoyed more (O’Brien and Ellsworth 2012). This occurs because the word “last” causes individuals to interpret the consumption situation as “the end”. In turn, because endings are associated with savoring, this leads to greater appreciation. Although one may interchangeably use the term “next” or “last” in this type of situation, the term that is ultimately used can affect perceptions of the experience. Mayer and Tormala (2010) examined the phrases “I think” versus “I feel”. “Think” is associated with cognition, while “feel” is associated with affect. In turn, the use of these words causes individuals to interpret the situation using one of these mindsets. The notion of semantic framing has also been examined in the marketing literature as well. Although the phrases “anytime between” and “only between” can be interchangeably used in marketing promotions (e.g., “Receive 30% off, only/anytime between 3 and 5pm”), Cheema and Patrick (2008) demonstrate that these frames differentially affect the likelihood of using a coupon. That is, because “anytime” is associated with freedom while “only” is associated with restriction, their use differentially affects how the time period is interpreted, and in turn, affects likelihood of using a coupon. While Cheema and Patrick (2008) examined the use of semantic framing in the domain of coupon redemption, Patrick and Hagdtvedt (2012) did so in the domain of self control. They found that when using self-talk, those who use “I can’t” to refuse an indulgence are less likely to engage in goal motivated behavior than are those who use “I don’t”. The authors posit that this occurs because using “I don’t” is associated with personal empowerment. Specifically, using “I don’t” engenders an attitude of personal willpower while using “I can’t” engenders an external focus on obstacles. Following this literature, I argue that even though both *long* and *far* denote time perception, *far* (vs. *long*) is associated more with destination.

I believe that *far* (vs. *long*) have different associations because they convey time perception by relying on different concepts. *Long* is the root of the word "length," and hence the dictionary definition of *long* focuses on the distance itself ("extending a specified distance…"); whereas *far* is derived from the Old English word "faran" meaning "to go," and hence the definition of *far* focuses on the destination that is at a distance ("to or at a particular distance…") (merriam-webster.com; dictionary.com). That is, *long* directly refers to a distance, whereas *far* refers to the destination that the distance leads up to. For instance, a sentence conveying a spatial perception of 50 miles to the pond may describe the distance directly in terms of how long it seems ("50 miles seems long"), or indirectly in terms of how far the destination seems because of the distance ("the pond seems far"). Similarly, a sentence conveying a temporal perception of 50 days for $110 may describe the distance directly in terms of how long it seems ("the 50-day wait seems long"), or indirectly in terms of how far the destination seems because of the distance ("the $110 reward seems far"). Thus, while both *far* and *long* convey time perception, a destination is more likely to be invoked when using the word *far* (vs. *long*). The outcome of such use in language would be a more frequent pairing of destination with *far* (vs. *long*).

Such frequent pairing has consequences. It is well known that as co-occurrences of two concepts increase, the association between them strengthens, and may be generalized. For instance, for events in the distant future, individuals often have only high-level abstract (not low-level concrete) information. Consequently, individuals develop a distant-abstract association. This association is generalized such that even when concrete information is available, a distant event is still viewed abstractly, with

high-level features receiving more weight in judgments (Bar-Anan, Liberman, and Trope 2006). More generally, because of frequent pairing, one concept can make another one salient (Anderson and Bower 1973; Collins and Loftus 1975; Quillian 1967), and the salient concepts then receive more weight in judgments (Fiske 1980; Srull and Wyer 1979). Thus, if time perception is framed in terms of *long* (e.g., "how long does the time until the 50th day seem?") versus *far* (e.g., "how far away does the 50th day seem?"), the mere mention of *far* (vs. *long*) should make the destination receive a higher weight in judgments. Specifically, when the destination involves a larger reward (e.g., $910 instead of $110), the same wait time (e.g., 50 days) should seem more contracted when the frame is *far*, but this effect should be attenuated when the frame is *long*. Because time contraction is known to increase patience (Kim and Zauberman 2009; Zauberman et al. 2009), the same increase in reward should lead to a stronger increase in patience in the *far* (vs. *long*) frame.

I test my theorizing in several studies. In studies 1 and 2, I employ the Implicit Association Test (IAT) to verify the premise about *far* (vs. *long)* being associated more with destination-related words. Response times are faster when the predicted associations are matched rather than mismatched (i.e., far-destination rather than long-destination). In study 3, I examine whether this association with destination has consequences for the *far* and *long* questions that have been employed in prior research to measure time perception. I show that whether a destination (i.e., larger-later reward) is present or absent, wait time is perceived similarly in the *long* frame. However, in the *far* frame, time perception is more contracted when the reward is present rather than absent. Thus, destination is considered in the *far* (but not *long*) frame. In study 4, I show further evidence for the

asymmetric effect of frame by manipulating the size of the destination (larger-later vs. much-larger-later). Specifically, when the destination is larger, time perception is more contracted when time perception is measured using a *far* question, but not when a *long* question is used. Consequently, a much-larger-later (vs. larger-later) reward boosts patience when the frame is *far* rather than *long*. Whereas studies 3 and 4 implement *far* and *long* frames employing time-perception questions used in prior research, studies 5 and 6 implement these frames independently of such questions. Specifically, these frames are primed in study 5 by making participants write sentences using either *far* or *long*. Here again, I find that a much-larger-later (vs. larger-later) reward boosts patience when the frame is *far* rather than *long*. I replicate this effect on patience in study 6, in which I prime these frames in the setting of a product advertisement. Moreover, I also show that the asymmetric effect of *far* and *long* on time perception acts as a mediator for the effect on patience.

2.6 STUDY 1

This study uses an Implicit Association Test (IAT) to verify that the *far*-destination association is stronger than the *long*-destination association. Specifically, relative to the association with distance-related words, I test whether the association with destination-related words is stronger for *far* than for *long*. I employ the IAT because it is an established technique to measure differential associations of target concepts, while avoiding the introspection and self-presentational biases of more explicit measures (Greenwald, McGhee, and Schwartz 1998). For instance, this technique has been used to demonstrate an intuitive tendency to associate greater psychological distance with higher construal level (Bar-Anan et al., 2006).

As an example from consumer research, Rozin et al. (2012) used the IAT to test a meat-male association. Participants had to place a meat-related word (e.g., beef) in one of two categories that were either matched as predicted (meat/male vs. vegetable/female) or mismatched (meat/female vs. vegetable/male). Reaction times were shorter when the presented words were matched rather than mismatched. Analogously, I used the IAT to test a far-destination association. For instance, participants had to place a destination-related word in one of two categories that were either matched as predicted (far/destination vs. long/distance) or mismatched (far/distance vs. long/destination). I expect reaction times to be shorter when the presented words are matched rather than mismatched.

2.6.1 DESIGN AND PROCEDURE

The IAT was administered using the software FreeIAT (Meade 2009). Excluding eight participants who had response times longer or shorter than 3 SD from the mean, two hundred and three students from a large public university successfully completed the study (67% female; M_{age} = 21). As in Rozin et al. (2012), participants placed a randomly presented word in one of two categories, but one half saw the matched pairings followed by the mismatched pairings, whereas the other half saw these pairings in the reverse order. In all cases, the target words appeared in the middle of the screen and had to be placed in one of the two categories by pressing a key on the keyboard. An introductory screen informed participants about the words belonging to the categories "distance" and "destination." Because my intention was to capture general associations, I did not limit the target words to intertemporal settings. The words for distance captured the notion of a degree of separation: mile, year, inch, month, kilometer, day, week, nautical mile, and

centimeter. The words for destination captured the notion of a place in space or time that a distance may lead to: concert, restaurant, city, graduation, beach, airport, home, grocery store, and doctor's office.

2.6.2 RESULTS

The statistic of interest is the mean response time per item. If *far* is associated relatively more with destination, it should take less time to categorize words when the pairings are matched as predicted (far/destination vs. long/distance) rather than mismatched (far/distance vs. long/destination). Indeed, this is what emerged. The mean response time per item was 1135 ms for matched pairings and 1204 ms for mismatched pairings, with the difference of 69 ms per item being statistically significant ($t(202) = 3.10$, $p < .01$).

2.6.3 DISCUSSION

As is generally true for IAT studies, my results present only a relative perspective. They do not show that destination (vs. distance) is associated only with *far* (vs. *long*). They simply confirm that destination is associated relatively more with *far* than with *long*. Attesting to the generality of these associations, the distance and destination words that I employed were not limited to intertemporal settings. However, to confirm that such associations arise even in exclusively intertemporal settings, I conducted another IAT study.

2.7 STUDY 2

Using a broad set of words, study 1 established that destination (vs. distance) is associated relatively more with *far* (vs. *long*). I now verify this association using words that are often relevant in intertemporal contexts. Specifically, in intertemporal situations, the "distance" refers to the wait time, and the "destination" to a better outcome that the wait time leads up to. Therefore, "wait time" and "better outcome" were the categories used in this study.

2.7.1 DESIGN AND PROCEDURE

Just as in study 1, the IAT was administered utilizing the software FreeIAT (Meade 2009). Excluding ten participants who had response times longer or shorter than 3 SD from the mean, two hundred and five students from a large public university successfully completed the study (64% female; M_{age} = 21). The procedure followed was the same as in study 1, except that the categories presented to participants related more to intertemporal settings. Specifically, participants were presented with the following "wait time" category: week, year, day, month, and decade. And they were presented with the following "better outcome" category: good health, large savings account, less debt, better electronics at same price, and earnings from interest rate.

2.7.2 RESULTS

As in study 1, the statistic of interest is the mean response time per item. If *far* is associated relatively more with better outcomes, it should take less time to categorize words when the pairings are matched as predicted (far/better outcomes vs. long/wait time) rather than mismatched (far/wait time vs. long/better outcomes). Indeed, this is

what emerged. The mean response time per item was 1026 ms for matched pairings and 1079 ms for mismatched pairings, with the difference of 53 ms per item being statistically significant ($t(204) = 2.80$, $p < .01$).

2.7.3 DISCUSSION

First using general words related to distance and destination (study 1), and now using words related to intertemporal settings (study 2), I observed the far-destination association that I predicted. I showed a relative effect such that, taking distance as a baseline, destination is associated relatively more with *far* than with *long*. Given this association, I expect changes in destination to have a greater influence on time perception and patience when the semantic frame is *far* (vs. *long*). I test this expectation in the next four studies.

2.8 STUDY 3

As discussed earlier, a stream of prior research has employed *far* and *long* questions interchangeably to assess time perceptions. In this study, I employ similar questions to assess whether destination has an asymmetric impact on time perception and patience—whether destination receives more consideration in the *far* frame than in the *long* frame. In later studies, I will assess such consideration by manipulating the size of the destination (i.e., how large the later reward is). In the current study, I assess such consideration by simply manipulating the presence of a destination. That is, in the destination-absent setting, I simply provide a time period without providing an intertemporal context of rewards—even if *far* participants want to adjust their responses based on destination, there is no destination to rely upon, only distance. In the

destination-present setting, I provide an intertemporal choice context such that there is a larger reward available at the end of the wait that may influence the responses of *far* participants.

2.8.1 DESIGN AND PROCEDURE

A 2 (frame: far vs. long) x 2 (destination: absent vs. present) design was used in which both variables were manipulated between subjects. Time perception served as the dependent variable. I included an attention filter question in this study (and in all other computer-based studies): "This question is to make sure you are paying attention. Please select choice 3."

Participants were randomly assigned to the experimental conditions. Excluding four participants who incorrectly answered the attention filter question, ninety nine Mturk participants completed the study (43% female, M_{age} = 32). Those in the destination-absent condition were asked to think about a day three weeks from the present. Then, in the *long* condition, they responded to the question "How long does the time until that day seem?" on 100-point slider scales with endpoints of "very short/very long." In the *far* condition, they responded to the question "How far away does that day seem?" on 100-point slider scales with endpoints of "very near/very far." Those in the destination-present condition were first provided with an intertemporal context: receiving $500 today versus $700 in three weeks. Then, just as in the destination-absent condition, they thought about the three weeks and responded to the *long* or the *far* questions. It is important to note that whether the scale used is that of *long* or of *far*, lower numbers reflect a contracted perception of wait time (i.e., not too far, or not too long).

2.8.2 RESULTS

An ANOVA was conducted using a between-subjects design: 2 (frame: long vs. far) x 2 (destination: absent vs. present). Wait time perception was the dependent variable. A significant main effect of frame emerged such that time perception was contracted in the *far* (vs. *long*) condition (M_{long} = 48. 12, M_{far} = 30.73; $F(1, 95) = 9.94$, $p < .01$). A marginally significant main effect of destination emerged such that time perception was contracted in the destination present (vs. absent) condition ($M_{present}$ = 34.48, M_{absent} = 44.37; $F(1, 95) = 3.22$, $p = .08$). Critical to my hypothesizing, there was a significant 2-way interaction between frame and destination ($F(1, 95) = 9.02$, $p < .01$). Planned contrasts revealed the predicted driver of this interaction. For participants in the *far* condition, time perception was contracted in the destination present (vs. absent) condition ($M_{present}$ = 17.50, M_{absent} = 43.96; $F(1, 95) = 10.60$, $p < .01$). However, for those in the *long* condition, time perception did not differ across destination conditions ($M_{present}$ = 51.45, M_{absent} = 44.78; $F(1, 95) = .80$, $p > .10$; see figure 6).

2.8.3 DISCUSSION

By utilizing IATs, studies 1 and 2 demonstrated that destination is associated more with *far* (vs. *long*) frames. The current study demonstrates the asymmetric consequence of this association for time perception. Using *long* and *far* questions of the type that have been used in prior research on time perception, I find that the *long* frame is immune to whether a destination is absent or present, but a *far* frame is sensitive to it. In other words, when participants are asked how *long* the time till a specific day is, their subjective assessment of the 3-week period is not influenced by whether or not they are

going to receive anything in the end. In contrast, when participants are asked how *far* that specific day is, they perceive that day to be less far if the wait time leads up to a reward. Thus, when there is a destination to consider, *far* (but not *long*) participants do factor in the destination when providing an estimate of time perception.

2.9 STUDY 4

The current study utilizes the same *long* and *far* questions that I used in study 3, and that have been used in prior research on time perception. I now go beyond study 3 in two ways. One, instead of examining just the presence of a destination, I manipulate its size. In line with my theorizing, increasing the size of a destination (i.e., much-larger-later instead of larger-later) should contract the perception of wait time, particularly when the frame is *far* rather than *long*. Second, I examine whether this asymmetric effect on time perception translates to an asymmetric effect on patience, given that contracted time perception should make individuals more patient (Zauberman et al. 2009). Thus, while increasing the attractiveness of a destination may make both *far* and *long* participants more patient, I argue that the increase in patience will be higher in the case of *far* (vs. *long*) because of the incremental influence of time perception.

2.9.1 DESIGN AND PROCEDURE

A 2 (frame: far vs. long) x 2 (destination: larger-later ($125) vs. much-larger-later ($200)) design was used in which both variables were manipulated between subjects. Choice of the later reward over a smaller-sooner reward ($100) was the key dependent variable while time perception served as the mediator.

Participants were randomly assigned to the experimental conditions. Excluding six participants who incorrectly answered the attention filter question, one hundred and thirteen students from a large public university successfully completed the study (66% female, M_{age} = 21). Those in the larger-later condition were asked to imagine that they had a choice between receiving $100 today versus $125 in two months, and then think about the day on which they could receive the larger amount. The instructions were identical in the much-larger-later condition except that the destination was $200 instead of $125. Next, as in study 3, those in the *long* condition responded to the question "How long does the time until that day seem?" on 100-point slider scales with endpoints of "very short/very long." Those in the *far* condition responded to the question "How far away does that day seem?" on 100-point slider scales with endpoints of "very near/very far." After indicating time perception, participants indicated which option they would choose: $100 today or the larger amount in two months.

2.9.2 RESULTS

Choice of the later option. Frame (-1 = long; 1 = far), destination (-1 = $125; 1 = $200), and their interaction were used as the independent variables in a binary logistic regression. Choice of the option reflecting more patience—the later rather than the sooner option—was the dependent variable (0 = sooner, 1 = later). The main effect of frame was marginally significant, such that preference for the later option was higher in the *far* condition versus the *long* condition (β = .51, z = 1.67, p = .09). Additionally there was a significant main effect of destination, such that choice of the later option was higher in the $200 condition versus the $125 condition ($\beta$ = 1.19, z = 3.88, p < .001). Critical to my hypothesizing, there was a significant 2-way interaction between frame and destination (β

= .62, z = 2.00, p < .05). A slope analysis revealed the predicted driver of this interaction. While a more attractive destination led to more patience in both frames, the effect was stronger in the far condition (β = 1.81, z = 3.36, p < .001) than in the long condition (β = .57, z = 1.96, p = .05; see figure 7).

Wait Time perception. An ANOVA was conducted using a between-subjects design: 2 (frame: long vs. far) x 2 (destination: larger-later reward of $125 vs. $200). Time perception was the dependent variable. The main effect of frame was not significant (p > .10), but a significant main effect of destination emerged such that time perception was contracted in the $200 (vs. $125) condition ($M_{\$125}$ = 68.01, $M_{\$200}$ = 55.06; F(1, 109) = 10.22, p < .01). Critical to my hypothesizing, there was a significant 2-way interaction between frame and destination (F(1, 109) = 7.10, p < .01). Planned contrasts revealed the predicted driver of this interaction. For participants in the *far* condition, time perception was contracted in the $200 (vs. $125) condition ($M_{\$125}$ = 70.44, $M_{\$200}$ = 46.74; F(1, 109) = 18.48, p < .001). However, for those in the *long* condition, time perception did not differ across destination conditions ($M_{\$125}$ = 65.58, $M_{\$200}$ = 63.39; F(1, 109) = .14, p > .10).

Mediation analysis. Given that both patience (choice of later option) and time perception revealed the predicted effects, I examined whether time perception acted as the mediator. I conducted a mediation analysis using the PROCESS SPSS macro (Model 8; Preacher and Hayes 2004; Hayes 2013). The regression model used choice as the dependent variable. The independent variables included the three independent variables used above (frame, destination, and frame x destination), as well as time perception. The effect of the hypothesized mediator, time perception, was significant (β = -.07, z = -3.72,

$p < .01$), and the interactive effect of frame x destination was not significant ($\beta = .50$, $z = 1.54$, $p > .10$). Taken together with the regression results reported earlier, and a bootstrap analysis confirming an indirect effect at 95% bias corrected CI [.15, 1.48], the overall data are supportive of time perception mediating the effect on patience.

2.9.3 DISCUSSION

Having established that destination is associated more with *far* (vs. *long*) frames (studies 1 and 2) and that the presence of a destination matters more for time perception measured using *far* frames (study 3), I go further in the current study. First, I establish that increasing the size of a destination matters more for time perception measured using *far* (vs. *long*) frames. Specifically, the *long* frame is immune to whether a destination is larger or much larger, but a *far* frame is sensitive to it such that time perception is contracted when the destination is much larger. This asymmetry, in turn, leads to an asymmetric effect on patience. While increasing the attractiveness of a destination does increase patience in general, the increase in patience is higher in the case of *far* (vs. *long*) frames.

In this study, as well as study 3, I incorporated the framing of *far* (vs. *long*) in the time-perception question itself. My intention was to employ questions similar to those that have been employed in prior research and show that while these questions may seem similar, they can lead to different consequences. One potential issue is the influence of other differences between the *far* and *long* measures that are unrelated to my theorizing. While there might indeed be other differences, they are unlikely to have led to my results. After all, I do not present main-effect differences between *far* and *long*, but an interactive

effect of greater sensitivity to destination in the *far* (vs. *long*) frame. That said, it is important to examine if my effects hold when the frame is manipulated independently, in separate tasks. I do so in the next two studies.

2.10 STUDY 5

The set up of this study was different from that of study 4 in two key ways. First, instead of measuring patience using a choice measure, I employed a preference measure. Second, I manipulated *far* versus *long* differently. In studies 3 and 4, the *far* versus *long* manipulation was embedded in the time-perception question. I now implement this manipulation using a sentence-creation task, and verify if that influences patience on an unrelated intertemporal task.

A key part of my theorizing is that *far* (vs. *long*) is associated more with destination, and I obtained evidence for this far-destination pairing in the two IAT studies. As discussed earlier, one reason for this association is that when sentences are formed, destinations are more likely to be used along with *far*, rather than *long*. I now use a sentence task to verify this, and also check if this task influences responses in an unrelated intertemporal setting, as one would expect from prior research. Specifically, it is known that when individuals construct sentences, related concepts are activated, and these primed concepts then change the interpretation of subsequent information (Higgins, Rholes, and Jones 1977; Srull and Wyer 1979). Therefore, when I ask individuals to construct sentences using the word *far* (vs. *long*), I expect a greater activation of destination, which should then change the interpretation of an intertemporal situation.

Overall, therefore, I first expect participants to use destination-related words more often when they form sentences using *far* (vs. *long*). Then, in an unrelated intertemporal task, I expect destination to receive higher consideration in *far* (vs. *long*)—increasing the size of a later reward should lead to relatively higher patience for *far* participants

2.10.1 DESIGN AND PROCEDURE

A 2 (frame: far vs. long) x 2 (destination: larger-later ($125) vs. much-larger-later ($200)) design was used in which both variables were manipulated between subjects. Preference for the later reward over a sooner reward ($100) was the dependent variable.

Participants were randomly assigned to the experimental conditions. Excluding four participants who incorrectly answered the attention filter question, eighty one students from a large public university successfully completed the study (54% female; M_{age} = 21). All participants were asked to create five sentences using the word *long* or *far*. Afterward, participants were asked to imagine that they had a choice between receiving $100 today versus either $125 in one month (larger-later condition), or $200 in one month (much-larger-later condition). They then indicated which option they would prefer (1=strongly prefer $100, 7=strongly prefer $125/$200).

2.10.2 RESULTS

I first verified the manipulation check for *far* versus *long*. Specifically, participants' sentences were coded for mentions of destinations. Destinations were often paired with *far* (e.g., "I wish the restaurant was not as far" referred to a destination that was not far), but were also sometimes paired with *long* ("December is a long way away" referred to a destination that was a long way away). In other cases, destinations were not

mentioned for either *far* (e.g., "This is the best, by far" used *far* in a sense that did not require a destination word) or *long* ("A canoe is a long, narrow boat" described the distance of the canoe without referring to the destination of the canoe). Two judges (α = .93) examined each sentence for the mention of a destination—a place to which one is journeying or to which something is sent—and coded the sentence as 1 if a destination is mentioned and 0 if a destination is not mentioned. The mean scores for all five sentences were summed, such that each participant had an aggregate score ranging from 0 to 5. As expected, the mention of destinations was greater in the *far* (vs. *long*) condition (M_{far} = 3.35, M_{long} = .79; $F(1, 79) = 137.57$, $p < .001$). Thus, my manipulation worked as I predicted. Next, I examined the consequence of this manipulation for the unrelated intertemporal task.

An ANOVA was conducted using a between-subjects design: 2 (frame: long vs. far) x 2 (destination: later reward of $125 vs. $200). Preference for the later reward (over the sooner reward of $100) was the dependent variable. The main effect of frame was not significant ($p > .10$) while a marginally significant main effect of destination emerged such that the later reward was preferred more in the $200 (vs. $125) condition ($M_{\$125}$ = 4.37, $M_{\$200}$ = 5.06; $F(1, 77) = 3.42$, $p = .07$). Critical to my hypothesizing, there was a significant 2-way interaction between frame and destination ($F(1, 77) = 4.32$, $p < .05$). Planned contrasts revealed the predicted driver of this interaction. For participants in the *far* condition, preference for the later reward was higher in the $200 (vs. $125) condition ($M_{\$125}$ = 3.92, $M_{\$200}$ = 5.38; $F(1, 77) = 7.70$, $p = .01$), but this effect attenuated in the *long* condition ($M_{\$125}$ = 4.82, $M_{\$200}$ = 4.74; $F(1, 77) = .03$, $p > .10$; see figure 8).

2.10.3 DISCUSSION

This study adds to the preceding ones in two ways. First, it adds to the findings from studies 1 and 2, which established that destination is implicitly associated more with *far* (vs. *long*). The current study demonstrates that even explicit mentions of destination are higher when sentences are constructed using *far* (vs. *long*). Second, it adds to the findings from studies 3 and 4, which established that, in *far* (vs. *long*) frames, destination changes have a stronger influence on time perception as well as choice. The current study demonstrates that this effect extends to a preference measure as well, and while utilizing a *far* versus *long* manipulation of sentence construction that was unrelated to the intertemporal task.

2.11 STUDY 6

This study has two objectives. The first one is to verify whether the *far* (vs. *long*) results that I observed for money emerge for products as well. The second objective is to resolve a quandary related to establishing the mediating influence of time perception on patience. I show mediation via time perception (study 4), but the issue there is that the *far* versus *long* manipulation is embedded in the time-perception question. Then I manipulate *far* versus *long* using an unrelated sentence procedure (study 5), but the issue there is that a *far* or *long* time perception question is not posed and, hence, mediation cannot be examined.

To meet the objective of using a product context, I present participants with a choice between an iPad Air now and a newer version of the product available in the future for the same price. Thus, the destination in this intertemporal setting was the newer

version, which was manipulated to be either just a bit better than the previous version, or much better. I manipulated *far* versus *long* by integrating the frames into advertisements for the newer version.

To meet the objective of using a time perception measure for mediation (while avoiding *far* and *long* questions), I borrowed from my first essay in terms of the conceptualization of wait time as an aversive force working against the larger reward (May and Monga 2014). In my earlier studies, the time perception measure related to the magnitude of waiting time, with the implicit assumption being that a more contracted wait time (i.e., not too far, or not too long) is less aversive, making individuals more patient for the later reward. Here, I utilize a new measure of time perception that directly captures the aversiveness of wait time.

2.11.1 DESIGN AND PROCEDURE

A 2 (frame: far vs. long) x 2 (destination: larger-later (improved iPad Air-2) vs. much-larger-later (substantially improved iPad Air-2)) design was used in which both variables were manipulated between subjects. Choice of the iPad Air-2 (over the current iPad Air) was the key dependent variable, while time perception served as the mediator.

Participants were randomly assigned to the experimental conditions. Excluding twelve participants who incorrectly answered the attention filter question, one hundred and sixty eight students from a large public university successfully completed the study (55% female, M_{age} = 21). First, participants were asked to imagine that they were considering purchasing an iPad Air, but that upon browsing the Apple website, they learned that the new iPad Air will be available at the same price in the near future (in 60

days, on April 18, 2014). Next, they were told that “In order to make an informed purchase, you browse the internet in search of reviews. One reliable tech website was able to procure a new iPad Air-2 and below is an excerpt of the review.”

The text of the review manipulated the size of the reward. Those in the larger-later condition were informed about minor improvements: "To summarize, the iPad Air-2 is an improvement over the original, but not a substantial one. Despite the upgrades to the processor and memory, performance when doing everyday tasks on the new tablet is only slightly smoother and snappier than the original. Also, the improvement in screen resolution, although noticeable, will not blow you away. In all, this is a better tablet than the original, but the level of improvement is ambiguous at best."

Those in the much-larger-later condition were informed about major improvements: "To summarize, the iPad Air-2 is an improvement over the original, and a very substantial one. Because of the upgrades to the processor and memory, performance when doing everyday tasks on the new tablet is very much smoother and snappier than the original. Also, the improvement in screen resolution is extremely noticeable, and will blow you away. In all, this is a better tablet than the original, and the level of improvement is considerable."

After reading the review, participants were shown an advertisement for the iPad Air-2 that would be available in 60 days (on April 18, 2014). Keeping with Apple’s usual advertising style, the advertisement employed a minimalist style of communicating information (see Appendix). In the *far* frame, the wording below the picture read, “The new iPad Air. How far? Not very far. April 18, 2014.” In the *long* frame, the wording

read, “The new iPad Air. How long? Not very long. April 18, 2014.” After viewing the advertisement, participants were asked to choose between the iPad Air that would be shipped right away and the iPad Air-2 that would be shipped after 60 days. Next, wait time perception was measured using 3 items: a) How aggravating would it be for you to wait to receive the iPad Air-2? (1 = Not at all, 7 = Very much so), b) How annoying would it be for you to wait to receive the iPad Air-2? (1 = Not at all, 7 = Very much so), and c) How difficult would it be for you to wait to receive the iPad Air 2? (1 = Very easy, 7 = Very difficult).

2.11.2 RESULTS

Choice of the later option. Frame (-1 = long; 1 = far), destination (-1 = small reward; 1 = large reward), and their interaction were used as the independent variables in a binary logistic regression. Choice of the option reflecting more patience—the later option—was the dependent variable (0 = sooner, 1 = later). The main effect of frame was not significant ($p > .10$), but there was a significant main effect of destination, such that choice of the later option was higher when the reward was high rather than low ($\beta = 1.26$, $z = 4.03$, $p < .01$). Critical to my hypothesizing, there was a significant 2-way interaction between frame and destination ($\beta = .64$, $z = 2.03$, $p < .05$). A slope analysis revealed the predicted driver of this interaction. A more attractive destination led to more patience in both frames, but the effect was stronger in the *far* condition ($\beta = 1.90$, $z = 3.60$, $p < .001$) than in the *long* condition ($\beta = .62$, $z = 1.85$, $p = .06$; see figure 9).

Time perception. An ANOVA was conducted using a between-subjects design: 2 (frame: long vs. far) x 2 (destination: larger-later vs. much-larger later). Time perception,

which was the average of the three items described earlier (α = .89), served as the dependent variable. The main effect of frame was not significant ($p > .10$), but a significant main effect of destination emerged such that the aversiveness of wait time was perceived to be lower in the much-larger-later (vs. larger-later) condition ($M_{\text{larger-later}} = 4.08$, $M_{\text{much-larger-later}} = 3.13$; $F(1, 164) = 11.02$, $p = .001$). Critical to my hypothesizing, there was a significant 2-way interaction between frame and destination ($F(1, 164) = 4.35$, $p < .05$). Planned contrasts revealed the predicted driver of this interaction. For participants in the *far* condition, the aversiveness of wait time was perceived to be lower in the much-larger-later (vs. larger-later) condition ($M_{\text{larger-later}} = 4.33$, $M_{\text{much-larger-later}} = 3.08$; $F(1, 164) = 15.85$, $p < .001$). However, for those in the *long* condition, time perception did not differ across destination conditions ($M_{\text{larger-later}} = 3.83$, $M_{\text{much-larger-later}} = 3.55$; $F(1, 164) = .71$, $p > .10$).

Mediation analysis. Given that both patience (choice of later-larger option) and time perception revealed the predicted effects, I examined whether time perception acted as the mediator. I conducted a mediation analysis using the PROCESS SPSS macro (Model 8; Preacher and Hayes 2004; Hayes 2013). The regression model used choice as the dependent variable. The independent variables included the three independent variables used above (frame, destination, and frame x destination), as well as time perception. The effect of the hypothesized mediator, time perception, was significant (β = -.95, $z = -4.35$, $p < .01$), and the interactive effect of frame and destination was marginally significant (β = .60, $z = 1.81$, $p = .07$). Taken together with the regression results reported earlier, and a bootstrap analysis confirming an indirect effect at 95% bias

corrected CI [.02, 1.05], the overall data are supportive of time perception mediating the effect on patience.

2.11.3 DISCUSSION

This study accomplished two objectives. First, it verified that the *far* (vs. *long*) results that I observed for money in earlier studies, emerge for products as well. Second, it achieved the twin aims of manipulating *far* versus *long* independently of the time perception question (i.e., using an advertisement), and verifying mediation via a time-perception measure (i.e., an aversiveness measure) that does not involve the words *far* or *long*. Once again, I observed the predicted effect on time perception which, in turn, led to the predicted effect on patience (i.e., choice of the later reward). Specifically, in *far* (vs. *long*) frames, changes in destination have a stronger influence on time perception and patience.

2.12 GENERAL DISCUSSION

2.12.1 SUMMARY

Intertemporal settings are characterized by a smaller-sooner reward, a larger-later reward, and wait time in between. Patience is a function of not only how the later reward seems, but also how the wait time seems (Zauberman et al. 2009). What has not been known is how the size of the later reward may contribute to patience via its influence on wait time perception. To examine this, I construe intertemporal settings in spatial terms, following prior research on space-time mapping (Boroditsky and Ramscar 2002; Hernandez 2001; Kim, Zauberman and Bettman 2012).

I construe a larger-later reward as a "destination" available after traversing the "distance" of wait time. It is known that physically larger destinations contract perceived distances, such that larger objects seem closer than smaller ones (Sousa et al., 2013), and a journey seems shorter when the destination appears to be geographically larger (e.g., one's home location; Raghubir et al., 2010). Thus, even when the objective spatial distance remains constant, larger physical destinations seem closer. Similarly, I propose that even when the objective temporal distance remains constant, larger rewards should seem closer. This suggestion also makes intuitive sense. Because people are usually willing to wait longer for a reward that is large rather than small, an identical wait time should be perceived as shorter in the context of a larger reward. What I argue is that this influence of reward size is moderated by the frame of the wait time—the influence is stronger when the frame is *far* rather than *long*.

The frames of *far* and *long* are used interchangeably by lay people as well as researchers who gauge time perception. However, research on semantic framing suggests that similar words may not evoke similar judgments (Fillmore 1976; Patrick and Hagtvedt 2012). I argue that even though both *long* and *far* denote time perception, the word *far* (vs. *long*) is paired more frequently with destination-related words. A consequence of frequent pairings is that evoking one concept makes the other one salient, which then receives a higher weight in judgments (Anderson and Bower 1973; Collins and Loftus 1975; Fiske 1980; Srull and Wyer 1979). Thus, changes in destinations should matter more when wait time is viewed using a *far* (vs. *long*) frame. Specifically, when the size of the later reward is increased, the same time should seem more contracted in the *far* (vs. *long*) frame. Because time contraction increases patience (Kim and Zauberman

2009; Zauberman et al. 2009), the consequent increase in patience should be stronger in the *far* (vs. *long*) frame.

The above ideas are supported in six laboratory studies. In Implicit Association Tests, first using general words related to distance and destination (study 1), and then using words related to intertemporal settings (study 2), I observe that destination is associated more with *far* (vs. *long*). In the next four studies, I observe the consequences of this association. In study 3, using *long* and *far* questions of the type that have been used in prior research on time perception, I find that the *long* frame is immune to whether a destination is absent or present, but a *far* frame is sensitive to it. Following this, study 4 shows that a *long* frame is immune to the size of a destination, but a *far* frame is sensitive to it such that time perception is contracted when the destination is much larger (vs. larger), which leads to higher patience. Study 5 complements studies 1 and 2 (that showed implicit association of far with destination) by showing that even explicit mentions of destination are higher when sentences are constructed using *far* (vs. *long*). Study 5 also complements studies 3 and 4 (that relied on *far* and *long* questions used in prior research) by showing that a *far*-*long* manipulation unrelated to the intertemporal task yields the same predicted results. Finally, study 6 adds to previous studies in two ways. It provides support in a product rather than monetary setting, and it manipulates *far* versus *long* independently, while showing mediation via a different time-perception measure. Thus, my results are robust across different settings. Implications arise for both theory and practice.

2.12.2 THEORETICAL IMPLICATIONS

Semantic framing. Because of subtle differences in meaning, similar words are associated with different associations. For instance, *I don't* (vs. *I can't*) is associated more with personal empowerment, *I think* (vs. *I feel*) with cognitive mindset (Mayer and Tormala 2010), *anytime between* (vs. *only between*) with freedom (Cheema and Patrick 2008), and *last* (vs. *next*) with savoring (O'Brien and Ellsworth 2012). Although both *long* and *far* denote time perception, I show that *far* (vs. *long*) is associated more with destination, which yields different consequences.

My results open the door to further research on semantic frames of time. For instance, I conducted my research with American participants who often think analytically (Nisbett et al. 2001). When people think holistically, as they do in Eastern cultures, it is possible that the destination is taken into consideration irrespective of whether the frame is *far* or *long*. Alternatively, it is possible that *far*, or its equivalent in a different language, is employed more often in Eastern (vs. Western) cultures. Such differences in semantic framing may contribute to the patience differences observed between Easterners and Westerners (Chen, Ng, and Rao 2005). There may also be other semantic-framing differences in time perception and patience beyond *far* and *long*. For instance, the phrases "2 days from now" and "in 2 days" may have different consequences if the word "now" increases the salience of the smaller-sooner option available in the present, making people more impatient.

Future research could also examine broader implications of the semantic frames that I studied. I focused on how different frames evoke a differential focus on the

destination, with consequences for patience. It would be interesting to examine if such a differential focus on destination evokes broader differences in mindset that apply to unrelated contexts. For instance, after using a semantic frame of *far* (vs. *long*) in an intertemporal setting, perhaps individuals would carry over a "destination" mindset to unrelated domains. Moreover, maybe the persistent use of such destination mindsets (e.g., for people who frequently use the word *far* rather than *long*) correlates with a greater awareness of the destination to which one is headed, either physically in space, or metaphorically in life.

Time perception and patience. Patience relates to self control and many important life outcomes such as those related to social, health and financial well being. For instance, children who are willing to wait for two marshmallows while forgoing a single marshmallow available sooner (Mishchel and Ebbesen 1970) may eventually have better life outcomes such as better scholastic performance, and higher social and cognitive competence (Mischel, Shoda, and Rodriguez 1989). Similarly, if retirees were patient and did not avail of the smaller social-security checks available sooner, they would enjoy larger checks later (Thaler and Shefrin 1981). Fundamental to such patience is how wait time is perceived (Kim and Zauberman 2009; Zauberman et al. 2009). That is why extensive research has been conducted on how patience may be influenced by time-related factors such as the additivity of time intervals (Read 2001; Scholten and Read 2006), the fragility of time (Ebert and Prelec 2007), the humanness of time (May and Monga 2014), and the descriptions of time intervals (LeBoeuf 2006; Monga and Bagchi 2012; Zauberman et al. 2010); as well as extraneous factors such as sexual cues (Kim and Zauberman 2013), and emotions such as awe (Rudd, Vohs and Aaker 2012). I contribute

to this literature on these factors by showing the influence of a factor that is embedded in time perception itself: the frame used to view time. I show that *far* (vs. *long*) frames promote a reliance on destination.

At a broader level, my results contribute to the mapping between space and time (Boroditsky and Ramscar 2002; Hernandez 2001; Kim et al. 2012). Prior research has not examined how the size of the "destination" may influence the "distance," but it is known that the two may be related. For instance, the perceived temporal distance of a reward can change its cognitive representation, with implications for patience and declining impatience (Malkoc and Zauberman 2006; Zauberman and Lynch 2005). This relates to the construal-level literature connecting distance and destination, showing how a larger temporal distance leads to events being viewed more abstractly (Trope and Liberman 2000; 2003). There is also evidence on the reverse relationship: the construal of the destination changing perceived temporal distance. Specifically, in the context of the time taken to start tasks, it has been shown that thinking of a task more abstractly elongates the estimated time till the start of the task, but may shrink it in some cases (Liberman et al. 2007; Siddiqui, May, and Monga 2014). Apart from construal, other features of destinations also influence perceptions of distance. For instance, fluent destinations appear closer than disfluent destinations do (Alter and Oppenheimer 2008), and time intervals ending in losses appear shorter than those ending in gains (Bilgin and LeBoeuf 2010). I contribute to this research by showing that the perception of distance may be a function of the size of the destination, particularly when the distance is viewed in terms of *far* (vs. *long*).

Although I do not vary duration in my settings, my results connect to duration neglect as well (Fredrickson and Kahneman 1993). Future research could explore whether one reason for duration neglect is a shift in attention from duration to the outcome available at the end of the duration. That is, if people give more weight to destination in *far* (vs. *long*) frames, could it lead to a greater duration neglect? Moreover, given that increasing the familiarity of a duration aids its consideration, and reduces duration neglect (Morewedge et al. 2009), it would be interesting to examine if the familiarity of a destination aids its consideration, and actually exacerbates duration neglect.

Constructive intertemporal preferences. An extension of the discussion in the previous paragraph is that measures of time and patience may not simply reveal the thoughts in individuals' minds, but aid in the construction of these thoughts (Payne et al. 1992). It is known that the way a question is framed determines what receives consideration in judgments and decisions. For instance, a purchase-intent measure does not simply reveal intent, but increases the consideration of purchase-related thoughts (Fitzsimons and Morwitz 1996; Levav and Fitzsimons 2006; Morwitz, Johnson, and Schmittlein 1993). I propose that the destination—the later reward—receives higher consideration in *far* (vs. *long*) frames. This finding is particularly significant given that these two frames are commonly used in questions used to gauge time perception. Researchers sometimes measure time perception using *long* frames (Bilgin and LeBoeuf 2010; Kim and Zauberman 2013; Kim et al. 2012; LeBoeuf 2006; Haddock 2004; Miller et al., 2008), and sometimes using *far* frames (Ross and Wilson 2002; Zhang and Wang 2009; Wilson and Ross 2001; Peetz, et al.,2007; Lu and Chang 2009; Lam and Buehler

2009; Wilson et al. 2012; Wohl and McGrath 2007; Jiga-Boy et al. 2010). In these two frames, I show that time perception, and consequently patience, may be constructed differently. The *long* and *far* questions may not be simply revealing how, say, 3 months are perceived by individuals; they may be revealing the perception that individuals construct after considering not only the 3 months, but also the reward that is waiting in the end.

Future research could explore how this notion of constructive time perception may extend to the domain of goals. While my focus was on a destination in intertemporal settings, one can broadly think of destinations simply as goals that one is trying to achieve. It is possible that, when faced with a goal, a question pertaining to it actually constructs the motivation to achieve the goal. Consider the goal gradient hypothesis, which posits that as the completion of a goal seems closer, the harder one will work to attain the goal (Kivetz, Urminsky, and Zheng 2006). When people are asked to think of a goal in terms of *far* (vs. *long*), they might be more likely to consider how desirable the goal is—a more desirable goal will likely seem closer, making it more likely that individuals will work hard to attain it.

2.12.3 PRACTICAL IMPLICATIONS

The key finding from my studies is that individuals are more sensitive to changes in later rewards of money (e.g., study 4) or products (e.g., study 6), when the frame used is *far* (vs. *long*). As the later reward improves, the perception of wait time improves and people become more patient, when the wait time is framed in terms of *far* (vs. *long*).

The above finding can be applied by managers and public-policy makers keen on highlighting a destination. Consider young adults for whom retirement is many years away, and who often do not have the patience to wait till retirement to withdraw funds. Public-policy makers, as well as benefits-management firms, should make such adults think of the time till retirement using a *far* (vs. *long*) frame. This would make them more sensitive to the large reward available at retirement, and induce patience. In a similar vein, consider an article trying to persuade people to delay retirement (US News and World Report 2012) with the headline: "How long should I work before retirement?" A headline of "How far should your retirement be?" would have been more persuasive in highlighting the benefits of delaying retirement.

Another interesting perspective relates to conveying perceived progress made by a company. The automobile company BMW has a video series that shows the history of various models, demonstrating the progress that has been made from the mid 1900's till today. Here, the present model is the destination that BMW has arrived at. My research would suggest that a far frame (e.g., "look how far we have come…") would better highlight the contrast of the present model from its predecessors versus a long frame (e.g., "we've come a long way…"). Similarly, a bank manager may want to provide a contrast between the current pot of money and the much larger pot that would be available, to make customers more patient. Even in this case, the use of *far* (vs. *long*) would be more appropriate to convey the attractiveness of the destination.

My findings can also be applied by those who would like to take focus away from the destination. For instance, online stores such as Amazon derive income when consumers pay more for expedited (vs. standard) shipping. Thus, the goal is to make

consumers impatient. If managers use a *far* (vs. *long*) frame, consumers buying desirable products might think of the wait time as minimal ("This wait time is nothing given what I am getting"); they might just stay with standard shipping. A *long* (vs. *far*) frame would be helpful in drawing attention away from the desirable destination, making it more likely that consumers will pay extra for expedited shipping. Such a strategy might also be useful when the destination is unattractive, such as when consumers are expecting a price increase. For instance, the streaming content company Netflix recently announced that prices would increase for existing members, but not immediately. To keep focus away from the undesirable destination of higher prices, the company would do well to state that there is a *long* time till the price increase is implemented, rather than say that the price implementation is *far*.

2.12.4 CONCLUSION

In intertemporal settings, patience is known to be influenced by the size of the later reward relative to the sooner one—a much-larger (vs. larger) later reward induces more patience. I show that this effect is moderated by the frame of wait time. Specifically, it is more evident in a *far* (vs. *long*) frame—as the later reward improves, people become more patient because the perception of wait time improves. My results have implications for research on semantic framing, time perception and patience, and the constructive nature of intertemporal preferences. They also offer guidance to managers and public-policy makers who sometimes want people to focus on the destination but, at other times, want to take focus away from the destination.

ESSAY 2 FIGURES

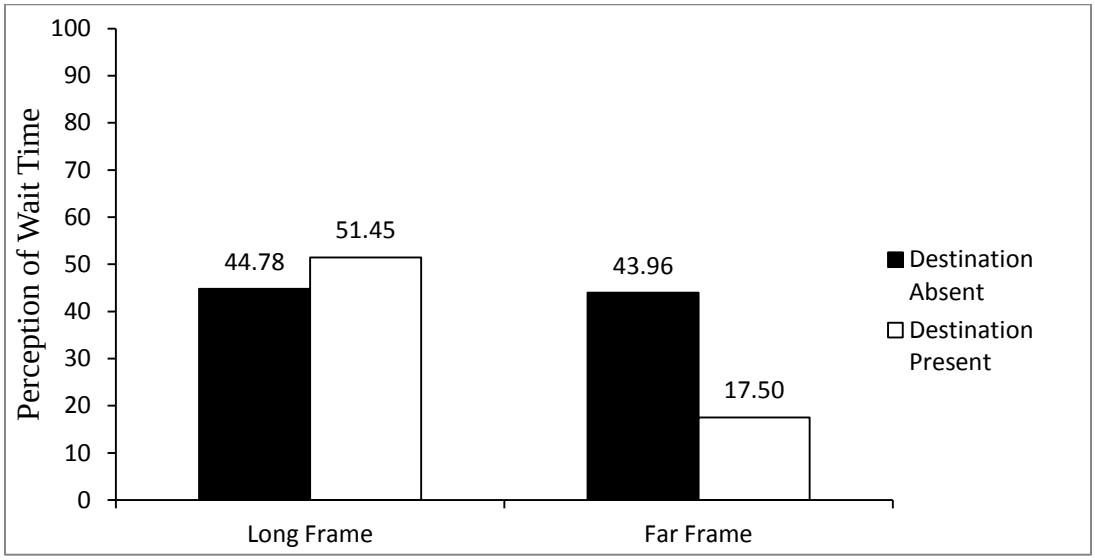
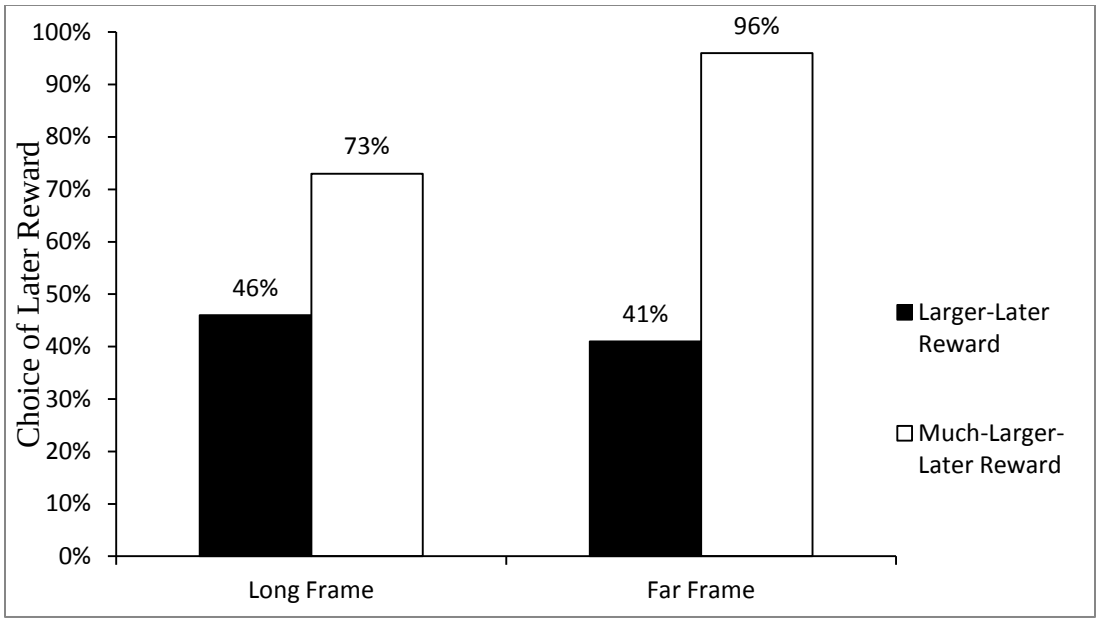


Figure 2.1: Time perception as a function of frame and destination

Panel A: Choice of Later Reward vs. the Smaller-Sooner Reward



Panel B: Time perception

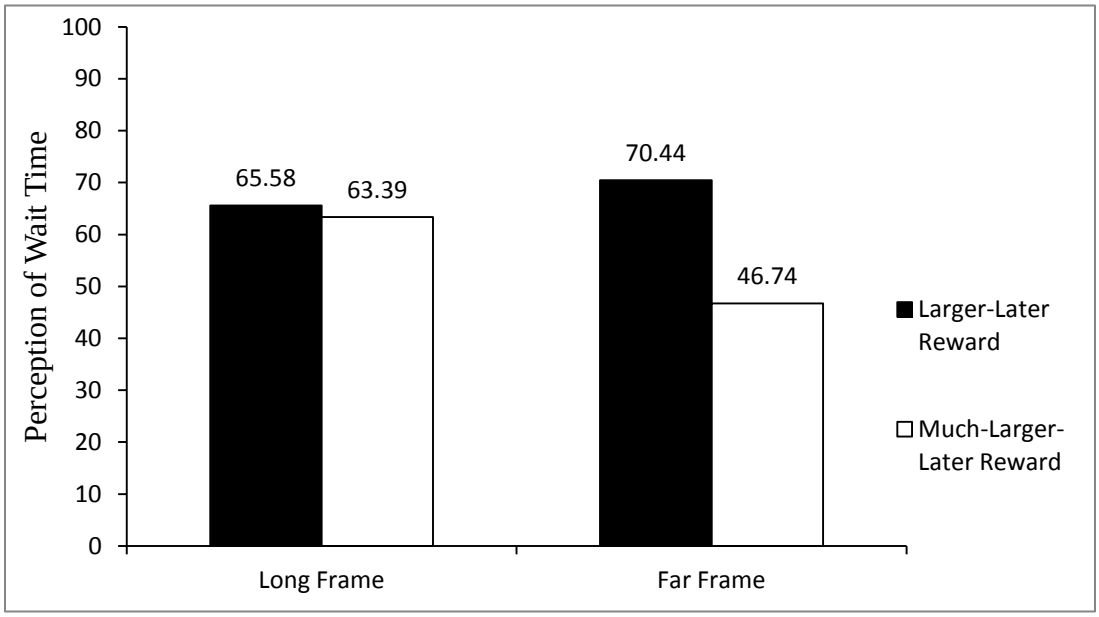


Figure 2.2: Choice share and time perception as a function of frame and destination

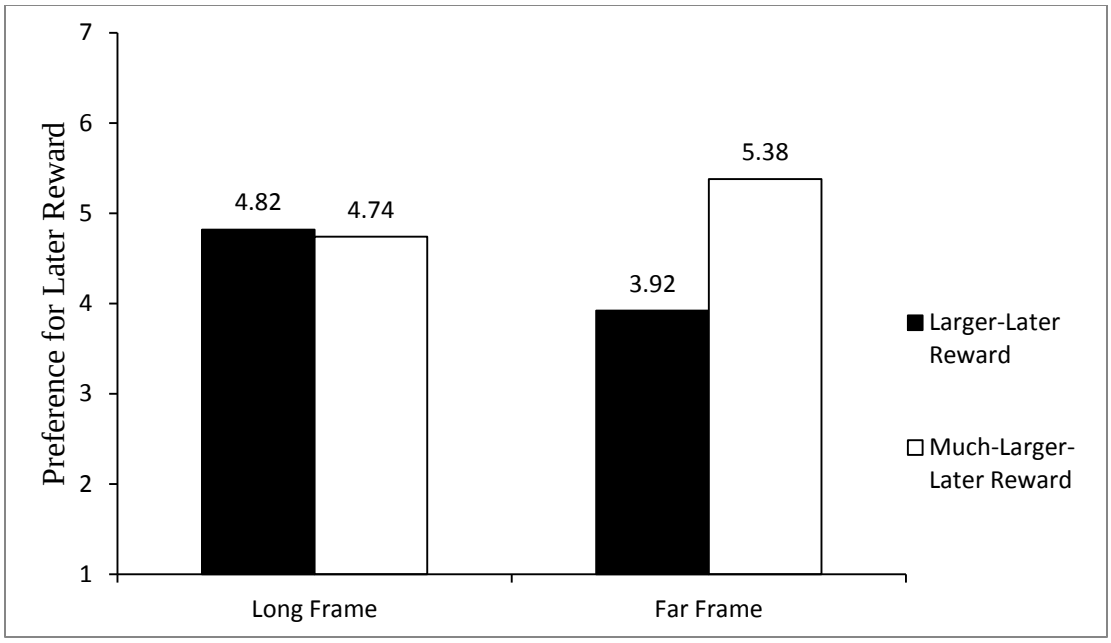
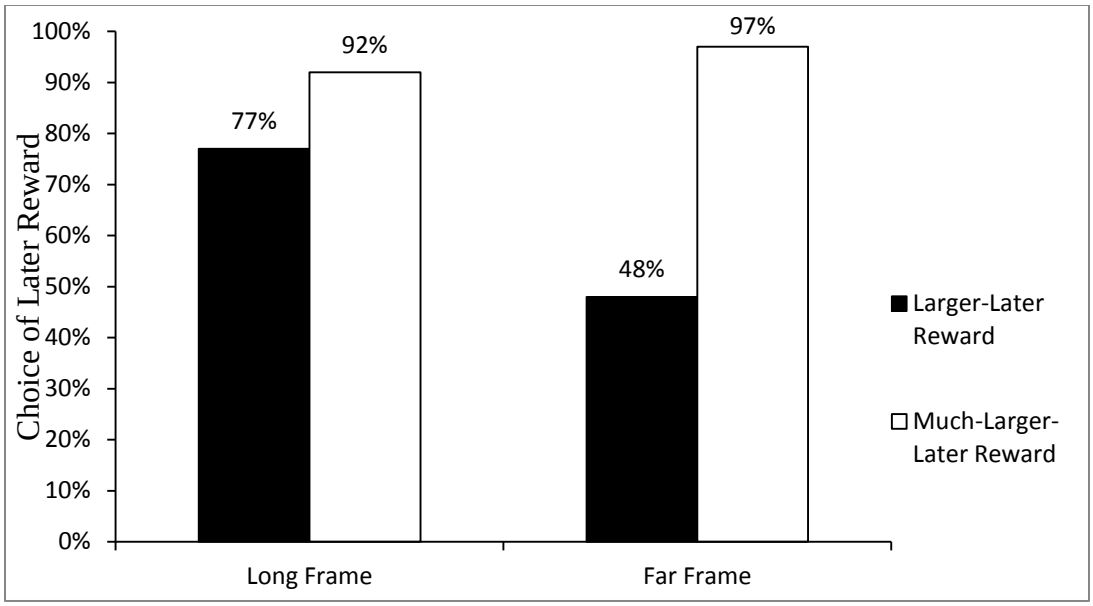


Figure 2.3: Preference for larger later reward as a function of frame and destination

Panel A: Choice of Later Reward vs. the Smaller-Sooner Reward



Panel B: Time Perception

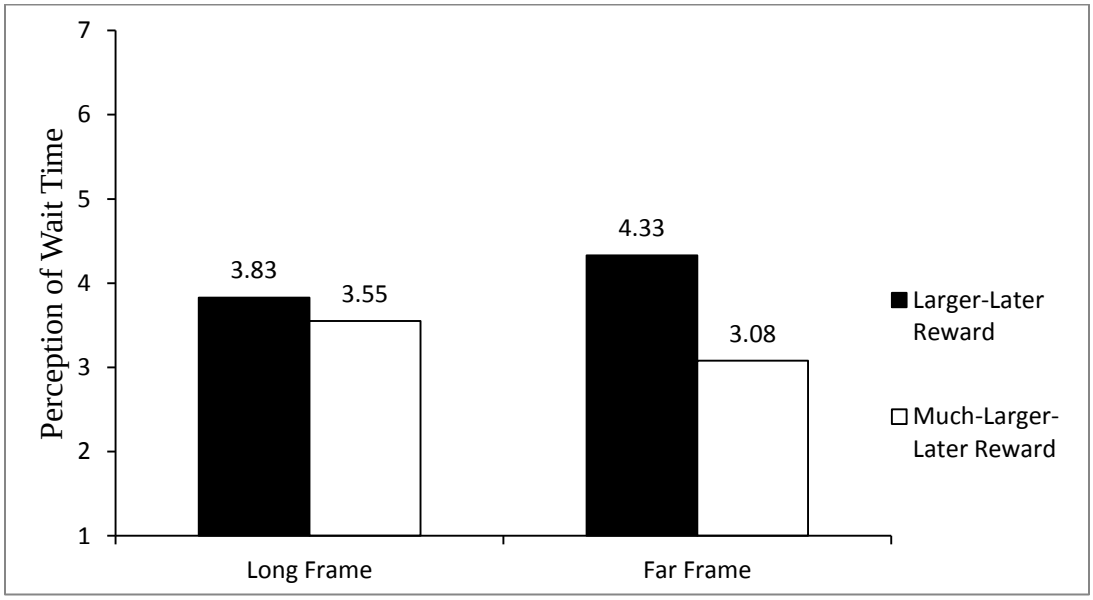


Figure 2.4: choice share and time perception as a function of frame and destination

CONCLUSION

Little research exists on how the properties of time itself can affect perceptions of time and consequently patience, or the ability to forgo a smaller reward in the present in order to wait for a larger reward in the future. Moreover, the research that does exist explores how the quantitative properties of time can affect time perceptions and patience. Given the multifaceted nature of time, there exists a gap regarding what is known regarding how the qualitative properties of time may affect time perceptions patience. In two essays, I attempt to fill this gap by examining two qualitative properties of time: anthropomorphic and linguistic properties.

In the first essay, I introduce time anthropomorphism: a tendency to attribute time with humanlike mental states (e.g., time has intentions; it has a will of its own). In introducing this novel concept, I find novel consequences: the anthropomorphism of time decreases patience, but only for those who are low in power. That is, low power (but not high power) individuals perceive wait time to be more aversive when anthropomorphized, leading to impatience. In the second essay I investigate how linguistic properties of time affect patience. Prior research has shown that time is metaphorically linked to physical space. Subsequently, individuals use spatial terms such as “long” and “far” when describing temporal distances (e.g., “How long…?” or “How

far…?"). My evidence suggests that the words "long" and "far" have different associations, and that their use may lead to different effects on patience levels.

Contributions emerge at both the individual essay level as well as the overall dissertation level. In essay 1, I introduce time as a consequential anthropomorphic entity, present novel effects on intertemporal preferences, and delineate a potency process for power. In essay 2, I demonstrate that the words "far" and "long" have different associations, show that the framing of time can affect perceptions of time and patience levels, and provide evidence for the constructive nature of patience. At the dissertation level, I contribute to the literature on time perceptions and patience. While prior research in this area has focused on how the *quantitative* properties of time can affect time perceptions and consequently patience, I examine how the *qualitative* properties of time may do so. Thus, this dissertation fills a gap in the literatures of time perceptions and patience by explicating the effects of two qualitative properties of time—anthropomorphic and linguistic.

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