How decision-making processes shape both our choices and our reputations

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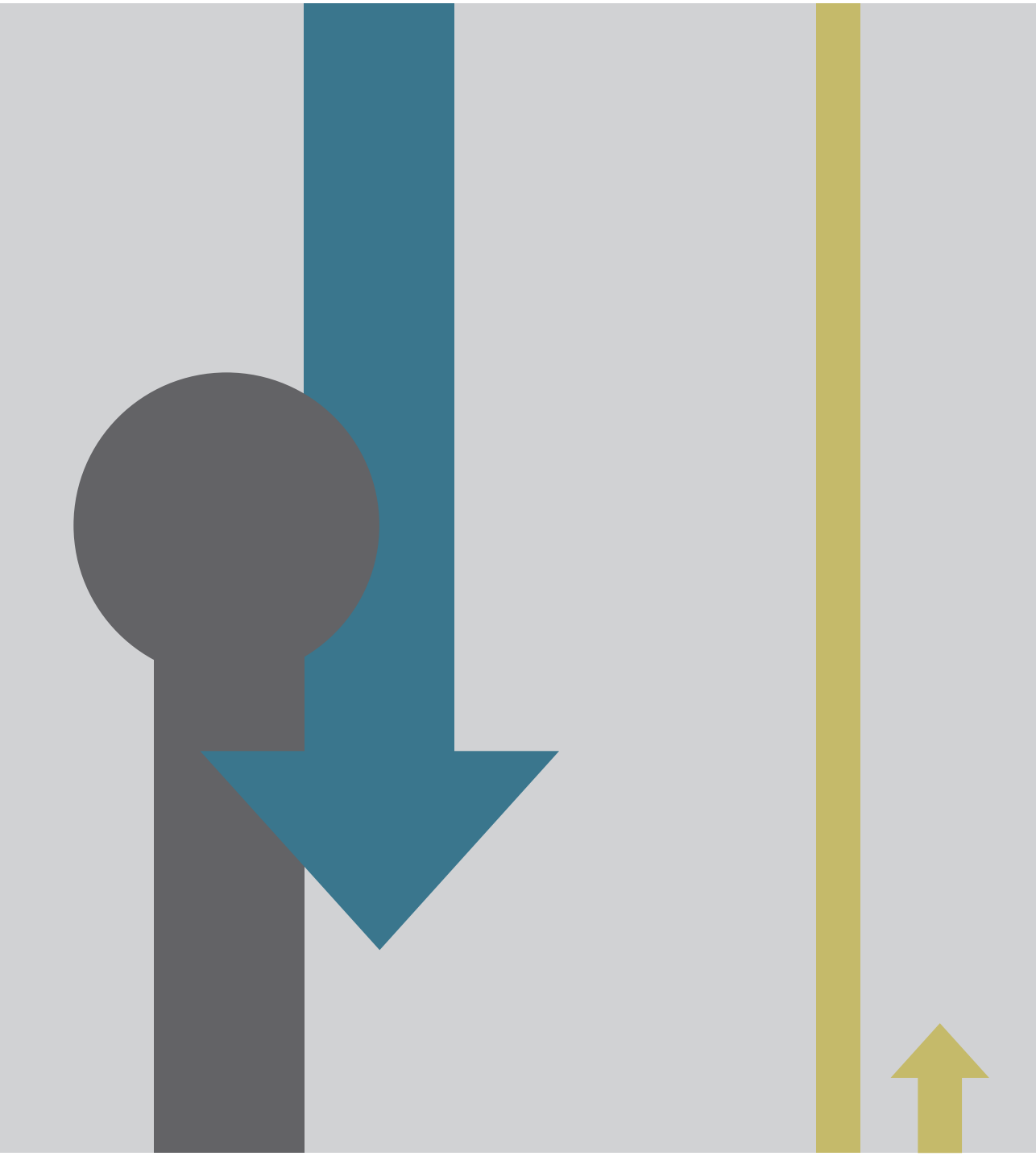

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CHAPTER 1.

Introduction

How Decision Processes Shape Both our Choices and Our Reputations

"We make our decisions, and then our decisions turn around and make us."
- F.W. Boreham

Decision-making is at the core of our daily lives. Whether it is deciding what to have for breakfast, which political party to vote for, or even accepting a postdoc position, we face both big and small decisions every day. Many of these decisions involve making trade-offs between all of the attributes of the options presented to us. In other words, people need to consider all available options and decide if it is worth forgoing the benefits of one option in favor of the benefits of an alternative option. For example, are the benefits of accepting a post doc position in England worth the challenges associated with moving to a new country? In my case, the answer is yes. The way we go about evaluating these choice options and deciding which trade-offs are worth making is called decision processing.

Our understanding of decision processing has evolved over the decades from strictly computational models from economics to models incorporating what we know from cognitive psychology about perception, attention, and memory. Traditional computational models assume that people engage in a simple mental calculations, evaluating the expected utility of each choice option and then picking the option with the highest utility (Von Neumann & Morgenstern, 1944). Later models described these mental calculations with ever more mathematical complexity, ranging from modifications of expected utility models to prospect theory (Kahneman & Tversky, 1979), and many more (for an overview see Oppenheimer & Kelso, 2015). While the underlying assumptions of all of these models differ, their foundation lies in the assumption that all relevant information is available to the decision maker at the time of making the decision. For example, when evaluating the decision of whether or not to accept a postdoc position, computational models will incorporate all available information about this choice, ranging from research opportunities, salary, friendly colleagues, and much more. The way in which this information is weighed and incorporated into the respective model is where these models diverge.

The question then arose of whether all this information is indeed available to decision makers to begin with and, if so, whether all information is actually used in the decision-making process. Drawing from the cognitive psychology literature, perception, attention, and memory processes were investigated to gain a better understanding of this information acquisition and how information is processed during decision-making. This led to a paradigm shift in the decision-making sciences with a focus on models that incorporate these cognitive processes (Oppenheimer & Kelso, 2015). As such, descriptive models of how information is

gathered, stored, integrated, and retrieved during decision-making have become central to understanding decision-making, as opposed to the more traditional normative models.

The focus of this dissertation is two-fold: In the first section of my dissertation, I apply an information processing approach, specifically focusing on memory retrieval processes, to understanding how and why people make choices in favor of a status quo in different decision-making contexts. For example, are you more likely to purchase the smartphone that a salesman placed in your hand or a smartphone of a brand to which you are loyal? My approach not only allows choice predictions but also acts as a diagnostic tool to help identify which pieces of information ("cues") are most influential when making decisions. This research shows that understanding memory retrieval processes can help us understand why decision makers sometimes make biased choices that would not be predicted based on rational computational models of decision-making. This research also finds that, by changing how these processes take place, we have the potential to change the choices that people make.

Information processing models of decision-making show that our thoughts can affect our choices. In the second section of my dissertation, I focus on how these thoughts can, in turn, shape our reputations. In studying this, I move away from the internal experience of the decision maker and shift towards observations of the decision maker by third parties. I test how making others aware of your decision processing changes how they view you as a person. The idea here is that observers use information about decision processing as a sort of window into the decision makers mind to infer whether the decision maker is a good or bad person. For example, does informing friends and family that I was conflicted about whether or not to accept a postdoc position influence how intelligent or sociable they believe me to be? In the context of moral decision-making, I examine how sharing information that highlights how the decision maker processed the decision can affect how favorably or unfavorably an observer judges them. In summary, my dissertation research focuses on how we process information from memory to *"make our decisions"* and then on how allowing others to glimpse these processes lead *"our decisions [to] turn around and make us."*

Section 1: We Make Our Decisions

The Status Quo Bias

In the first section of my dissertation, I focus on the decision processes that lead people to make choices in favor of the current state of affairs, the status quo (Samuelson & Zeckhauser, 1988). This preference for the status quo can come in many forms: buying the brand of chocolate you usually buy even when other (potentially tastier) flavors are on the market; voting for the political party you have always voted for, even when they support a policy you may disapprove of; taking the same route to work every day, even when a shorter route may be available. In some cases, it is rational to keep things the way they are rather than opting for change that can come with unknown risks. However, in many cases, people will opt for the choice option that is in favor of the status quo, even when it is not rational to do so. In fact, just labeling (Bar-Hillel & Neter, 1996; Moshinksy & Bar-Hillel, 2010) or framing (Crandall, Eidelman, Skitka, & Morgan, 2009) one choice option as the status quo, will significantly increase choices or preferences in favor of that option. This phenomenon is called the status quo bias (for an overview see Eidelman & Crandall, 2012).

Many prominent effects in the social sciences can be classified as biases in favor of the status quo. For example, default effects (Dinner, Johnson, Goldstein, & Liu, 2011), the endowment effect (Kahneman, Knetsch, & Thaler, 1990; Moshinksy & Bar-Hillel, 2010), system justification (Jost, Banaji, & Nosek, 2004), existence bias (Eidelman, Crandall, & Pattershall, 2009) are all examples where people prefer the status quo over alternatives. Although each of these differ from each other, for example by focusing on action vs. inaction or supporting current political systems, the assumption across all of them is that people tend to value, prefer, and even choose the current state of affairs over alternatives. A plethora of reasons why people exhibit status quo biases have been proposed. These include the status quo reflecting a recommendation by some authority, maintaining a status quo being effortless, and the loss aversion and regret associated with change (Inman & Zeelenberg, 2002; Johnson & Goldstein, 2003; Moshinksy & Bar-Hillel, 2010). Generally speaking, the status quo bias is considered to result from fast and frugal heuristic decision-making style (Gigerenzer & Gaissmaier, 2011; Gigerenzer & Goldstein, 1996). The question arises of what cognitive processes underlying this decision-making style lead to a preference in favor of the status quo. In other words, does the way that we process the information provided to us when deciding in a fast and frugal state of mind predispose us towards making a choice in favor of the status quo?

Query Theory: Sequential Memory Retrieval Predicts Choices

When we make decisions or form preferences, we retrieve relevant information from memory (Weber & Johnson, 2006). Query theory (Johnson, Häubl, & Keinan, 2007) posits that we retrieve this decision-relevant information by posing queries, or evaluative questions, to ourselves in a sequential order. For example, when deciding whether or not to accept a postdoc position, I may first think about the research opportunities associated with the position, next the increase in salary, next that I will need to move to another country, and so on. This retrieval process can happen both consciously or unconsciously. Due to output inference (Anderson, Bjork, & Bjork, 1994; Anderson & Spellman, 1995), earlier queries inhibit the retrieval of later queries, leading these earlier queries to be richer and weighted more heavily in the decision-making process. As such, earlier queries are more predictive of our preferences and choices than later queries. In other words, first thinking about the positive research opportunities associated with the postdoc positions means that this first query is more likely to predict my final choice, suggesting I will most likely accept the position. Using query theory, I not only can understand the underlying information retrieval processes that shape people's choices, but I can also predict their choice by measuring which information they retrieve earlier in the memory retrieval process.

Query theory also specifically highlights that different response modes lead to differences in memory retrieval order. In other words, response mode is dependent on which information in the decision context acts as a reference point for the decision maker; which in turn becomes their status quo. As such, information regarding the current state of affairs is more likely to be salient to the decision maker and thus retrieved earlier. In both Chapters 2 and 3, I find that this is indeed the case in both a political and consumer decision-making context. People are more likely to first think of the options that represents their status quo.

It should be noted that query theory only specifies that information about a status quo is more likely to be salient to the decision-maker, retrieved earlier in the memory retrieval process, and therefore predict preferences. Query theory does not speak to *why* and *how* status quo information is considered to be more salient. How information becomes salient is most likely better captured by other decision processes models, specifically those focusing on information sampling and storage, than that of information in memory. Nonetheless, query theory is of particular interest to decision scientist because it allows for the opportunity to change preferences and choices. Since the order in which we retrieve information from memory shapes choices, altering query order should change choices. Using this method, query theory has been applied successfully to eliminate the endowment effect or produce it in the absences of ownership (Johnson et al., 2007). Additionally, altering query order can mitigate default effects (Dinner et al., 2011) and eliminate asymmetry in discounting of delayed vs. accelerated consumption (Weber et al., 2007). In the second experiment reported in Chapter 2,

I was able alter preferences for political candidates by altering query order, finding that query theory can also be used successfully to attenuate a well-known status quo bias in political decision-making known as the incumbency advantage.

Which Cues Drive Memory Retrieval Processes?

Query theory specifies that information about the status quo is most salient to decision makers, which is why it will be retrieved earlier than information about other alternatives. Because the status quo, or the current state of affairs, consists of many moving parts, it is hard to determine a priori which information in a decision context represents the most relevant cue of the status quo. For example, my chocolate eating status quo is informed by multiple cues. Living in the Netherlands, I have come to appreciate and habitually purchase the brand Tony's Chocolonely. However, when standing in the supermarket holding the bar of Tony's Chocolonely, I realize that my favorite Swiss brand Lindt is also available for purchase. In this case, which cue is most salient to me, my purchasing habits or my brand preference? Which cue represents my "current state of affairs"? In Chapter 3, I use query theory as a diagnostic tool to determine which cue is most salient to decision makers in a consumer context.

My experimental work shows that a query theory approach can be used to understand the memory retrieval processes resulting in status quo biases in a variety of decision-making contexts. Perhaps the greater contribution of these experiments is that they provide evidence that the inclusion of different (potentially relevant) decision cues can shift decision makers response modes: Query orders shift towards the most salient cue for the decision maker and thus choices also shift. In other words, I have used a query theory approach to change choices by including previously established strong cues into the decision-making context that override status quo information (Chapter 2). Additionally, I have used query theory as a diagnostic tool to determine which cues are most salient to decision makers (Chapter 3). Knowing this information provides choice architects with a tool to override status quo effects by including stronger cues into the decision-making context, thus shifting choices without changing decision processing. In Chapters 2 and 3, I explore how the inclusion of various cues into the decision-making context can affect choices, shape memory retrieval orders, and help us understand what is most salient to decision makers.

Section 2: Then Our Decisions Turn Around and Make Us

The way that we process information while making a decision predicts which choice we make. Understanding decision processing may not only be useful for predicting and understanding decisions, but also judging decision makers. When we know how someone goes about deciding, we may learn more about them and what considerations are important to them. As social beings with a fundamental need to belong (Baumeister & Leary, 1995), we are constantly on the lookout for information that can help us determine which people will make kind and trustworthy cooperation partners. In other words, we want to know which people we should keep in our lives and which we should avoid. Decision processing information may give us insight into the values and motives of decision makers.

A Person-Centered Approach to Moral Decision-making

In the second section of my dissertation, I study the effects of providing third parties with decision processing information of moral decision makers. Moral decisions provide a particularly interesting context in which to judge the effects of decision processing on reputation. Traditionally research on moral decision-making has focused on the decisions themselves, for example, the permissibility and acceptability of moral choices (Greene, 2009; Kohlberg, 1969). A newer line of research suggests that observers use the moral decisions, more than any other type, to learn about a person. This person-centered approach to moral decision-making (Uhlmann, Pizarro, & Diermeier, 2015) suggests that moral decisions are practically informative of the motives and values of others, because moral motives provide information about whether someone is out to help us or harm us. Unsurprisingly, much research has shown that we judge people based on the decisions they make. Simply put, if someone makes a moral choice they are perceived to be a good and trustworthy person, but if they make an immoral choice, they are perceived to be a bad person.

Nonetheless, it seems that making inferences about people's moral motives is not as simple as observing if they made the moral or immoral choice. Research suggests that some types of moral decisions are considered to be more diagnostic of the motives of the decision maker than others (Pizarro & Tannenbaum, 2011). This may be particularly true for decision makers who make the moral choices. Contrary to someone who makes an immoral choice, which usually suggests that you had some immoral motives, making the morally correct choice is more ambiguous. In some cases, immoral people make moral choices (Reeder & Spores, 1983) and moral choices can sometimes be perceived to have underlying selfish motives (Critcher & Dunning, 2011). A second reason why moral decisions may not always be informative of character is due to situational factors (Jones & Davis, 1965; Jones, Davis, & Gergen, 1961). Some contexts may promote more moral or immoral decisions compared to others, thus making them less useful for determining the underlying character of the decision maker. For example, if you learn that a thief

stole to feed his family, you may no longer believe the immoral act of stealing is informative of an immoral character.

Moral Trade-Offs: Three Types of Sacred Value Trade-Offs

As described above, when people decide, they need to make trade-offs between the advantages or disadvantages of all choice alternatives. These trade-offs lead to a sort of mental cost-benefit analysis of all the choice alternatives, where the final choice is the option that provides the decision maker with the highest perceived value or utility. However, moral decisions often involve choice alternatives that are resistant to trade-off. Sacred values (for an overview see Tetlock, 2003), also known as protected values (Baron & Spranca, 1997), are religious, ideological, or relational values (i.e., the sanctity of human life, nature, purity, etc.) that are resistant to trade-offs. Following this idea, no amount of money should be enough to sell a child, because human life is sacred and cannot be quantified. In other words, these sacred values take on infinite value to the decision maker, leading them to overwhelmingly choose for the option in favor of maintaining the sacred value. Opting to forgo sacred values is seen as immoral and can illicit anger and disgust from onlookers (Tetlock, 2003).

Different types of moral decisions can be classified by the structure of the sacred value trade-offs the decision maker is asked to make. Three types of sacred value trade-offs have been identified (Hanselmann & Tanner, 2008): 1) taboo trade-offs, in which a secular value (e.g., money) is pitted against a sacred value, 2) tragic trade-offs, in which two sacred values are pitted against each other, and 3) secular trade-offs, which describe trade-offs including no sacred values. In Chapter 4, I test the person-centered approach to moral decision-making in these three different types of moral trade-offs. I assess whether decision processing information, specifically decision time, is indeed more informative for character evaluations than acceptability ratings of choices. I also assess how decision processing information shapes character evaluation's in these different types of moral trade-offs. I am particularly interested in the comparison between moral vs. secular trade-offs in order to provide insight into whether the effects of decision-making processes are equivalent in moral as compared to non-moral domains.

In Chapter 5, I focus on taboo trade-offs, in order to assess the effect of different types decision process information on character evaluations. This specific type of moral trade-off may be particularly suited for testing theories about decision processing effects because of the simplicity of detecting the morally acceptable choice. A large majority of decision makers recognize at a glance what the morally "correct" option is (i.e. the sacred value option, see the manipulation check study in Chapter 4 and its supplemental materials) and therefore should be able to make the decision without much decision processing and deliberation. Consequently, deviations from expected decision processing should be easy to detect and be particularly informative to observers compared to other types of moral decision contexts.

Which Type of Decision Processing is Most Impactful?

Researchers applying the person-centered approach (Uhlmann et al., 2015) to morality have focused on decision processing as a cue of moral motives. The idea is that decision processing lets us glimpse into the mind of the decision maker, giving some additional insight into their motives and character traits. In other words, adding decision processing as a cue in a moral decision is thought to make these decisions more informative of the decision maker's character. For example, if you learn that the thief who stole to feed his family did not think twice before stealing, you may judge him more harshly then if he truly struggled with this moral dilemma. In other words, a lack of internal conflict about committing an immoral act serves as a warning signal. Many different decision processing cues have been used to highlight a decision makers internal conflict or lack thereof (Critcher, Inbar, & Pizarro, 2013; Robinson, Page-Gould, & Plaks, 2017; Tetlock, Kristel, Elson, Green, & Lerner, 2000)

One decision processing cue, used extensively in studies in this context, is decision time. Providing observers with information about decision time affects decision makers' character evaluations. Critcher et al. (2013) found an extremity effect of quick decisions on character evaluations, showing that quick decisions lead to harsher evaluations than slow decision. In other words, if you make the right decision quickly, you are evaluated as more moral than if you made it slowly. Conversely, if you make the wrong choice quickly, you are evaluated as less moral than if you made it slowly. The idea here is that slow decisions are indicative of an internal battle between moral and selfish motives, while quick decisions mean that one of these motives clearly outweighed the other, most likely the one that the decision maker ended up choosing. In this section, I explore how such decision processing cues shape character evaluations in different types of moral decisions (Chapter 4) and which types of decision processing cues are most effective at shaping these character evaluations (Chapter 5).

Throughout the literature on the effects of decision processing information on character evaluations in moral decisions, different types of decision cues have been used interchangeably. The argument is made that any decision process that highlights potential internal conflict or lack thereof functions similarly on (moral) character evaluations. In some cases, different types of decision processing information are even conflated, such as decision time and difficulty or decision time and effort, thus making it hard to determine which type of processing information is driving effects on character evaluations. In Chapter 5, I ask and answer the question of which type of decision processing information is most impactful in shaping character evaluations. This information provides us with insight into which internal processing cues are most informative to make inferences about decision makers and whether all types of communications regarding information processing are equally indicative of battling motives. Finally, it provides some initial advice for researchers and practitioners alike to which information is most useful at strategically shaping reputation.

Overview of This Dissertation

We Make Our Decisions…

In Chapter 2, I apply a query theory approach (Johnson, et al., 2007) to predict, understand, and change the incumbency advantage. The incumbency advantage is a well-known status quo bias in the field of political science; voters prefer a political candidate who is currently in office, the incumbent, over their opponents. Here the status of incumbent acts as the status quo and thus becomes the most salient cue in the decision-making process. Using the premises of query theory, I clarify the underlying cognitive decision-making processes of the incumbency advantage by testing if memory retrieval orders predict preferences for the incumbent.

In the first experiment (N = 256), I replicated the incumbency advantage and showed that participants tended to first query information about the incumbent. In the second experiment (N = 427), I attenuate and boost the incumbency advantage by experimentally manipulating participants' query orders. In the third and final experiment (N = 713), I show that the effects of incumbency status can be overridden by providing participants with a more valid cue: political ideology. Participants queried information about ideologically similar candidates earlier and also preferred these ideologically similar candidates. These findings provide evidence that including new and more relevant cues into the decision-making context can draw decision maker's attention and thus change their query orders. This, in turn, leads to changes in candidate preferences.

In Chapter 3, I apply a query theory approach (Johnson, et al, 2007) in a consumer decision-making context. Specifically, I use query theory to determine which cue is most salient to decision maker when faced with a choice that either pits endowment or previous preferences against each other or combines them. Research on the endowment effect has shown that simply endowing people with a good can increase the salience of the good and make it more likely to be chosen over alternatives. Other research suggest that previous preferences are hard to override and may be chronically accessible to decision makers. Therefore, it is difficult to predict a priori which of these two strong cues within their current state of affairs will drive choices.

In two experiments, I explore the relationship between previous preferences, operationalized as brand loyalty or purchasing habit, and the endowment effect for two different kinds of consumer product, smartphones and soda beverages. Using query theory, I then determine which cue drives decision-making when the cues are either consistent (i.e., endowed with a product in line with previous preferences) or inconsistent (i.e., endowed with a product not in line with previous preferences) with each other. In Experiment 3.1 (N = 202), I find that participants high in brand loyalty are most likely to be influenced by the experimental condition than those low in brand loyalty. In other words, endowment only acts

as the relevant cue for participants who did not already have a strong previous preference. In Experiment 3.1 (N = 486), I find main effects of both endowment and purchasing habits, showing that both cues influence decision-making to some degree. These findings show that the endowment effect, a robust status quo bias, is not completely immune to previous preferences: It can be weakened for people with (strong) previous preferences in favor of an alternative option or boosted for people with (high) previous preferences in favor of the endowed option. To sum up, including more relevant cues into the decision-making context can shift decision-makers choices.

Then Our Decisions Turn Around and Make Us…

In Chapter 4, I compare the unique effects of decision time on character evaluations across the three different types of (moral) trade-offs: taboo, tragic, and routine trade-offs. Using two samples (total N = 1434), I tested the two following questions: 1) whether the effect of decision time differs for evaluations of decisions compared to decision makers and 2) whether moral contexts are unique in their ability to influence character evaluations through decision process information. First, I find that decision time affects character evaluations, but not evaluations of the decision itself. This supports the person-centered approach to moral decision-making (Uhlmann et al., 2015) which implies that decision processing information is more informative of traits than acts. Second, I find that decision time does not affect tragic trade-offs and secular trade-offs differently. In fact, decision time had almost no effect on character evaluations in these types of trade-offs. This suggests that decision processing information may only be useful in situations where there is a clearly superior choice alternative, such as in taboo trade-offs. Overall, the magnitude of the unique effect of decision time shows us that decision time, may be of less practical use than expected. Therefore, I take a closer examination of the processes underlying decision time and its inferences in Chapter 5.

In Chapter 5, I test which type of decision process information is most informative for character evaluations in taboo trade-offs. I hypothesize that decision time is a more ambiguous piece of decision processing information than more direct types, such as difficulty, doubt, or effort, which are often inferred from decision time. More specifically, I predict at more direct cues of decision processing will have a larger effect on competence, warmth, and morality ratings than decision time. This scenario study (N = 871) provided no support for this hypothesis for warmth and morality evaluations. The effect of direct types of process information on warmth and morality evaluations were no different than that of decision time. Observers may use any hint of internal conflict, ambiguous or direct, to make inferences about the decision makers moral motives. However, for competence we found that doubt and (marginally) difficulty had stronger effects on competence ratings than decision time, thus partially supporting our hypothesis. I discuss the possibility that competence ratings may be driven by different inferences derived from this same decision processing information. When the task is to infer competence, decision

processing information is interpreted as cognitive capacity, and thus more direct cues are more informative of this trait.

Modern Science: Transparency, Reproducibility, and Replicability

To combat what has come to be known as the "reproducibility crisis" in psychology (Earp & Trafimow, 2015; Pashler & Wagenmakers, 2012) many efforts have been made to improve the way research is conducted. This has led to a movement towards modern science practices, which put emphasis on transparency, reproducibility and replicability of scientific research (Munafò et al., 2017). In my experimental work presented in this dissertation, I, with the support of my coauthors Mark Brandt and Marcel Zeelenberg, have tried to follow these practices to the best of my ability, even if in some domains a learning curve could not be avoided.

Although power analyses were not always straightforward due to the multilevel nature of some of my experiments, I conducted a-priori power analyses when feasible. In other studies, we report predetermined stopping rules for data collection, which were often based on approximate power analyses (e.g., if we had conducted the experiments described in Chapters 4 with only one scenario instead of multiple scenarios). Additionally, I report all measures included in the experiments, all conditions and manipulations, and all data exclusions (if any).

All data from all experiments have also been made publicly available along with the corresponding materials, analyses syntax, and any supplemental materials. All of these can be found on the Open Science Framework (OSF). In some cases, the data has also been made openly available on other open science platforms such as on the *Judgment and Decision-making* journal website (Chapter 2) or Dataverse.nl. In the later stages of my PhD project, I also preregistered my experiments before data collection (Chapter 5). These can also be found on the OSF. Please feel free to visit my OSF Profile (osf.io/jr9m8) and find any data, materials, preprints, and preregistrations under the projects with the same names as the Chapters of interest.

Before continuing to the empirical Chapters of this dissertation, I would like to inform you that these Chapters were all written as unique articles that have been published or are currently under review at academic journals. Hence, these articles can be read independently. As such, there will be some overlap between these Chapters, especially when explaining the previous research, theories, and relevant constructs. Also, the empirical Chapters are all written in "we" form, because they were all co-authored. I am the sole author of the Introduction and Discussion Chapters which primarily reflect my own opinions and reflections, therefore I use the "I" form in these Chapters.

SECTION 1.

We make our decisions...

2

CHAPTER 2.

Memory Retrieval Processes Help Explain the Incumbency Advantage

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Abstract

Voters prefer political candidates who are currently in office (incumbents) over new candidates (challengers). Using the premise of query theory (Johnson, Häubl, & Keinan, 2007), we clarify the underlying cognitive mechanisms by testing if memory retrieval sequences affect political decision-making. Consistent with predictions, Experiment 2.1 (N = 256) replicated the incumbency advantage and showed that participants tended to first query information about the incumbent. Experiment 2.2 (N = 427) showed that experimentally manipulating participants' query order altered the strength of the incumbency advantage. Experiment 2.3 (N = 713) replicated Experiment 2.1 and, in additional experimental conditions, showed that the effects of incumbency can be overridden by more valid cues, like the candidates' ideology. Participants queried information about ideologically similar candidates earlier and also preferred these ideologically similar candidates. This is initial evidence for a cognitive, memory-retrieval process underling the incumbency advantage and political decision-making.

Keywords: memory retrieval, query theory, incumbency advantage, information processing, political decision-making

Memory Retrieval Processes Help Explain the Incumbency Advantage

Voters prefer candidates who are running for reelection (incumbents) over their challengers (Carson, Sievert, & Williamson, 2015; Cox & Katz, 1996). This incumbency advantage has been established in both federal and local elections (Cox & Katz, 1996) and has grown steadily in the second half of the twentieth century in the U.S., in which a 90% re-election success rate was observed in the House of Representatives (Lee, 2001). Studies have also reported an incumbency advantage in other Western countries, such as Germany (Hainmueller & Kern, 2008) and the UK (Eggers & Spirling, 2014). Most accounts of the incumbency advantage stem from sophisticated analyses of historical election data (Kennedy, Wojcik, & Lazer, 2017) and have also been corroborated with quasi and natural experiments (Ansolabehere, Snyder, & Stewart, 2000; Lee, 2001). This literature paints the following picture: voters tend to vote for maintaining the current state of affairs rather than change. Here, we test how memory retrieval processes involved in preference formation (Weber & Johnson, 2006) contribute to the incumbency advantage.

Current psychological perspectives on the incumbency advantage come in two forms. Both assume that the incumbency advantage is a manifestation of the status quo bias (Samuelson & Zeckhauser, 1988). The first suggests that people heuristically assume that the status quo is good, and likely better than alternatives (Eidelman & Crandall, 2014). The second is more specific and suggests that this heuristic results from loss aversion (Moshinksy & Bar-Hillel, 2010; Quattrone & Tversky, 1988). While these accounts can predict when the incumbency advantage occurs, they remain vague about how this decision is formed.

We take an information processing approach. Building on query theory (Johnson, Häubl, & Keinan, 2007), a memory-retrieval account of the status quo bias and preference formation (Dinner, Johnson, Goldstein, & Liu, 2011; Weber & Johnson, 2006), we examine how the order in which people retrieve information from memory while forming candidate preferences results in a preference for the incumbent. This approach integrates the heuristic perspective with memory retrieval mechanisms proposed by cognitive psychology.

Query Theory: A Memory Retrieval Processes Underlying Preference Formation

Information processing accounts of decision-making focus on how information is sampled, retrieved, and integrated during the decision-making process (Oppenheimer & Kelso, 2015). Query theory (Johnson, Haubl, & Keinan, 2007) makes predictions about how information is retrieved from memory and integrated when constructing preferences (Weber & Johnson, 2006; see Zaller, 1992, for a political science account). It specifies three premises by which this information retrieval and integration process operates. First, people access preference-relevant information by posing evaluative questions, or queries, to themselves in sequential order. Second, salient and accessible information is retrieved earlier, is richer, and more numerous, and thus more heavily weighted in the decision-making process. Third, according to the principles of output inference and retrieval inhibition (Anderson, Bjork, & Bjork, 1994; Anderson & Spellman, 1995; Dempster, 1995), earlier queries interfere with the retrieval of other relevant information. As such, later queries are inhibited and less information is retrieved, leading these later queries have less predictive value than earlier queries.

Query theory has been successfully applied to explain default effects (Dinner et al., 2011), asymmetric discounting (Appelt, Hardisty, & Weber, 2011; Weber et al., 2007), the sunk cost bias (Ting & Wallsten, 2011), and the endowment effect (Johnson et al., 2007). For example, in research on the endowment effect (Kahneman, Knetsch, & Thaler, 1990) sellers endowed with a mug assigned a higher monetary value to the mug than potential buyers. Johnson and colleagues (2007) found that sellers first queried value-increasing information about the mug, while buyers first queried value-decreasing information about the mug. Query order was significantly associated with the endowment effect. A subsequent experiment tested this effect experimentally, finding that reversing query order reduced the endowment effect.

Here we use query theory to investigate the incumbency advantage. Just as endowment acts as a cue in the mug task that prompts memory retrieval (Johnson et al., 2007), we predict the incumbent acts as a cue in political decision-making. Thus, information about the incumbent will be more salient and accessible during the memory retrieval process. This should manifest in two ways. First, people will first retrieve information about the incumbent and only later about the challenger in the memory retrieval process. Second, people retrieve more information about the incumbent compared to the challenger.

Experiment 2.1: Query Order and Candidate Preferences

We first experimentally manipulate incumbency and measure memory retrieval and incumbency support. We expect that people will support the incumbent more than the challenger and query information first and more often about the incumbent compared to the challenger. We report how we determined our sample size, all data exclusions (if any), all manipulations, and all measures for all studies. Sometimes this information is provided in the supplemental materials.

Method

Participants. We recruited 300 participants[1] from the electronic crowdsourcing platform Amazon's Mechanical Turk (MTurk; Buhrmester, Kwang, & Gosling, 2011). After removing participants with duplicate IP addresses, who were not U.S. citizens, or who did not complete the dependent measures, a sample of 256 participants remained (165 men, 91 women, M_{age} = 33.53, *SD* = 11.10).

Materials and procedure. Participants read the description of two mayoral candidates and then listed all the thoughts that passed through their mind while considering which candidate they preferred. Next, they indicated their candidate preferences, coded their thoughts, and provided demographic information. All materials are available on the Open Science Framework.

Candidate descriptions. Participants read descriptions of Greg Nickels and Mike McGinn, who were running for office in the city of Grand Rapids, MI., for at least 12 seconds. Both candidates were described as having relevant experience. The descriptions showed each candidate's slogan, background, leadership experience, and their campaign platform (Figure 2.1).The candidate descriptions were obtained and revised from Eidelman, Blancher, and Crandall (2014). Either Nickels (*n* = 130) or McGinn (*n* = 126) was labelled as the incumbent. Additionally, the content of the descriptions (i.e. if Nickels was from Seattle or Long Island; see Figure 2.1) and the display order (i.e., if they were displayed on the left or the right of the screen) was systematically varied across participants.

Aspect listing. Participants were asked to think about and list all the reasons that passed through their minds while considering which mayoral candidate they preferred, using the aspect listing methodology (Dinner et al., 2011; Ericsson & Simon, 1984; Johnson et al., 2007). After entering their first response in a text box, participants clicked the submit button to bring them to the aspect listing question on the next screen where they could list a second response. This process was repeated until participants indicated they did not have any more reasons to

1 For Experiment 2.1, we aimed for a target sample size of 300 participants to obtain 35 to 40 participants per cell. Using the effect size from Experiment 2.1, we conducted power analyses with 95% power for Experiments 2.2 and 2.3 to estimate the desired sample sizes. The stopping rule and the power analyses are reported in the supplemental materials.

list (*M* = 2.95, *SD* = 0.82, Range [1, 6]). As in previous work (Johnson et al., 2007), responses were limited to 200 characters and participants were not trained in advance.

Candidate preferences. Five items measured participants' candidate preferences (Eidelman et al., 2014): "Who is best-qualified to be mayor?", "Who is most likely to be a good mayor?", "Who is more like the kind of person who should be mayor?", "Who do you prefer to be elected?" and "Who would you be most likely to vote for?". The end-points of the nine-point scale were the candidates and their incumbent vs. challenger labels matching the order the participants read them. For example, in the condition matching Figure 2.1 the end-points read, *Incumbent Greg Nickels* (1) and *Challenger Mike McGinn* (9). All responses were recoded so that higher scores indicated a preference for Greg Nickels, regardless of whether he was the incumbent ($\alpha = .97$). The midpoint of the scale (5) reflected the participant showed no preference for one candidate over the other.[2]

2 Participants also answered two questions regarding their perception of other's candidate preferences. Exploratory analyses for this dependent variable can be found in the supplemental materials.

Grand Rapids, MI is the second largest city in the state. It has a population of approximately 190,000 people and an economy based on health care and manufacturing. Please imagine that you are a long-term resident of Grand Rapids, MI. The candidates' respective campaigns and the result of this election will directly affect you.

Candidate Description

The 2015 Grand Rapids mayoral election will be held in November to elect the mayor of Grand Rapids, MI. Incumbent Mayor **Greg Nickels** is seeking a second term, and is being challenged by **Mike McGinn**.

Incumbent Mayor Greg Nickels	**Challenger Mike McGinn**
"Taking Action, Getting Results"	*"Vote for the Future Now"*
Background: • Born in Seattle, WA • Oldest of six children	*Background:* • Originally from Long Island, NY • Grew up in a family of three
Experience: • Mayor since 2011 • Listed as number 3 in USA Today's "5 Best Mid-City Mayors"	*Experience:* • City commissioner for seven years • Received highest approval ratings of any city commissioner in Grand Rapids' history
• Former legislative assistant to Grand Rapids City Council Member and previous mayor John H. Logie • Served on the board of The Rapid Transit	• Former executive director of the Grand Rapids Great City Initiative • Former head of the Kentwood Community Council
Campaign centers on: • Making homelessness and affordable housing a top priority • Reducing class sizes, modernizing school facilities, and hiring new teachers	*Campaign centers on:* • Increasing access to higher education • Affordable broadband Internet access • Modernizing transportation infrastructure

Municipal elections in Michigan are officially non-partisan.

Figure 2.1. Candidate description displayed to participants in the "Nickels incumbent" condition. The order and content of the descriptions were systematically varied between participants.

Self-coding of aspects. Participants coded the reasons they listed in the aspect listing task, as either in favor or against each candidate (e.g. Dinner et al., 2011; Johnson et al. 2007). Responses indicating that the aspect was "in favor of Greg Nickels" and those "against Mike McGinn" were grouped together, as in a dichotomous choice a reason to vote against McGinn results in a vote for Greg Nickels. Similarly, responses "in favor of Mike McGinn" and "against Greg Nickels" were grouped together.

Query order (SMRD): We measured query order with the standardized mean rank difference (SMRD) score (Johnson et al., 2007). This reflects participants' tendency to list reasons supporting Nickels before reasons supporting McGinn. It is defined as $2(MR_{McGinn} - MR_{Nickels})/n$, where MR = median rank of reasons supporting Nickels or McGinn in the participant's sequence and n = the total number of reasons in the participant's sequence. The SMRD score ranges from -1 (all reasons supporting McGinn were listed before those supporting Nickels) to 1 (all reasons supporting Nickels were listed before those supporting McGinn). For participants who only listed reasons supporting one candidate, the SMRD score was calculated by setting the median rank of the missing candidate to s + 1 and n = s + 1, where s = the total number of reasons listed by the participant. This ensures that such participants received an SMRD score of 1 when they only list reasons in support of Nickels and an SMRD score of -1 when they only list reasons in favor of McGinn.

Query content: Using participants' self-coded responses, we also computed their query content score (Dinner et al., 2011):

$$Query\ Content\ = \frac{(POS_{Nickels} + NEG_{McGinn}) - (POS_{McGinn} + NEG_{Nickels})}{(POS_{Nickels} + NEG_{McGinn}) + (POS_{McGinn} + NEG_{Nickels})}$$

$POS_{Nickels}$ ($NEG_{Nickels}$) indicates the number of positive (negative) reasons for Nickels, while POS_{McGinn} (NEG_{McGinn}) indicates the number of positive (negative) reasons for McGinn. The query content score ranges from -1 (only reasons supporting McGinn) and 1 (only reasons supporting Nickels). Zero indicates that an equal number of reasons were listed for both candidates. The query content score and SMRD were very strongly correlated across all three studies: $r_{Exp.\ 1}(254) = .86$, $p < .001$; $r_{Exp.\ 2}(166) = .77$, $p < .001$; $r_{Exp.\ 3}(711) = .91$, $p < .001$.

Demographics. Participants provided basic demographic information (e.g., age, gender, political ideology) and indicated their familiarity with the city of Grand Rapids, MI, on a seven-point Likert scale from 1 (*not at all familiar*) to 7 (*very familiar*). On average, participants were unfamiliar with Grand Rapids, MI ($M = 2.56$, $SD = 1.66$).

Results

Incumbency advantage. Participants preferred the incumbent, $t(252.43) = 5.87$, $p < .001$, $d = 0.74$[3] (Figure 2.2A). Both candidates benefited from being labelled as the incumbent.

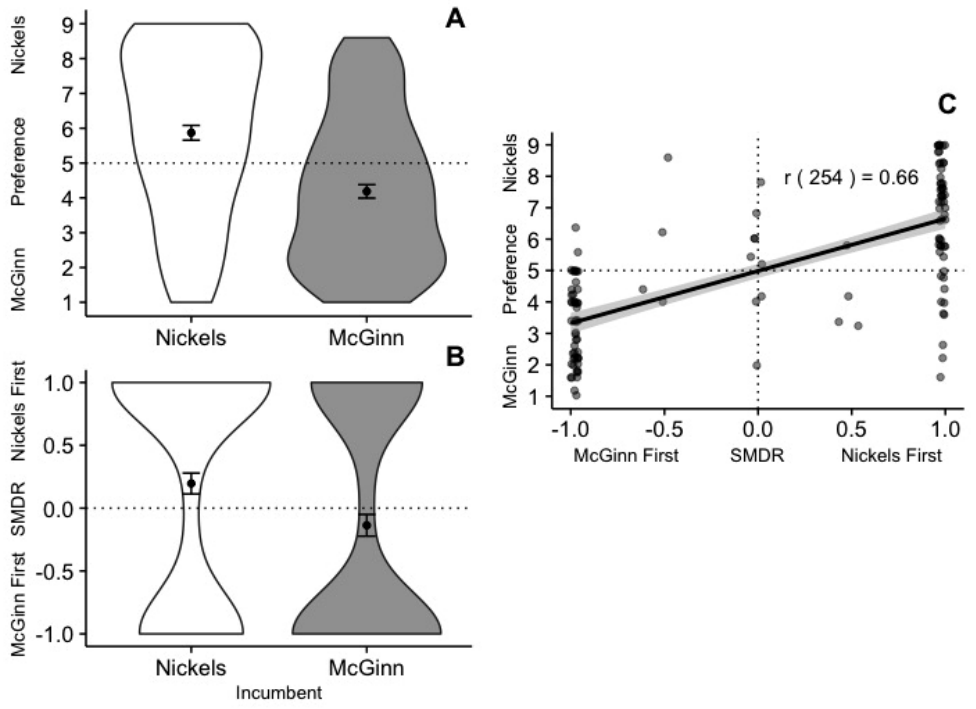

Figure2.2. (A) Violin plots of candidate preferences and (B) SMRD scores for both incumbency conditions. Error bars represent standard errors. The dotted line represents the neutral midpoint of the scale. (C) Correlation between candidate preference (y-axis) and SMRD scores (x-axis). The grey region surrounding the regression line represents the 95% confidence interval.

Query order. As predicted, people queried information about the incumbent earlier, $t(253.28) = 2.78$, $p = .006$, $d = 0.35$ (Figure 2.2B). The SMRD score was significantly higher in the Nickels incumbent condition ($M = 0.20$, $SD = 0.95$) than in the McGinn incumbent condition ($M = -0.14$, $SD = 0.97$). Consistent with the idea that query order is used in preference construction, the SMRD score was also positively correlated with candidate preference, $r(254) = .64$, $p < .001$ (Figure 2.2C). The order in which information is queried from memory is related to preferences and, therefore, also to the incumbency advantage.

3 For all *t*-tests, unequal variances are assumed and Welch's approximation to degrees of freedom are reported.

Query content. Participants also listed more reasons in support of the incumbent, $t(252.64) = 4.40$, $p < .001$, $d = 0.55$. When Nickels was the incumbent, participants listed more reason supporting Nickels ($M = 0.27$, $SD = 0.83$), and listed more reasons supporting McGinn when he was the incumbent ($M = -0.20$, $SD = 0.86$). The tendency to list more queries supporting the incumbent was positively correlated with candidate preference, $r(254) = 0.83$, $p < .001$.

Discussion

Experiment 2.1 provided two key findings. First, we replicated the incumbency advantage in a controlled experimental setting. Second, we measured the memory retrieval processes that may underlie the preference formation in favor of the incumbent. As predicted, participants retrieved information about the incumbent earlier and more often compared to information about the challenger. This provides initial evidence that the incumbency advantage may be due to information retrieval processes that favor the incumbent.

Experiment 2.2: Altering Query Order Alters Decisions

In Experiment 2.1, we found that query order is associated with incumbency and candidate preference. However, it is unclear if information retrieval order also plays a causal role and if retrieval order is separate from query content. Thus, we experimentally alter query order (e.g., Appelt, et al., 2011; Dinner et al., 2011; Johnson et al., 2007) while holding query content constant. We predict that the incumbency advantage will be reduced by asking voters to first query information about the challenger and only later about the incumbent. These earlier queries in support of the challenger should be weighted more heavily and lead to the elimination, or at least an attenuation, of the incumbency advantage. Just as reversing the query order will reduce the incumbency advantage, we also expect that emphasizing the typical query order will enhance the incumbency advantage. By comparing the effects of query manipulations to a neutral condition, a close replication of Experiment 2.1, we can see how these manipulations alter the strength of the incumbency advantage independent of query content.

Method

Participants. We recruited 600 participants from MTurk who did not participate in Experiment 2.1. Based on the same criteria as in Experiment 2.1, 73 participants were removed from the analysis. Additionally, participants who had a query order or query content[4] scores inconsistent with the instructions, showing they had disregarded the instructions altogether, were also removed from analyses (n =

4 28 participants had a correct query order score but an incorrect query content score. Nine of these participants had followed the instructions but incorrectly self-coded their reasons. These 9 participants were not removed from the analysis.

100). A sample of 427 participants remained (224 men, 203 women, M_{age} = 34.33, *SD* = 11.05).

Table 2.1. Number of Participants Randomly Assigned to each Experimental Condition

	Neutral	Emphasizing	Reversed
Incumbent Nickels	97	64	60
Incumbent McGinn	72	67	67

Materials and procedure. Participants followed a link to the survey and were randomly assigned to one of the six experimental conditions (Table 2.1). Materials were the same as in Experiment 2.1 (candidate preference: α = .96; familiarity with Grand Rapids, MI: *M* = 2.56, *SD* = 1.60), unless discussed otherwise.

Aspect listing. Participants in the neutral condition received the same aspect listing instructions as in Experiment 2.1 (see supplemental materials for replication analyses). Participants listed three reasons on average (*M* = 2.93, *SD* = 0.68, Range [0, 5]).

In the emphasizing condition, the participant's query order was emphasized by instructing participants to first list two reasons supporting the incumbent and only later two supporting the challenger. In the reversed condition, we instructed participants to first list two reasons in supporting of the challenger and only later two supporting the incumbent. The instructions for these conditions read: "Please think of a reason why you personally would want to vote for incumbent Mayor Greg Nickels or against challenger Mike McGinn." The order in which candidate names were mentioned in the instructions matched the experimental conditions.

Self-coding of aspects. The instructions and responses were the same as in Experiment 2.1, and included the option to self-code aspects as "*other*"[5]. This response category was added because some participants in Experiment 2.1 commented that the aspects they listed did not fit any of the provided response categories. It is likely that participants reflect on information not pertaining directly to the candidates when forming preferences.

Results

Altering query order alters candidate preference. A 2 (incumbent) × 3 (query order) ANOVA revealed a significant interaction effect of incumbency and query order on personal candidate preference, $F(2, 421) = 4.55$, $p = .011$, $\eta^2 = .02$. Simple effects revealed that participants preferred the incumbent in the neutral condition, $F(1, 421) = 26.95$, $p < .001$, d = 0.75, which was approximately doubled

5 The analysis reported below includes "other" as a response option. However, only 10 participants in the final sample used this response category and removing them from the analysis did not alter the conclusions reported below.

in the emphasized condition, $F(1, 421) = 49.52$, $p < .001$, d = 1.48. Furthermore, the incumbent advantage was nearly cut in half in the reversed condition compared to the neutral condition, $F(1, 421) = 7.32$, $p = .007$, d = 0.49 (Figure 3).

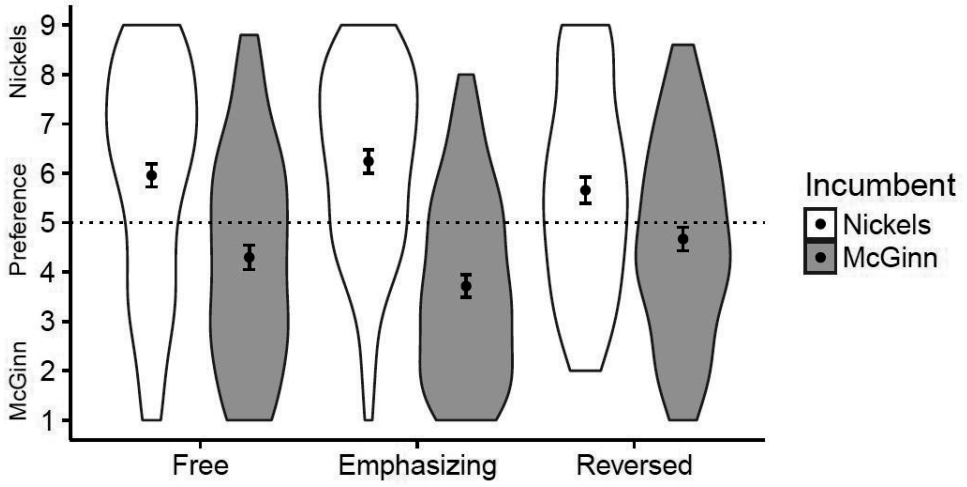

Figure 2.3. Violin plots of candidate preferences. Error bars represent standard errors. The dotted line represents the neutral midpoint of the scale.

Discussion

In Experiment 2.2, we experimentally manipulate query order. Consistent with predictions, reversing query order reduced the incumbency advantage by almost half, compared to the neutral condition. Similarly, emphasizing query order nearly doubled the size of the incumbency advantage. This provides further evidence that information retrieval processes can be used to understand, but also to intervene in political decision-making.

There was one main concern: One-hundred participants in the emphasizing and reversed conditions did not follow the aspect listing instructions and so their query orders were not manipulated. That is, these participants show no significant difference in SMRD scores between the two incumbency conditions, $t(78.89) = 0.83$, $p = .411$. It may be that participants did not pay attention or that changing query order does not come easily. This is not to say that query order does not matter – there was positive correlation between SMRD scores and candidate preferences, $r(79) = .63$, $p < .001$, for these participants. It does suggest that instructions to change query order are only effective when instructions are followed.

Experiment 2.3: Salient Information is Queried Earlier

Political decision-making typically does not happen in a vacuum; voting decisions are multiply determined. One predictor of vote choice is political ideology, especially in the two-party system of the U.S. (Jacoby, 1991; Jost, 2006). Voters support candidates from the political party that they are affiliated with. It seems unlikely that voters will vote for a political candidate who does not share their ideology, even if they are an incumbent. Instead, voters will likely consider partisanship or ideology cues to be more important and valid in their decision-making process, and hence their information retrieval process, than incumbency. Initial support for this idea comes from Hardisty, Johnson, and Weber (2010) who found that Democrats and Republicans exhibited different query orders when forming a preference in the tax domain. This experiment may inform us about the boundary conditions of the incumbency advantage and how query order is affected by an additional and a potentially more valid decision cue.

Method

Participants. We recruited 800 MTurk workers who did not participate in the previous two studies via the software TurkPrime (Litman, Robinson, & Abberbock, 2016), which enabled us to collect participants in small batches over two consecutive days. Participants were removed from the analysis based on the same criteria as in Experiment 2.1 (n = 3). Additionally, we asked participants to classify themselves as either a Democratic or Republican. Those who could not be classified were excluded from the analysis (n = 84). A sample of 713 participants remained (308 men, 405 women, M_{age} = 37.36, SD = 12.31).

Experimental design. The experiment employed a 2 (incumbency) × 3 (ideological compatibility) between-subjects design. Incumbency was manipulated as in Experiment 2.1. Ideological compatibility was manipulated by including an ideological standpoint in the candidate descriptions and matching participants with the ideological standpoints (see below).

Materials and procedure. Participants followed a link to the online survey and were randomly assigned to one of the six experimental conditions (Table 2.2). All materials were the same as in Experiment 2.1 (candidate preference: α = .97, number of reasons listed: M = 2.91, SD = 0.78, Range [1, 7][6]; familiarity with Grand Rapids, MI: M = 2.66, SD = 1.70), with the exception of the candidate descriptions and the measurement of ideological compatibility.

6 We did not include the response category "other" for the self-coding as reasons, because in of its infrequent use in Experiment 2.2.

Table 2.2. Number of Participants Randomly Assigned to each Experimental Condition

	Neutral	Compatible	Incompatible
Incumbent Nickels	131	116	108
Incumbent McGinn	119	121	118

Candidate descriptions. In the neutral condition, no ideological standpoint was added to the candidate descriptions (direct replication of Experiment 2.1). To manipulate the political ideology of the candidates in the other experimental conditions, we included one ideological standpoint as the second bullet point under the "campaign centers on" section (Figure 2.1) for both the incumbent and the challenger. The political standpoints were adapted from the websites of a prominent Democratic (Hilary Clinton) and Republican (Ted Cruz) politician, respectively. At the time, both politicians were competing for their party's presidential nomination in the 2016 U.S. primary elections. The liberal standpoint read "protecting women's access to reproductive health care, including contraception and safe, legal abortion in city clinics" and the conservative standpoint read "removing burdensome restrictions for law-abiding citizens to obtain concealed carry licenses for firearms". We choose these statements because they are issues on which Democrats and Republicans have polarized opinions (Pew Research Center, 2014). Therefore, participants should easily be able to judge whether the mayoral candidates are liberal or conservative. The standpoints were added such that if the incumbent supported the liberal standpoint than the challenger supported the conservative standpoint and the reverse.

Ideological compatibility. After aspect coding, we measured participants' party affiliation. They responded to the question "Generally speaking, do you usually think of yourself as a Democrat, Republican, Independent, or something else?" Five-hundred and twenty-four participants indicated a clear party affiliation with either the Democrats or the Republicans. They then indicated whether they were strong, moderate, or slight Democrats/Republicans. The participants who did not clearly identify with a party were asked "Do you think of yourself closer to the Democratic party or to the Republication party?" We classified participants who reported being closer to one party or the other as supporting that party. Participants who responded that the felt close to neither party (n = 84) were excluded from the sample as for these participants we could not determine which ideological standpoint would be most compatible with their beliefs.

Participants who read a scenario where the incumbent supported a standpoint consistent with the politics of their identified party were coded as compatible (e.g., a Democratic participant reading about an incumbent with a liberal standpoint). Participants who read a scenario where the incumbent supported a standpoint inconsistent with their party's politics were coded as incompatible (e.g., a Democratic participant reading about an incumbent with a conservative standpoint).

Results

Incumbency effect. A two-way factorial ANOVA revealed a significant incumbency×ideological compatibility interaction on candidate preferences, $F(2, 707) = 67.11$, $p < .001$, $\eta^2 = .15$ (Figure 2.4 A).[7] An analysis of the simple effects revealed that in the neutral condition, the findings of Experiment 2.1 were replicated. When no ideological cue was added to the candidate descriptions, participants experienced a significant effect of incumbency, $F(1, 707) = 18.11$, $p < .001$, $d = 0.53$. This incumbency effect increased substantially, when the incumbent's ideology was compatible with that of the participant, $F(1, 707) = 147.75$, $p < .001$, $d = 1.71$. However, if the incumbent's political standpoints did not match the political ideology of the participants they were significantly, more likely to vote for the challenger, $F(1, 707) = 18.71$, $p < .001$, $d = -0.54$. In sum, participants exhibited an incumbency effect when no ideological information about the candidates was provided. However, a cue about political ideology overrode the effect of incumbency, with participant being more likely to vote for the candidate with whom they were ideologically compatible.

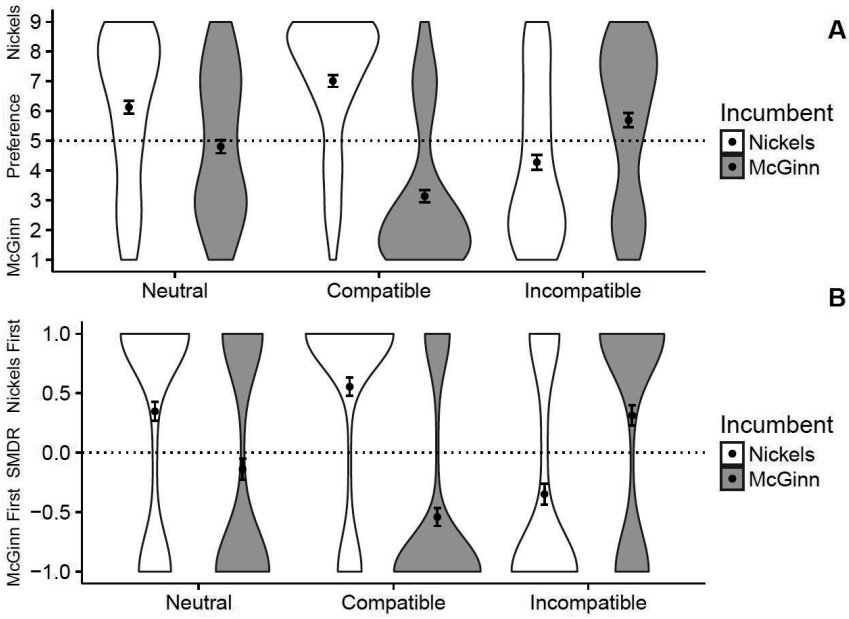

Figure 2.4. Violin plots of (A) personal candidate preferences and (B) SMRD scores for both incumbency conditions at each level of ideological compatibility. Error bars represent the standard errors. The dotted line represents the neutral midpoint of the scale.

7 Levene's Test of homogeneity of variance (median centered) revealed a significant violation homogeneity, $F = 3.55$, $p = .004$. An additional analysis to deal with the heterogeneity of variance is reported in the supplemental materials. The results confirmed the conclusions drawn from the two-way factorial ANOVA.

Query order. We also found a significant incumbency×ideological compatibility interaction on participant's query orders, $F(2, 707) = 56.81$, $p < .001$, $\eta^2 = .13$ (Figure 2.4 B).[8] A simple effects analysis showed that participants queried information about the incumbent first in the neutral condition, $F(1, 707) = 18.26$, $p < .001$, $d = 0.52$, which provided a direct replication of Experiment 1. This tendency became stronger when the incumbent's political ideology was compatible with their own, $F(1, 707) = 88.06$, $p < .001$, $d = 1.33$. However, this relationship flipped when the incumbent held an opposing political ideology. In this incompatible condition, participants first queried information about the challenger, $F(1, 707) = 30.61$, $p < .001$, $d = -0.72$.

Across all conditions the SMRD score was significantly, positively correlated with personal candidate preference, $r(711) = .78$, $p < .001$. When considering a decision between two political candidates, the order in which aspects are queried from memory is significantly associated with candidate preferences.

Query content. We also found a significant incumbency×ideological compatibility interaction on participant's query contents, $F(2, 707) = 59.45$, $p < .001$, $\eta^2 = .14$.[9] A simple effects analysis showed that participants queried more information about the incumbent in the neutral condition, $F(1, 707) = 11.28$, $p = .001$, $d = 0.40$. This tendency became stronger when the incumbent's political ideology was compatible with their own, $F(1, 707) = 103.30$, $p < .001$, $d = 1.47$. However, this relationship flipped when the incumbent held an opposing political ideology. In this incompatible condition, participants queried more information about the challenger, $F(1, 707) = 28.05$, $p < .001$, $d = -0.69$.

Across all conditions, query content was also significantly, positively correlated with personal candidate preference, $r(711) = .87$, $p < .001$.

Discussion

We find that the incumbency advantage is only present when no or compatible information about the incumbent's political ideology is provided. In fact, incumbency along with ideological compatibility is the winning hand, as this combination provides the strongest support for the incumbent. Conversely, when the incumbent supports issues that the participants does not, the participant is more likely to indicate a preference for the challenger. This pattern was also

8 Levene's Test of homogeneity of variance (median centered) revealed a significant violation of homogeneity, $F = 3.55$, $p = .004$. As there is no standard nonparametric test for a 2x3 factorial design, we addressed this issue by dichotomizing the SMRD score and conducting a logistic regression analysis. Dichotomization of the SMRD score is a viable option for this robustness check as only 31 participants had scores other than -1 and 1. We excluded these participants from analysis. The results confirmed the conclusions drawn from the two-way factorial ANOVA (see supplemental materials).

9 Levene's Test of homogeneity of variance (median centered) revealed that there was as significant violation of the homogeneity assumption, $F = 5.01$, $p < 0.001$. As no traditional non-parametric test is available, we conducted a logistic regression to confirm our conclusions (see supplemental materials). The results of this analysis mirror those of the main analysis reported here.

reflected in participants' query order and query content. Participants focused on incumbency as a cue when no ideological information was added. However, as predicted, political ideology provided to be a stronger and more valid cue in this context and thus had a stronger effect on participants' query order and content.

General Discussion

Our experiments contribute to the growing interest in applying information processing paradigms to decision-making (Oppenheimer & Kelso, 2015); in our case political decision-making. This research shows that a well-known phenomenon in U.S. historical elections can also be understood by how voters retrieve information from memory while forming their candidate preferences. Query order is predictive of the incumbent advantage. Participants who exhibited a preference for the incumbent were more likely to first retrieve information supporting the incumbent. Furthermore, experimentally manipulating query order altered the strength of the incumbency advantage. By emphasizing or reversing query order we increased or reduced the incumbency advantage. This suggests that memory retrieval processes make up at least part of the psychological mechanisms behind the incumbency advantage.

In our experiments the incumbency advantage appears limited to contexts where incumbency is the most valid cue. Common sense predicts that it is unlikely that a strong Republican will vote for a Democratic candidate, even if she is the incumbent, and vice-versa. Extending prior work on query theory, Experiment 2.3 provides evidence that more a salient cue, for example partisanship, can override weaker cues, for example incumbency. Participants first queried information about the candidate with similar political beliefs, who they were also more likely to prefer, suggesting that when more valid cues are available, people use them.

Our findings about query order and cue validity provide support for one of the key theoretical assumptions of query theory: People query information related to the most salient option earlier from memory, which in turn is predictive of their preference formation (Weber & Johnson, 2006). This assumption, however, has been merely an assertion because prior investigations only tested contexts where one piece of information could provide a salient cue to the decision maker. In this research, we tested this assumption. Consistent with prior work that only focused on one cue, incumbency was salient to the participants and was related to query order and candidate preferences. However, in an American context, adding the more valid cue of political ideology changed participant's pattern of information retrieval. It appears that when both cues pointed in the same direction, the addition of stronger cues had an additive effect in determining preferences. When the cues conflicted, people relied more on the valid cue (political ideology) and the weaker cue (incumbency). Given the importance of cues in the assumptions of

query theory, our comparison of competing cues is an important addition to the query theory literature.

This can be seen by considering how query theory has been applied to investigate when consumers opt for a default rather than choosing a new, environment friendlier product (Dinner et al., 2011). Information about the default was retrieved earlier in consumers' query sequences. However, throughout the entire set of studies, the default remained the only salient cue to participants. For default effects there may be other cues that, similar to political ideology, have a stronger effect on purchasing decisions. To the extent partisanship is loyalty to a political brand, brand loyalty (He, Li, & Harris, 2012) and strong brand commitment in the consumer domain may override default effects and thus produce more choices in favor of the preferred brand. Furthermore, participants with strong pro-environmental attitudes (Stets & Biga, 2003) may also show a different pattern of memory retrieval, favoring environmentally friendly products. As such, both query theory and consumer choice can benefit from identifying and measuring which cues are salient in a given choice context.

Directions for Future Research

There are several directions for future research. Query theory only speaks to how information is retrieved from memory during preference formation. It does not address how the decision-relevant information is gathered in the first place, if at all. These other information processing effects, such as information search or sampling, may also help explain the incumbency advantage. If incumbency acts as a salient cue to voters, they may be drawn to information about the incumbent rather than the challenger. They may first actively search for or spend more time considering information pertaining to the incumbent compared to the challenger. Especially, during long election campaigns, when voters have access to a large amount of information about the candidates, how they go about sampling this information may be directly related to which information is easier retrieved from memory at the time of the final preference is formed and voting decision is made.

It is also important to note that the reported experiments were all conducted in an American context and other contexts may show variations of the results we find. Although we focused on the United States, the incumbency advantage is a phenomenon that has also been found in other Western electoral settings (Eggers & Spirling, 2014; Hainmueller & Kern, 2008; Kendall & Rekkas, 2012). Nonetheless, some studies on incumbency (e.g., in India, Uppal 2009) did not find a clear incumbency advantage (see Fowler & Hall, 2016, for a critical overview of exceptions to the incumbency advantage). From our perspective, an interesting question is how query order functions in these other contexts and if incumbency serves as a relevant cue in these contexts.

Americans exhibit a strong partisan affiliation (Deaux, Reid, Mizrahi, & Ethier, 1995; Iyengar, Sood, & Lelkes, 2012), and clearly perceive political ideology to be a valid cue in their political decision-making (Jost, 2006). We expect our findings related to ideology to replicate in other electoral contexts characterized by strong partisan affiliations. However, in different situations other cues may prove to be more valid. For example, partisan identification is typically weaker in countries with many different political parties. Although specific issues might be seen as valid cues, specific parties may not be as valid as they would be in the United States. Similarly, even within the American context, the validity of ideological cues may be weaker for people who are indifferent or uninvolved in politics.

Finally, a query theory approach to the incumbency advantage can also be applied to political elections in which more than two candidates are running for office or in multi-party systems. Quattrone and Tversky (1988) propose that in such multi-choice elections the incumbency effect should become stronger. However, they do not provide evidence for this claim. Therefore, it would be prudent to apply the query theory approach to election scenarios with multiple candidates. Such an approach would also contribute to our theoretical understanding of query theory, which so far has only been experimentally applied to dichotomous choices. However, under these circumstances the assumption that a reason against one candidate is a reason in support of the other does not hold. Consequently, additional hypotheses and statistical measures regarding the effects of positive and negative information queried will be necessary.

Conclusion

In our experiments, we integrated the heuristic perspective with memory retrieval processes to gain a better understanding of the incumbency advantage. Our findings indicate that the order in which voters retrieve information from memory may, at least in part, help explain voters' preference for the incumbent. In sum, we believe that it is be fruitful for psychologists to integrate information processing and other cognitive mechanisms when investigation why people adopt certain political positions and how they make decisions in general.

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CHAPTER 3.

Endowment vs. Previous Preferences: Which Cue Drives Consumer Decision-Making?

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Abstract

Research on the endowment effect has shown that simply endowing people with a good can increase the salience of the good and make it more likely to be chosen over alternatives. Other lines of research suggest that previous preferences are hard to override and may be chronically accessible to decision makers. We investigate the relationship between previous preferences (i.e. brand loyalty and purchasing habits) and the endowment effect in a switching paradigm and measure participants' memory retrieval orders to assess the salience of choice options. In Experiment 1 (N = 202), participants interacted with a smartphone of a brand either in line with or contradicting their brand loyalty. We find that participants high in brand loyalty are most likely to be influenced by the experimental condition than those low in brand loyalty. In Experiment 2 (N = 486), we endowed participants with a can of Coke or Lipton and measured their purchasing habits of these products. We find main effects of both endowment and purchasing habits. In both experiments, the salience of cues was affected by previous preferences as well as endowment. We show that the endowment effect is not completely immune to previous preferences: It can be weakened for people with (strong) previous preferences in favor of an alternative option or boosted for people with (high) previous preferences in favor of the endowed option.

Keywords: previous preferences, endowment effect, query theory, consumer decision-making, brand loyalty

Endowment vs. Previous Preferences: Which Cue Drives Consumer Decision-Making?

The endowment effect is characterized by people placing higher values on products they own or were endowed with compared to when they had not been endowed with the product (for an overview see Morewedge & Giblin, 2015). They value the coffee mug in their hand more than the coffee mug on the store shelf. In short, people seem to overvalue what they have. This preference for the current product is an example of the status quo bias wherein people make decisions that maintain the current state of affairs (Bar-Hillel & Neter, 1996; Moshinksy & Bar-Hillel, 2010; Samuelson & Zeckhauser, 1988). However, having a product in hand is not the only relevant cue when making a purchasing decision. People may also have prior experience with the product. For example, they might identify with the brand, habitually purchase the product, or have fond memories of the product. These other experiences may serve as alternative cues within the current state of affairs. We test *what* consumers choose when faced with multiple cues and *how* these cues may alter the decision-making processes underlying the choice. In two experiments, we investigate how people make choices when self-reported previous preferences (i.e. brand loyalty and purchasing habits) and endowment overlap or contradict each other.

Endowment effect vs. previous preferences

Choices and preferences are reference-dependent (Bhatia, 2017). Reference-dependent theories of choice posit that, when decision makers make a choice among (multiple) options, they will use the most salient option or attribute as their reference point. By simply changing this reference point, choices and preferences can be altered because the salient options and attributes shift. A classic example of reference dependent choice is the status quo bias. People are more likely to stick with the option that represents the current state of affairs (Samuelson & Zeckhauser, 1988). This can manifest in not acting to change the current state of affairs (e.g., endowment effects and default effects) or actively choosing an option that represents the status quo (e.g., incumbency advantage in politics). Previous research has shown that simply labeling one option as the status quo can shift preferences towards that option (Moshinksy & Bar-Hillel, 2010). However, little research has explicitly examined how people react when two strong decision cues are pitted against each other. Which decision cue becomes dominant in the decision-making processes? How does this decision-making process relate to actual choice?

One of the most well-known manifestations of a status quo is the endowment effect. It was first coined by Kahneman, Knetsch, and Thaler (1990) as an explanation of the lack of evidence for the Coase Theorem in real world markets. The Coase Theorem describes how, within a market, products will (re-)allocate themselves to the consumers with high preferences for that product, assuming the transaction costs are low. However, the endowment effect showed that people who are endowed with an object value that object more than those who are not endowed with the object. The endowment effect has been tested and consistently replicated in two experimental paradigms (Morewedge & Giblin, 2015). In the valuation paradigm, half of the participants are randomly endowed with a good (e.g., a mug) and then are given the opportunity to sell the good to the other half of the participants. The minimum amount of money that participants endowed with the mug are willing to accept for the mug (WTA) is much higher than the maximum non-endowed participants are willing to pay for the mug (WTP). In the exchange paradigm, participants are randomly endowed with one of two goods. Participants are then given the opportunity to switch to the other good. However, participants are more likely than expected by chance to keep the good they were initially endowed with even though the transaction costs for switching are low or even zero.

Cognitive process models suggest that attention and memory biases explain the effectiveness of endowments (Bhatia, 2017; Johnson, Häubl, & Keinan, 2007; Morewedge & Giblin, 2015). Here, as the argument goes, the having or being endowed with an object becomes the status quo and acts as the reference point. The endowed good is more salient to the decision maker in the decision-making process than the other choice options. The positive (and negative) attributes of the endowed object will be remembered and assessed first, as well as weighted more heavily, in the decision-making process. This leads to a preference for the endowed object. These memory and attentional biases can account for multiple explanations of the endowment effect, including loss aversion and psychological ownership (Morewedge & Giblin, 2015). The strong evidence for the endowment effect and how it shifts attention during the decision-making process, leads us to our first hypothesis: The *endowment hypothesis* predicts that participants will opt for the endowed option regardless of any previous preferences. This should also be reflected in participants' decision-making processes, as the endowment of a product makes it more salient to the participant in the moment of making a choice.

However, the endowment effect is usually tested in settings where participants do not have strong pre-existing preferences or where pre-existing preferences were not measured. That is, participants are typically endowed with a relatively neutral object like a coffee mug or a chocolate bar. In real-word decision-making, people may already prefer one of the products within the choice set because of previous experience with the product or because of positive associations with the product's brand. This may either be a previous preference for the endowed option, so that

previous preferences and endowment are compatible, or a product other than the endowed option, so that previous preferences and endowment are incompatible. One example of including compatible previous preferences in an endowment experiment found that participants in a valuation paradigm were willing to pay more money for a mug with their college insignia pictured on it than for a plain white mug (Tom, 2004).

The option that represents the pre-existing preference and its attributes should become most salient to the decision maker during the decision-making process. Research in the context of political decision-making provides one example of how a relative robust status quo bias can be overridden by a more relevant decision cue. The incumbency advantage, whereby citizens typically prefer candidates who are already in office, was completely overridden when candidates' political ideology was made known (Chapter 2: Spälti, Brandt, & Zeelenberg, 2017). This suggests that, when strong beliefs are incompatible with the status quo, voters will opt for the focus on the cue in line with their previous preferences in the decision-making process.

Generally, it seems unlikely that consumers will opt for a good that is not in line with their pre-existing preferences, even if this good was endowed to them. Pre-existing strong preferences may be hard to shift (Morewedge & Giblin, 2015) and may be chronically accessible and exceptionally salient to decision makers, and thus take on the role of a reference point rather than an endowed object. As such, previous preferences may have the power to override the endowment effect, especially if these previous preferences have been held for a long period of time (Strahilevitz & Loewenstein, 1998). This leads us to our second hypothesis: The *previous preference hypothesis* predicts that participants will choose the option in line with their previous preferences because the preferred option is chronically available to them and is therefore the salient reference point.

Nonetheless, a third possibility arises. Participants may be affected by both previous preferences and endowment. Particularly for consumers with weak previous preferences or even negative experiences with the alternative choice option, endowment may become the dominant cue in the decision-making process. Thus, explaining both the robustness of the endowment effect but also not discounting the power of previous preferences. For instance, our *preference strength hypothesis* predicts that only consumers who have weak previous preferences will exhibit an endowment effect, while participants with strong previous preferences will opt with the choice in line with their previous preferences.

Query theory: Memory retrieval in favor of the status quo

Choice options that are most salient to decision makers are most likely to be chosen. This is in line with information processing accounts of decision-making which focus on how information is sampled, retrieved, and integrated during the decision-making process (Oppenheimer & Kelso, 2015). Information about salient options is more central to the decision-making process. Using query theory (Johnson et al., 2007), a theory about how information is retrieved from memory and integrated when constructing preferences, we aim to gain a better understanding of which cue within the current state of affairs (i.e. endowment or previous preference) is most salient to decision makers during their decision-making process. Query theory predicts the following process:

1. People access preference-relevant information from memory by posing evaluative questions, or queries, to themselves in sequential order.

2. Salient and easily-accessible information is retrieved earlier, is richer, and more numerous, and thus more heavily weighted in the decision-making process.

3. According to the principles of output inference and retrieval inhibition (Anderson, Bjork, & Bjork, 1994; Anderson & Spellman, 1995; Dempster, 1995), earlier queries interfere with the retrieval of other relevant information. Later queries are inhibited and less information is retrieved, leading these to be less predictive than earlier queries.

Based on the second premise of query theory, we can identify which decision cue is most salient to a decision maker by measuring which choice option is recalled first and most frequently in the memory retrieval process during decision-making. Previous research has successfully applied query theory to the endowment effect (Johnson et al., 2007) and default effects (Dinner, Johnson, Goldstein, & Liu, 2011) showing that the option considered the status quo is the most salient in the decision-making process. However, in a decision in which a more context-relevant cue (i.e., political ideology) was presented to decision makers, queries in favor of the context-relevant cue were retrieved earlier in the memory retrieval sequence regardless of which option was given the status quo label (i.e., political incumbent; Chapter 2: Spälti et al., 2017). This indicates that the most salient option to decision makers can shift depending on the cues present in the choice set and this shift is reflected in decision makers' memory retrieval orders.

Using query theory as a diagnostic tool, we investigate which cue is most salient to consumers and thus acts as a reference point in the decision-making process: the endowed option (*endowment hypothesis*), the option corresponding to previous preferences (*previous preferences hypothesis*), or the reference point differs for decision makers with weak or strong previous preferences (*preference strength hypothesis*). By assessing which choice option was retrieved earlier in the memory

retrieval process, we can make inferences about the salience of different decision cues within the current state of affairs. In two experiments, we provide participants with a choice set in which one of the options acts as an endowment. We then measure previous preferences (Experiment 3.1: brand loyalty; Experiment 3.2: purchasing habits) to investigate whether participants will choose the endowed good or if they are more likely to switch. Additionally, we measure participants' query order during their decision-making process, to gain insight into which decision cue is most salient thus acting as the reference point and predicting decisions.

Operationalization of previous preferences: Brand loyalty and purchasing habits

In the context of consumer decision-making, a popular measure of previous preferences for consumer goods is captured by brand loyalty measures. Brand loyalty is defined as "the biased, behavioral response, expressed over time by some decision-making unit, with respect to one or more alternative brands out of a set of such brands, and is a function of psychological […] processes" (Jacoby & Chestnut, 1978, p. 80). Brand loyalty leads consumers high in brand loyalty to value and identify more with their preferred brand compared to alternatives (Chaudhuri & Holbrook, 2001). Loyal customers will continue purchasing products by their preferred brand, even if potentially better options are available to them (Jacoby & Kyner, 1973), and are willing to pay higher prices for products from their preferred brand (Krishnamurthi & Raj, 1991). Indeed, brand loyalty is often fostered by companies to ensure a consistent client base.

Of note here is that brand loyalty is described as a psychological process, or preference, which leads to behavioral outcomes. As such, brand loyalty is generally measured in two ways (Mellens, Dekimpe, & Steenkamp, 1996):

1. attitudinal measures

2. behavioral measures.

The attitudinal measures usually refer to self-reported preference and commitment towards that brand. The behavioral measures are usually captured by aggregate data, market shares, or measures individual choices and/or purchasing patterns in favor of a specific brand (Mellens et al., 1996). In our experiments, we aim to capture both aspects by conceptualizing previous preferences in terms of self-reported brand loyalty and commitment towards a brand (Experiment 3.1) and self-reported purchasing habits of a brand (Experiment 3.2). For both experiments, we report all measures, conditions, data exclusions, and how we determined our sample sizes.

Experiment 3.1: Smartphones

In our first experiment, we investigate the effect of being endowed with a smartphone for a short time compared to the effect of brand loyalty on smartphone preferences, using both a hypothetical and incentivized measure of smartphone preferences. We measure whether participants endowed with a phone in line with their previous preferences (compatible condition) or contrary to their previous preferences (incompatible) exhibit differing choice patterns and memory retrieval processes. This will give us insight into how people go about making these decisions and help us measure which decision cue is most salient to the decision maker. Finally, we also include the additional measure of psychological ownership of the endowed smartphone for exploratory purposes. Psychological ownership has been proposed as a potential mechanism underlying the endowment effect (Morewedge, Shu, Gilbert, & Wilson, 2009).

Method

Participants. We aimed to recruit as many participants as we could during a period of one week. As we only had three smartphones available for our research, we could only test three participants at one time. After one week, we had recruited a total of 204 Tilburg University students to participate in our laboratory study. In return for participation, participants were awarded course credit or €5 cash. Additionally, one participant won a *Beats by Dre* headset (approximate value €130) in a raffle which participants could voluntarily participate in. We removed the data of 2 participants who did not own a smartphone at the time of data collection, which resulted in a final sample of 202 (64 women, 138 men, M_{age} = 20.87, SD_{age} = 2.60). To determine which effect size, we could detect with this final sample, we conducted a sensitivity analysis with G*Power (Faul, Erdfelder, Buchner, & Lang, 2009). Specifically, we measured the ability to detect an increase in explained variance in our regression model by including an additional predictor. With our final sample, we would be able to detect an effect size of f = 0.20 with a power of 80%.

Procedure. The experiment was conducted using Qualtrics survey software. Participants completed the experiment on computers in our laboratory facilities. After providing informed consent, participants were asked about their general smartphone brand preferences and which brand of smartphone they currently owned. They also indicated how long they owned their current smartphone, how happy they were with their smartphone, and completed a brand loyalty measure towards the brand of their current smartphone. Next, participants were asked to imagine that they were about to buy a new smartphone and were debating between the newest iPhone, HTC, and Samsung models. Before deciding which of these three smartphones they would purchase, participants were given the opportunity to handle one of the three smartphones (depending on the experimental endowment condition). Participants were then asked to list all the thoughts that passed through their mind while considering which smartphone they

would chose, before indicating their smartphone preferences, willingness to pay for each smartphone (WTP)[10], and self-coded their thoughts. Finally, participants filled in a perceived ownership scale of the smartphone they had interacted with and provided demographic information (i.e., age, gender). Before being debriefed, participants were informed that they could participate in a raffle whose winner would win either the smartphone of their choice or a headset by *Beats by Dre*, and thus they were asked to indicate which of the three smartphones they would wish to win. The experiment was conducted in Dutch.

Primary measures.

Current phone. Participants were asked to type the name of the brand of their current smartphone[11]. Next, they were asked for how many months (ranging from 1 to 48+ in one-month increments) they had been using their current phone and how happy they were with their current phone on a scale from 1 (extremely happy) to 7 (very unhappy), with a midpoint of 4 (neither happy or unhappy).

Brand loyalty. To measure brand loyalty towards their current phone, we asked participants to respond to four items regarding the brand of their current smartphone. "I intend to rebuy and continue using [phone brand]", "It is difficult for me to change to from one smartphone brand to another", "I believe that that [phone brand] smartphones have a higher quality than any other brand", "I will continue to use [phone brand], even though I know that there were better alternatives" (α = .75). Participants indicated how much they agreed with each statement on a seven-point Likert scale from 1 (completely agree) to 7 (completely disagree) with a midpoint of 4 (neither agree nor disagree).

Scenario. Participants were asked to imagine themselves in the following situation:

> "Today is the day you can renew your mobile phone subscription. After having used your current smartphone for two years, you decide to choose a new smartphone with your new subscription. You went to the local phone retailer to get some information about the newest smartphones. You received information about the newest iPhone, Samsung, and HTC smartphones. Subsequently you are handed one the smartphones. The salesman lets you use this smartphone. After using the smartphone, you will have to decide which smartphone you will choose with your new subscription."

10 WTP: Participants indicated the maximum amount of money they would be willing to pay for the three smartphones. They could choose from a dropdown list from <€500 to €1000 in €25 increments. Unfortunately, we found a floor effect for this question, with 35% participants indicating that they would pay less than €500 for all three smartphone (iPhone = 39%; Samsung = 50%, HTC = 78%). Therefore, the differences in this measure per condition were not be analyzed.

11 If they owned more than one phone, they were informed to type the brand name of the phone that they used most often.

Below this description, participants are shown three pictures of the available three smartphones in randomized order: Apple iPhone 6s Plus, Samsung Galaxy S6 Edge Plus, and HTC One M9. At the time of data collection these were the newest smartphones of each brand on the market.

Brief endowment. After reading the scenario, participants were informed that there was a small box underneath the desk with a smartphone inside of it. Depending on the experimental endowment condition (iPhone, Samsung, or HTC), the box contained the corresponding phone. Participants were instructed to remove the smartphone from the box and use it as they would normally use a smartphone for the next few minutes: "[…] feel free to surf on the internet, take photos, or use or download an app". They were told that after a few minutes the survey would allow them to continue. After five minutes, a green button would appear on the computer screen for the participant to continue to the next page of the survey, where they were informed to place the smartphone back in the box. On average, participants remained on this page, interacting with the smartphone, for 5 minutes and 26 seconds (*SD* = 43.32 seconds).

Compatibility. For purposes of the analysis, we classified participants according to compatible and incompatible conditions. Participants who were endowed with a smartphone of the same brand that they currently owned (e.g., a participant who owned an iPhone and was placed in the iPhone endowment condition) were classified as "compatible" (*n* = 52). Participants who were endowed with a smartphone other than the brand they currently owned (e.g., a participant who owned an iPhone but was placed HTC endowment condition), were coded as "incompatible" (*n* = 150). All analyses were completed using this compatible vs. incompatible classifications.

Aspect listing. To measure participants' query order, we employed the aspect listing methodology (Dinner et al., 2011; Ericsson & Simon, 1984; Johnson et al., 2007), in which participants were instructed to list all the reasons that passed through their minds while considering which of the three smartphones they would purchase in the scenario. They were asked to consider why they would prefer the smartphone they were endowed with over the other smartphones. After entering their first response in a text box, participants clicked the submit button to bring them to the next screen where they could list a second response. This process was repeated until participants indicated that they did not have any more reasons to list (*M* = 4.27, *SD* = 1.31, Range [2, 8]). As in previous work (Johnson et al., 2007), responses were limited to 200 characters and participants were not trained in advance.

Relative smartphone preference. Participants were asked to indicate how likely they were to choose each of the three possible smartphones (Apple iPhone 6S Plus, Samsung Galaxy S6 Edge Plus, or HTC One M9) on sliders from 1 (very unlikely) to 100 (extremely likely). To measure the effect of temporarily being endowed with the smartphone, we measured the relative preference between the endowed smartphone preference compared the average of the other two smartphone preferences. In this measure, positive scores indicate an endowment effect, negative scores indicate a preference for the non-endowed smartphones, and zero indicates indifference between the endowed and non-endowed smartphones.

Self-coding of aspect listing. Participants coded the reasons they listed in the aspect listing task (Dinner et al., 2011; Johnson et al., 2007), as either about the iPhone, Samsung, or HTC smartphone. They also indicated if each response was a positive or negative reason about the selected phone. We coded aspects as either in favor of the endowed option (e.g., a positive reason about the iPhone when endowed with an iPhone) or as about the non-endowed option, which included negative queries about the endowed option (e.g., a negative reason about the iPhone when endowed with an iPhone) and both positive and negative reasons about the non-endowed option (e.g., a positive/negative reason about the Samsung when endowed with an iPhone).

Query Order (SMRD). We measured query order with the standardized mean rank difference (SMRD) score (Johnson et al., 2007). This score reflects participants' tendency to list reasons in favor of the endowed smartphone before negative reasons about the endowed smartphone or reasons (both positive and negative) about the non-endowed smartphones[12]. It is defined as $2(MR_{Endowed} - MR_{Non\text{-}endowed})/n$, where MR = median rank of reasons for choosing the endowed or non-endowed smartphone in the participant's sequence and n = the total number of reasons in the participant's sequence. The SMRD score ranges from -1 (all reasons in favor of the endowed smartphone were listed first) to 1 (all reasons against the endowed smartphone or in favor of a non-endowed smartphone were listed first). For participants who only listed reasons for one smartphone, the SMRD score was calculated by setting the median rank of the missing reasons to s + 1 and n = s + 1, where s = the total number of reasons listed by the participant. This ensures that such participants received an SMRD score of 1 when they only listed reasons in favor of the endowed smartphone and an SMRD of -1 when they only listed negative reasons about the endowed smartphone or reasons about the non-endowed smartphones.

12 Traditionally, this measure has been used to calculate the query order between two choice options. However, in this experiment, participants could choose between three smartphones. Therefore, we opted to use a conservative measure of query order, whereby we do not code choices against the non-endowed option as a choice in favor of the endowed option (because there are two non-endowed options to choose from). This is a more conservative measure of query order, since it only captures queries clearly in favor of the endowed option.

Incentivized preference. We aimed to also measure what participants' real preference for the smartphones would be outside of our hypothetical scenario by including an incentivized choice. We told participants that they could enter into a raffle with the prize of either the smartphone of their choice or a headset by *Beats by Dre* (approximate value €130). There would only be one winner of the raffle. Participants were informed that if they wanted to participate in the raffle, they must indicate which of the three smartphones they would like to win: iPhone, Samsung, or HTC. All participants participated in the raffle and the winner received the headset by *Beats by Dre*.

Secondary measures.
Perceived Ownership. To measure perceived ownership, participants were asked to what extent they agreed with the following three items (Peck & Shu, 2009) about the smartphone they had interacted with during the experiment (1 = completely agree, 7 = completely disagree; with a midpoint of 4 = neither agree nor disagree): "I feel the smartphone is mine", "I feel a very high degree of personal ownership of the smartphone", and "I feel like I own this smartphone" (α = .91).

General smartphone brand preferences. Participants were asked to respond to an item regarding their general preference of smartphone brands on a ten point-Likert scale: "Generally, do you prefer Apple or Android smartphones?" (0 = Apple, 5 = no preference, 10 = Android). If participants indicated a preference for Android phones (<5), they also responded to an item that was aimed to distinguish their brand preference of android phones: "In regards to Android smartphones, do you generally prefer Samsung or HTC smartphones?" (0 = Samsung, 5 = no preference, 10 = HTC). Analyses and results for this measure can be found in the online supplemental materials.

Results
Relative smartphone preference. To test the effect of brand loyalty (mean centered) and compatibility (incompatible = -1, compatible = 1) on the preference for the endowed phone, we ran a multiple regression analysis, $F(3,198) = 57.75$, $p < .001$, $R^2 = 0.47$. There were significant main effects of both brand loyalty, $b = 6.25$, $SE = 1.88$, $p = .001$, and compatibility, $b = 23.84$, $SE = 2.43$, $p < .001$. These main effects were qualified by a significant interaction, $b = 10.37$, $SE = 1.88$, $p < .001$, which supports our *preference strength hypothesis.*

We probed the interaction at +1 *SD* and -1 *SD* of brand loyalty, to test the effect of endowment for participants who were highly loyal to their current smartphone brand or had no strong loyalty to their current smartphone brand. We found that for participants high in brand loyalty (+1*SD*) the effect of the compatibility condition was larger, $b = 37.17$, $SE = 2.97$, $p < .001$, than for participants with low brand loyalty (-1*SD*), $b = 10.50$, $SE = 3.83$, $p = .007$. This suggests that for people who are high in brand loyalty, being endowed with a phone of the brand they are

loyal to boosts their preferences above and beyond mere endowment (Figure 1, left). However, if they are endowed with a smartphone incompatible with their brand loyalty, they are very unlikely to prefer that endowed smartphone. For participants low in brand loyalty the compatibility condition only had a small effect on their smartphone preferences.

To test the effectiveness of endowing participants with a smartphone not in line with their previous preferences, we estimated the simple slope of brand loyalty for participants in the incompatible condition. We find that for participants in the incompatible condition there is a significant effect of brand loyalty, b = -4.12, SE = -2.24, p < .001. The negative slope indicates that participants who are high in brand loyalty are less likely to indicate a relative preference for the endowed option than those with low brand loyalty. When endowed with an incompatible smartphone, participants with lower brand loyalty are more likely to be influenced by endowment than those with higher brand loyalty.

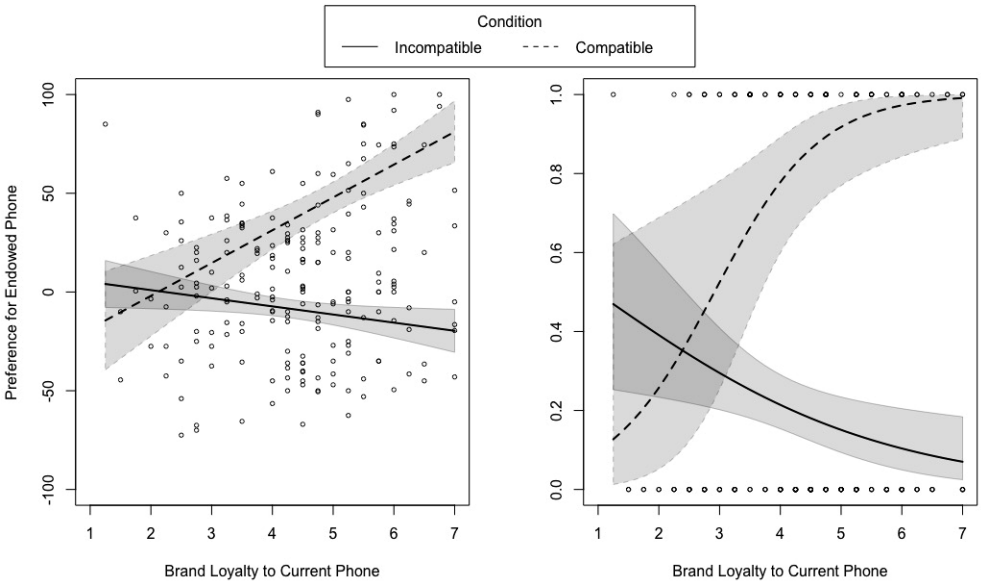

Figure 3.1. The effect of brand loyalty and compatibility condition on the reported preference for the endowed phone (left) and the incentivized choice (right, logit model fit). The grey region surrounding the regression lines represent the 95% confidence intervals.

Incentivized preference. In addition to reported smartphone preferences, we asked participants to respond to an incentivized choice by asking participants which smartphone they would like to win in a raffle. We ran a logistic multiple regression with incentivized choice (0 = non-endowed smartphone, 1 = smartphone) as the dependent variable. Compatibility condition (-1 = incompatible, 1 = compatible), brand loyalty (mean centered), and their interaction were included as predictors, R^2 = .47, (Nagelkerke, 1991). The analysis revealed that compatibility, b =1.63, SE = 0.26, p < .001, OR = 5.09, 95% CI [3.17, 9.19], significantly predicted choices, but brand loyalty did not b = 0.36, SE = 0.23, p = .110, OR = 1.44, 95% CI [0.96, 2.40]. However, supporting the *preference strength hypothesis*, these main effects were qualified by a significant interaction, b = 0.79, SE = 0.23, p < .001, OR = 2.21, 95% CI [1.47, 3.68].

We probed this interaction effect at +1 *SD* and -1 *SD* of brand loyalty. We found that for participants high in brand loyalty (+1*SD*) the effect of the compatibility condition, b = 2.65, SE = 0.47, p < .001, OR = 14.10, 95% CI [6.38, 42.43], was larger than for participants with low brand loyalty (-1*SD*), b = 0.61, SE = 0.30, p = .046, OR = 1.83, 95% CI [1.00, 3.37]. These results support the findings of the reported preference, showing that people high in brand loyalty are unlikely to opt for the endowed option unless it is in line with their previous preferences (Figure 3.1, right).

Query order (SMDR). According to query theory, query order is related to the salience of the choice options. Thus, to test the effect of brand loyalty (mean centered) and compatibility (incompatible = -1, compatible = 1) on query order (SMDR), we ran a multiple regression analysis, $F(3,198) = 15.99$, p < .001, R^2 = .20. We found a significant main effect of compatibility, b = 0.39, SE = 0.07, p < .001, but no effect of brand loyalty on SMRD, b = -0.04, SE = 0.05, p = .440. However, these main effects were qualified by an interaction, b = 0.14, SE = 0.05, p = .012, as predicted by the *preference strength hypothesis*.

We probed this interaction effect at +1 *SD* and -1 *SD* of brand loyalty. We found that for participants high in brand loyalty (+1*SD*) the effect of the compatibility condition was significant, b = 0.57, SE = 0.09, p < .001. However, for participants who indicated low brand loyalty (-1*SD*), the compatibility condition had no effect on query order, b = 0.21, SE = 0.11, p = .061. This suggests that people who are high in brand loyalty will first think about their preferred phone, whereas for those who are low in brand loyalty the compatibility condition did not affect their memory retrieval order (Figure 3.2). In fact, for participants with low brand loyalty we find that the intercept is significantly different from zero in a positive direction, b = 0.33, SE = 0.11, p = .003, this indicates that participants with low brand loyalty were more likely to think of the endowed phone first regardless of their compatibility condition.

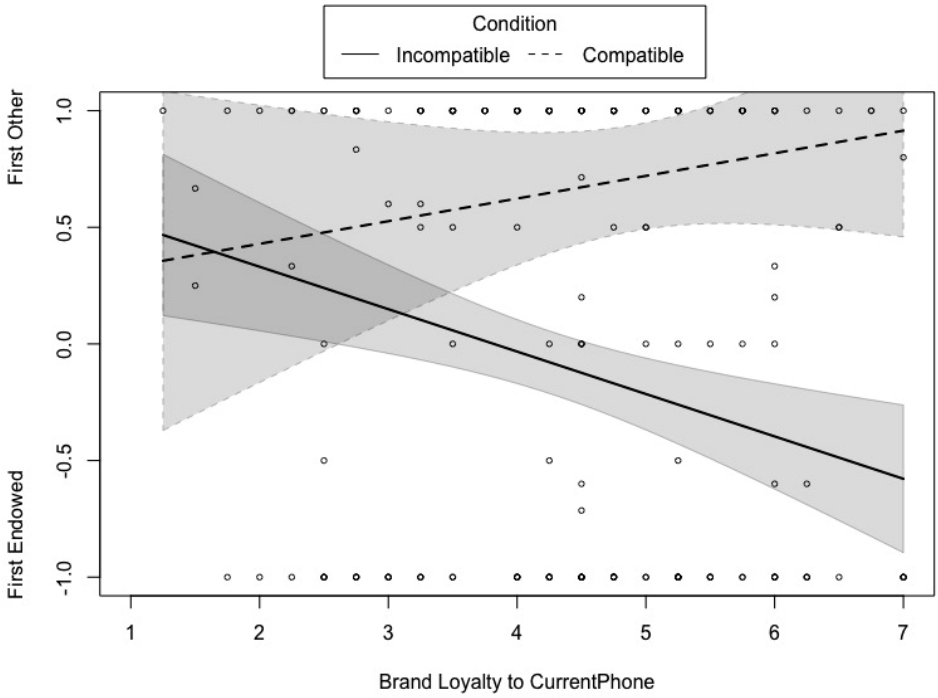

Figure 3.2. The effect of brand loyalty and compatibility condition on query order (SMRD). The grey region surrounding the regression lines represent the 95% confidence intervals.

Additional analyses.

Perceived ownership. One line of research on the endowment effect proposes that participants begin to feel a sense of ownership towards the endowed option which leads them to place higher value on the endowed object (Morewedge et al., 2009). We tested if brand loyalty (mean centered) and compatibility (-1 = incompatible, 1 = compatible) could explain feelings of perceived ownership using a multiple regression analysis, $F(3, 198) = 32.49$, $p < .001$, $R^2 = .33$. The results showed a similar pattern as for the above described smartphone preferences. There was a significant main effect of compatibility condition, $b = 0.34$, $SE = 0.13$, $p = .010$, but not of brand loyalty, $b = 0.11$, $SE = 0.10$, $p = .278$. This main effect was qualified by a significant interaction effect, $b = 0.22$, $SE = 0.10$, $p = .033$. The simple slopes analysis showed that, for people high in brand loyalty (+1SD), there was a significant effect of compatibility, $b = 0.62$, $SE = 0.16$, $p < .001$. However, for participants low in brand loyalty (-1SD), compatibility was not significant, $b = 0.06$, $SE = 0.21$, $p = .773$. These findings show that perceived ownership, which should only explain the endowment effect, is also affected by previous preferences, specifically brand loyalty.

Discussion

To test our three hypotheses about the effects of previous preferences and endowment, we measured participants brand loyalty to their current smartphone and then briefly endowed them with one of three smartphones. Measuring both preferences for the endowed smartphone and an incentivized choice for receiving the endowed smartphone in a raffle, we find the interaction of compatibility and brand loyalty as predicted by the *preference strength hypothesis*. Although not surprising that being endowed with a phone in line with your previous preferences is the winning hand, we also find that endowment had an effect for people in the incompatible condition. In fact, participants who were endowed with an incompatible smartphone were more likely to choose the smartphone they were endowed with, if they were low in brand loyalty. Thus, adding additional support for the *preference strength hypothesis*. Furthermore, this pattern of results was also reflected in our measure of the memory retrieval processes underlying the choice. Participants with strong previous preferences found the smartphone in line with their previous preferences to be most salient. Participants with weak previous preferences had their attention drawn to the endowed smartphone.

Experiment 3.2: Soda Beverages

Traditionally, in endowment experiments participants are given a product to keep. Only later on in the experiment do they have the option to sell or switch the product. In our first experiment, we were unable to give participants the smartphones to keep due to financial restrictions. Thus, in the traditional sense of the word, they were not officially endowed with a smartphone. To address this potential limitation, in our second experiment we endowed participants with a soda beverage which they are able to keep after completion of the experiment or switch for another brand of soda.

We opted for soda beverages in order to test our hypotheses with products for which previous preferences may be high, but for which the choice is not as financially costly to consumers and therefore maybe subject to more heuristic decision-making. We aimed for two compatible products that people can experience a strong preference for, but also which most people do not consider to be overly important to them. We opted for the soda brands Lipton Ice Tea and Coca Cola based on a pilot study (N = 78). The measures and analysis of the pilot study can be found in the online supplemental materials on the Open Science Framework (OSF)[13].

13 https://osf.io/k5cq9/?view_only=14ef12422d8e4b6594167c05af0cb218

Method

Participants. In exchange for course credit or €8 cash, we recruited 571 Tilburg University students[14] to participate in our laboratory experiment. We removed two participants because the computer failed half-way through the experiment. Additionally, we excluded participants from the analyses who either said they would take the soda can for a friend rather than for themselves (n = 58) or who did not sketch the can (n = 25), indicating that they did not follow instructions. This resulted in a final sample of 486 (339 women, 146 men, 1 other, M_{age} = 20.56, SD_{age} = 2.58). To determine which effect size we could detect with this final sample, we conducted a sensitivity analysis with G*Power (Faul et al., 2009). Specifically, we measured the ability to detect an increase in explained variance in our regression model by including an additional predictor. With our final sample, we would be able to detect an effect size of f = 0.13 with a power of 80%.

Procedure and materials. The experiment was conducted using Qualtrics survey software. Participants first filled out a purchasing habits questionnaire to estimate their soda beverage preferences and demographics (age, gender, nationality, study program). After a filler task (i.e., an unrelated study from the experimental batch), participants continued on to the main experiment. Participants were randomly assigned to either the Coke or Lipton endowment condition, and asked to carefully inspect and sketch the soda can they were endowed with. Next, participants completed an aspect listing task to measure their memory retrieval order and indicated their willingness to pay (WTP) and willingness to accept (WTA)[15] for each of the soda beverages. Participants then self-coded their aspects and were asked if they had previously participated in a similar study. Finally, before leaving the lab, participants were asked if they wanted to keep their soda can, or switch to a can of the other brand. Participants kept the soda that they choose. The experiment was conducted in English.

Brand habit. Following Verwijmeren, Karremans, Stroebe, and Wigboldus (2011), we asked participants how often they bought different soda brands: Coca Cola, Pepsi, Sprite, Lipton Ice Tea, and Fanta. Participants responded to the question "When you buy a soft drink, how often do you buy…?" on a six-point scale from 1 (never) to 6 (always). To divert from our true measures of interest (preference for Coke and Lipton), we also asked them about their preferences for candy bar brands, shampoo brands, and tooth paste brands.

14 This experiment was completed by participants as part of a batch of three studies which had been combined to fill one hour, in order to award participants one credit hour for their participation. One of the other studies required a minimum sample size of 435 participants based on a power analysis. We scheduled the lab for one week at a time, repeating this procedure until we had reached a sample size of more than 435 participants.

15 We included self-devised hypothetical measures of WTP and WTA. These are reported in the online supplemental materials on OSF. However, we came to realize that our measures did not tap into the traditional definitions of WTP and WTA and are thus not comparable to traditional value paradigms of the endowment effect.

Endowment condition. Participants were instructed to look under the computer desk and retrieve the box that was hidden there. Participants were then asked to remove the soda can that was in the box. This was either a can of Coke or a can of Lipton depending on the experimental condition. Participants were instructed to carefully inspect the can and sketch it in as much detail as possible, to ensure that participants actually handled and interacted with the can[16]. Participants who did not sketch the can, were removed from analysis for not following instructions.

Aspect listing. As in Experiment 3.2, we employed the aspect listing methodology to measure their query order. We told participants that at the end of the experiment they would be able to keep the can they just sketched or that they could switch the other brand (Coke or Lipton respectively). Participants were instructed to list all the reasons that passed through their minds while considering whether to keep the can or switch to the other brand. After entering their first response in a text box, participants clicked the submit button to bring them to the aspect listing question on the next screen where they could list a second response. This process was repeated until participants indicated they did not have any more reasons to list (M =3.03, SD =0.74, Range [1, 6]). As in the previous experiment, responses were limited to 200 characters and participants were not trained in advance.

Self-coding of aspects. Participants coded the reasons they listed in the aspect listing task, as either in favor or against each soda brand (Johnson et al. 2007). Responses indicating that the aspect was "in favor of keeping the can of Lipton Ice Tea" and those "against switching to the can of Coca Cola" were grouped together, as in a dichotomous choice a reason against switching to Coke results in a reason for keeping the can of Lipton. Similarly, responses "in favor of keeping the can of Coca Cola" and "against switching to the can of Lipton Ice Tea" were grouped together.

Query order (SMRD). We measured query order (Johnson et al., 2007) in the same way as in Experiment 3.1. SMRD scores reflect participants' tendency to list reasons in favor of choosing Lipton before reasons in favor of choosing Coke. It is defined as $2(MR_{Coke} - MR_{Lipton})/n$.

Soda choice. When the participant completed the experiment, the participant contacted the research assistant via the intercom system, who then came to escort them out of the cubicle. The research assistant would then hold up a can of the other soda brand and tell participants that they could either keep the can they had sketched or switch to the other brand. The lab assistant made a note of which can the participant decided to keep. Participants who strongly insisted that they did not want either can (e.g., because they do not drink carbonated beverages) or who

16 In order to ensure that participants would not drink the soda, we told participants that drinking was prohibited in the lab.

explicitly said they would take the can for a friend were removed from the analysis (n = 58).

Results

Analysis Strategy. For each of the dependent variables, we fit a (logistic) multiple regression model. We included the predictors endowment condition (-1 = Coke,1 = Lipton), Coke purchasing habits (mean centered), Lipton purchasing habits (mean centered), as well as the interaction of endowment × Coke purchasing habits and the interaction of endowment × Lipton purchasing habits. This regression model allowed for us to test the unique effects of purchasing habits in favor of one soda brand while controlling for the purchasing habits of the other brand. All model coefficients are reported in Tables 3.1 and 3.2.

Choice. Our logistic multiple regression model explained a significant amount of the variance in soda choices, where high scores indicate a choice for Lipton and low scores a choice for Coke, $\mathbf{x}^2(5) = 93.4$, $p < .001$, $R^2 = .36$ (Nagelkerke, 1991). The analysis revealed significant main effects of both Coke and Lipton purchasing habits along with a significant main effect of endowment. This supports the *previous preferences hypothesis*. Neither of the interaction terms were statistically significant, thus ruling out our *preference strength hypothesis*. The finding suggests that people are more likely to choose the soda brand in line with their previous preferences. However, being endowed with that same brand gives the product an additional boost, although this did not differ for participants with strong or weak previous preferences.

Table 3.1. Summary of the Logistic Regression Model for Choice in Experiment 3.1 (N = 486)

	b	***SE***	***p***	***OR***	**CI95% *OR***
Intercept	1.02	0.13	.<.001***	2.76	[2.15, 3.63]
Lipton Habits	0.57	0.08	<.001***	1.76	[1.53, 2.06]
Coke Habits	-0.60	0.09	<.001***	0.55	[0.46, 0.64]
Endowment	0.79	0.13	<.001***	2.21	[1.71, 2.90]
Lipton Habits × Endowment	0.09	0.08	.356	1.07	[0.93, 1.25]
Coke Habits × Endowment	-0.02	0.09	.809	0.98	[0.82, 1.55]

Note: *p < .050, ** p < .010, *** p < .001, higher scores indicate a higher likelihood to make the choice in favor of Lipton.

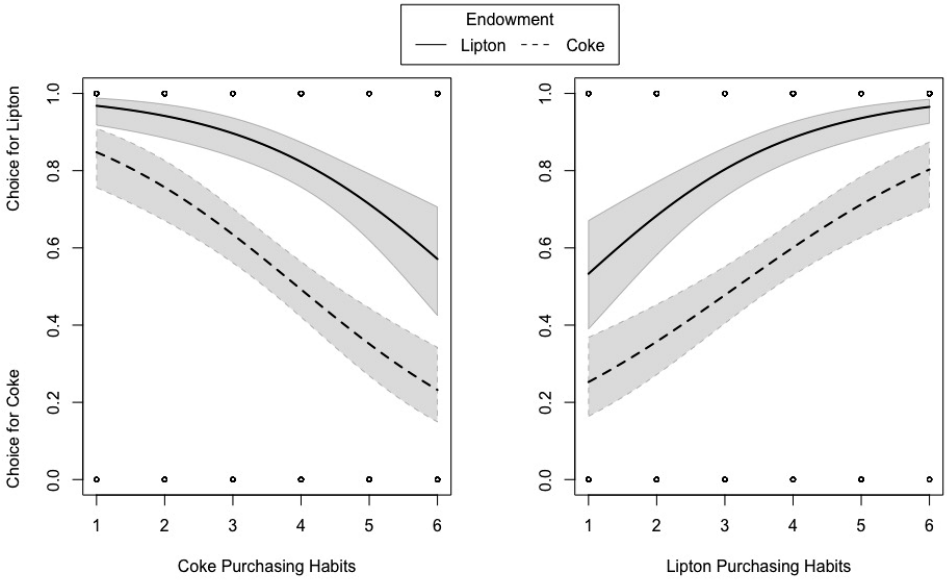

Figure 3.3. Predicted values for the modeled logistic regression of purchasing habits on soda choices. The grey region surrounding the regression lines represent the 95% confidence intervals.

Additional analysis. To get a better picture of our results, we estimated the effect of endowment on soda choice while disregarding purchasing habits. We found that 82.51% of participants opted for Lipton when they were endowed with Lipton, but 55.16% of participants still opted for Lipton when they were endowed with Coke, $\boldsymbol{x}^2(1) = 30.86$, $p < .001$. This indicates that there was generally a larger preference for Lipton, but that the endowment condition boosted that preference. In total, 61.24% of participants opted for the soda brand they were endowed with.

Query order (SMRD). To test the effect of endowment and purchasing habits on the order in which people retrieve information from memory, we ran a multiple linear regression analysis with participants' SMRD scores as the outcome variable, $F(5,480) = 33.26$, $p < .001$, $R^2 = .26$ (Figure 3.4). The results revealed that both Coke and Lipton purchasing habits, as well as the endowment condition, predicted SMRD scores. Here we also found a significant interaction of Coke purchasing habits × endowment. The interaction of Lipton purchasing habits × endowment was not significant.

We probed the significant interaction at -1*SD* and +1*SD* of Coke purchasing habits. In line with the *preferences strength hypothesis*, we find that for participants with weak purchasing habits of Coke, $b = 0.13$, $SE = 0.05$, $p = .012$, there was a smaller effect of endowment than for participant with a high purchasing habit of Coke $b = 0.30$, $SE = 0.5$, $p < .00$. In other words, participants who had low purchasing habits

for Coke thought about Coke first only slightly more if they were endowed with Coke instead of Lipton. However, participants who had a high preference for Coke, thought of Coke first to a much larger degree when they were endowed with Coke instead of Lipton.

Table 3.2. Summary of Multiple Regression Model for Query Order (SMRD)

	b	**SE**	**p**
Intercept	0.29	0.04	<.001***
Lipton Habits	0.18	0.02	<.001***
Coke Habits	-0.21	0.02	<.001***
Endowment	0.22	0.04	<.001***
Lipton Habits × Endowment	-0.02	0.02	.332
Coke Habits × Endowment	0.05	0.02	.030*

Note: *$p < .050$, ** $p < .010$, *** $p < .001$

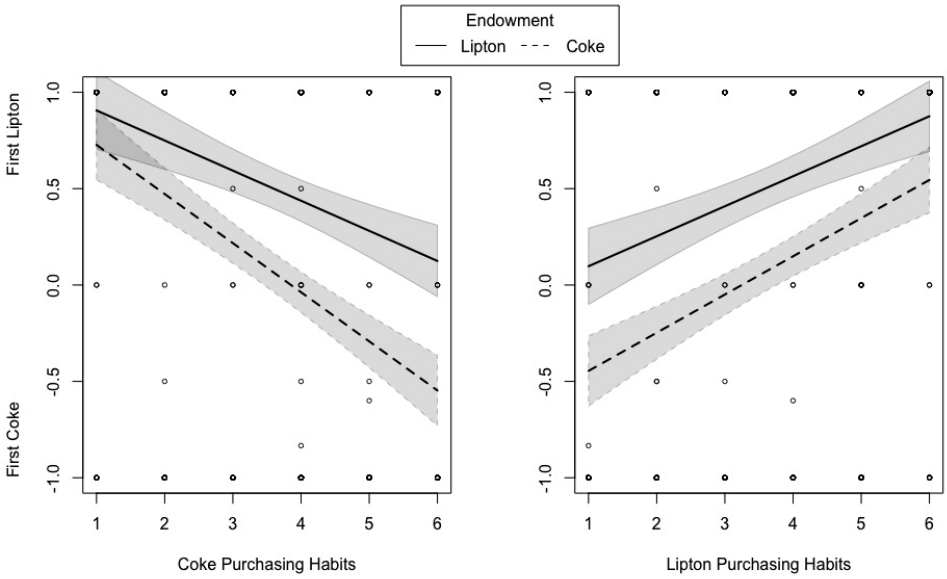

Figure3.4. Predicted values for the modeled multiple regression of purchasing habits and endowment on query order (SMRD). The grey region surrounding the regression lines represent the 95% confidence intervals.

Additional analysis. A closer look at participants' SMRD scores, revealed that all but 21 participants had a score of -1 or 1. Therefore, we ran a sensitivity analysis by testing our effects using a dichotomous measure of query order. We ran a logistic regression analysis on query order (0 = all reasons for Coke first, 1 = all reasons for Lipton first), while excluding these 21 participants ($N = 465$). The analysis revealed

a similar pattern as for the continuous measure of query order, $\mathbf{x}^2(5) = 88.1$, $p < .001$, $R^2 = .35$. There were significant main effects of both Coke, $b = -0.74$, $SE = 0.12$, $p < .001$, $OR = 0.48$, 95% CI [0.38, 0.59], and Lipton purchasing habits, $b = 0.59$, $SE = 0.11$, $p < .001$, $OR = 1.80$, 95% CI [1.48, 2.24], and a significant main effect of endowment, $b = 1.25$, $SE = 0.25$, $p < .001$, $OR = 3.48$, 95% CI [2.16, 5.75]. However, none of the interaction effects were significant, ps < .250. Thus, showing the same pattern of results as for the choice of soda brand.

Discussion

We tested our three hypotheses regarding the effect of previous preferences, endowment, and their interaction using a choice between soda brands. After measuring participants soda purchasing habits, we endowed each participant with either a can of Coke or Lipton and measured which of the two sodas participants opted to take home. As in Experiment 3.1, we find that both previous preferences, that is, purchasing habits, and endowment play a role in choices. However, unlike Experiment 3.2, we do not find the interaction affect predicted by the *preference strength hypothesis*. Instead our results show support for the *previous preferences hypothesis*. However, it is important to note that endowment did not play an insignificant role in soda choices. Similar to Experiment 3.2, it seems that to receive the winning hand is to be endowed with a product in line with your previous preferences. However, this effect does not differ for people with strong or weak previous preferences.

We also found that query order reflected participants' choices. Participants were not only more likely to first think of the product they were endowed with, but also of products that they had a previous preference for. Although there was a significant interaction effect of endowment and Coke purchasing habits, this interaction did not survive a sensitivity analysis. This suggests that the interaction was relatively unstable and that query order reflects the same pattern as the final soda choice. A result in line with the premises of query theory.

General Discussion

A choice situation can consist of many different decision-making cues. In our research, we examined how cues of endowment and previous preferences affect choices as a result of shifting the salience of a choice option during the decision-making processes. Using query theory (Johnson et al., 2007) as a diagnostic tool, we measured which decision cue was most salient for participants and found that memory retrieval order was consistent with choices. For both smartphones and soda brands, we find that previous preferences play an important role on choices and decision processing regardless of endowment. However, the nature of the effect of previous preferences differs. In our Experiment 3.1, we find that the *preference strength hypothesis* predicted preferences and incentivized choices

for smartphones. In Experiment 3.2, we find support for the *previous preferences hypothesis*, suggesting that participants were more likely to opt for the beverage in line with their previous preferences above and beyond endowment. It appears that (strong) previous preferences cannot easily be overridden by endowing participants with a product.

Of course, we cannot discount the effect of endowment. While it may not be a strong enough cue to override (strong) previous preferences, it does factor significantly into the decision-making process. Rather than overriding previous preferences, the endowment effect is qualified by pre-existing preferences so that it becomes weaker, especially for consumers with strong previous preferences. As such, the endowment effect may be most effective for people who do not have strong pre-existing preferences for the alternative option in a choice set when endowment is introduced. For smartphones, we find that for participants with weak previous preferences, the compatibility condition does not affect preferences. For sodas, on the other hand, we find a main effect of endowment, showing that endowment acts as a boost to your previous preferences regardless of the strength of your previous preferences. Nonetheless, being endowed with the brand in line with your previous preferences seems to be the winning hand, both in terms of decision processing and the final choice.

Research on the endowment effect has repeatedly shown the strength and robustness of this effect (Morewedge & Giblin, 2015). We provide additional evidence that endowment is effective, especially when it is in line previous preferences. However, in some cases previous preferences can even override the endowment effect, showing that it is vital to take previous preferences into account when studying the endowment effect. After all, endowment does not occur in a vacuum. Decision makers enter into most choice contexts, including endowment, with their previous experiences and preferences in place. As these previous preferences are usually chronically accessible to people, leading to earlier memory retrieval during the decision-making process, they will shape the choice either boosting or attenuating the endowment effect.

Previous preferences: Brand loyalty vs. purchasing habits?

Although we find ample support that previous preferences matter, our experiments show conflicting results about the nature of their effect. In our first experiment, we find support for the *preference strength hypothesis*, suggesting that strong previous preferences completely override the endowment effect. People with weak preferences are more likely to opt for the endowed option when endowed with an incompatible product compared to people with strong previous preferences. In our second experiment, we find support for the *previous preferences hypothesis*, suggesting that pervious preferences predict choices while working in tandem with the endowment effect (i.e., the endowment gives these previous preferences a boost). Although, our data cannot directly speak to

the causes of these differences, the differences in the experimental design and operationalizations of constructs may provide some valuable insight into what may affect the role of previous preferences on the endowment effect.

First, the products used in our two experiments differ substantially on a few dimensions, first and foremost in monetary value and frequency of purchase. Smartphones are significantly more expensive than soda beverages and are purchased less frequently in general. Most smartphone providers in the Netherlands require costumers to commit to a one- or two-year contract, leading most consumers to only update their smartphones in (bi-)yearly periods. Additionally, the high costs of smartphones make them a substantial and risky purchase, especially for students with no or low incomes who were the subject pool in Experiment 3.1. Given these factors, the decision of which smartphone to purchase may be subject to a more deliberate decision-making process, leaving more room to take previous experiences into account or to being more hesitant at accepting and implementing product information obtained in a very short period of time (i.e., endowment).

If smartphones do elicit a more deliberative decision-making processes, there may also be more room to evaluate not only positive but also negative previous experiences with smartphone brands. In other words, low scores of self-reported brand loyalty may not only reflect a lack of brand loyalty towards a smartphone brand, but potentially also an obvious dislike for the brand. Previous research has shown that product trials, which are similar to endowment, can lead to a decrease in preference for the product (de Groot, Antonides, Read, & van Raaij, 2009). During the trial period consumers also have the opportunity to become familiar with the negative aspects of the product. As such, previous experiences may also lead to a greater disliking of the product and therefore a negative evaluation of the product. This could lead consumers with weak preferences or dislike of the product to be more open to endowment as a cue in the decision-making process. Indeed, we find that people who scored low on brand loyalty were much more likely to choose the incompatible endowed option than those who scored high on brand loyalty.

Conversely, soda beverages may elicit less deliberate decision processing, as these purchases occur more frequently and a wrong decision is less costly to the consumer. We opted to measure previous preferences in the soda experiment using self-reported purchasing habits. Habits are behavioral tendencies that are repeated often and are not always reflected in people's thoughts or intentions (Wood, Quinn, & Kashy, 2002). Additionally, habits are stable across different decision contexts and are driven by past performance. As such, previous preferences take the lead in making choices in favor of a can of soda. Additionally, this less reflective decision-making process may also explain why endowment continues to play a role in soda choices. Rather than overriding endowment, the effect of endowment is

simply combined with that of previous preferences, leading to our findings in favor of the *previous preferences hypothesis,* while still finding an effect of endowment across different levels of purchasing habits.

In Experiment 3.1, we do not endow participants with a smartphone in the traditional sense of the word. Due to financial restrictions we could not give participants the smartphones to keep. An additional limitation in this experiment is that we could not measure real switching behavior. Instead, we attempted to measure real preference by including an incentivized choice with lottery system. However, one problem with lotteries is that most participants realize that they have a relatively small chance of winning. They may not truly believe that they will receive the item they chose. To address these problems, we provided participants with an endowed soda to keep and an incentivized, consequential switching choice in Experiment 3.2. All participants were aware from the time they were endowed with a soda can that they could take the can home with them. However, we cannot know for sure if participant took the soda for their own consumption. Some participants clearly indicated that they took the can for someone else and were dropped from the analysis. However, this exclusion criterium was based on self-report and therefore may not have captured all participants who took the soda for someone else. This would have impacted the importance of *personal* previous preferences as a cue in the decision-making process.

Directions for future research

A closer look at different measures of preference is called for. In the domain of brand loyalty, both attitudinal and behavioral measures are used (Jacoby & Chestnut, 1978). However, they may be capturing different decision-making processes, deliberate vs. habitual, and therefore lead to differences in decision outcomes. In our studies, we examined the underlying decision-making processes using query theory (Johnson et al., 2007), measuring the memory retrieval order during the decision-making process to determine which option was most salient. This method may be better at capturing more deliberate and reflective decision-making processes than habitual decision-making processes. In fact, simply asking participants who are in a more habitual and automatic decision-making mindset to list all of their thoughts may shift their decision-making processes all together. Therefore, it should also be investigated if a query theory approach to determining salience will yield the same results as a more unobtrusive measurement of decision processing, for example eye tracking methodology.

Another avenue for exploration is the types of cues introduced into a status quo. In our experiments we test the effects of endowment and previous preferences on choices and their underlying memory retrieval processes. However, other cues may also play an important role in consumer decision-making. For instance, strongly held attitudes and beliefs could play and important role, even when they go against both previous preferences and endowments. One example could be

products with moral value cues, for example environmentally friendly or fair-trade products. If people hold strong beliefs about the topic of environmentalismthe environment or human rights, such cues may act as the most salient option, regardless of other decisional cues in the decision context. Identifying such cues and investigating their combined effect on decision-making, may not only help us to understand why people do (not) purchase environmentally or socially impactful products, but may also give us insights into how we can shift salience towards such cues, without impacting consumers freedom of choice.

Conclusion

Within the current state of affairs different decision cues exist. Which of these options acts as a salient reference point can shift decision-making processes as well as their outcomes. We find that previous preferences are not to be discounted, even when another strong cue of endowment is present. Overall, people are likely to stick with their previous preferences, especially if these previous preferences are strong. Nonetheless, endowment is still important. In fact, we can boost the preference for the brand in line with previous preferences if you also endow the consumer with it. As such, knowing and understanding the combined effect of decision cues can help us understand for whom altering the decision-making context, for example by endowing them with a good, will be most effective: The winning hand is the product in line with previous preferences and acts as an endowment. It cannot lose.

SECTION 2.

Then our decisions turn around and make us…

4

CHAPTER 4.

The Effects of Decision Time on Perceptions of Decisions and Decision Makers in (Moral) Trade-Off Scenarios

PsyArXiv preprint:
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The effects of decision time on perceptions of decisions
and decision makers in (moral) trade-off scenarios
doi: 10.31234/osf.io/37t2r.

Abstract

People often have to make trade-offs. We study three types of trade-offs: 1) "secular trade-offs" where no moral or sacred values are at stake, 2) "taboo trade-offs" where sacred values are pitted against financial gain, and 3) "tragic trade-offs" where sacred values are pitted against other sacred values. Previous research (Critcher et al., 2011; Tetlock et al., 2000) demonstrated that tragic and taboo trade-offs are not only evaluated by their outcomes, but are also evaluated based on the time it took to make the choice. We investigate two outstanding questions: 1) does the effect of decision time differ for evaluations of decision outcomes compared to evaluations of the decision makers? and 2) are moral contexts unique in their ability to influence character evaluations through decision process information? In two experiments (total $N = 1434$), we find that decision time affects character evaluations, but not evaluations of the decision itself. There were no significant differences between tragic trade-offs and secular trade-offs, suggesting that the decisions structure may be more important in evaluations than moral context. Additionally, the magnitude of the effect of decision time shows us that decision time may be of less practical use than expected; warranting a closer examination of the processes underlying decision time and its perception.

Keywords: moral decision-making, decision time, process information, taboo trade-offs, tragic trade-offs, secular trade-offs, sacred values, interpersonal evaluations

The Effects of Decision Time on Perceptions of Decisions and Decision Makers in (Moral) Trade-Off Scenarios

Understanding how and when people make moral choices is important for understanding how morality and virtue plays out in society and in our daily lives.

Recently, research in moral psychology has turned its focus to person perceptions of moral decision makers. Rather than look at how we make moral decisions, this new work looks at how our moral decisions influence how we are evaluated and perceived by others (Uhlmann, Pizarro, & Diermeier, 2015; Pizarro, 2011). This person-centered approach to moral judgment suggests that moral decisions, especially the outcomes of our choices, inform inferences about our character by providing the observer with pertinent information about our moral values. Just as economists claim that choices reveal preferences (Samuelson, 1948), it appears that people believe that moral decisions reveal moral preferences. More practically, they give the observer insight into whether a person has the potential to harm them or cooperate with them in the future (Everett, Pizarro, & Crockett, 2016; Rom, Weiss, & Conway, 2017).

It is perhaps obvious that the choices people make influence evaluations of their character. After all, immorality and bad moral choices are typically things to be avoided. In moral decision-making, the choice itself is not the only type of information that can influence how a decision maker is perceived. Aspects of the decision-making *process* can also play a role (Critcher, Inbar, & Pizarro, 2013; Robinson, Page-Gould, & Plaks, 2017). In our research, we study one of these aspects: the effects of the decision time on evaluations of decisions and decision makers in sacred value trade-off decisions.

Sacred Value Trade-offs

Decisions necessitate that we make trade-offs between two or more options. We opt to forgo a positive aspect of one option, in favor of a positive aspect of the other option. For example, when choosing between two job offers, you may make a trade-off between the higher salary of "Job A" compared to the shorter commuting time of "Job B." In other words, decision makers conduct an informal cost-benefit analysis of the options and choose the option with the highest value.

However, there are some decisions where a cost-benefit analysis is clearly not possible. The characteristics of one option may be resistant to any kind of trade-off, such is the case for protected or sacred values (Baron & Spranca, 1997). These sacred values (e.g., human life, loyalty, justice, and purity) are deeply held normative intuitions about the integrity, even sanctity, of certain relationships

and of moral-political values (Fiske & Tetlock, 1997). Whereas selling baby clothes is a trade-off most people accept, people typically find it reprehensible to even contemplate selling a baby; this is a trade-off between a sacred value (i.e., human life) and monetary gain. When sacred values are violated, people experience strong negative reactions (Hanselmann & Tanner, 2008) and express intolerance of the people who violate the values (Henry & Reyna, 2007; Tetlock, 2003; Tetlock, Kristel, Elson, Green, & Lerner, 2000). Sacred values appear to take on a near infinite value as people oppose profitable and functional economic markets where these values are traded-off (Roth, 2007). The idea is that when people are asked to make a trade-off between a sacred and a secular value, people will opt for the decision that protects and promotes the sacred value because of the sacred value's infinite value.

There are three different types trade-offs that we consider here: 1) *taboo trade-offs* where a sacred value is pitted against a secular or economic gain, 2) *tragic trade-offs* where two sacred values are pitted against each other, and 3) *secular trade-offs* where no sacred values are at stake and which are comparable to standard trade-off scenarios often studied in decision-making sciences. Examining how information about the decision-making process interacts with these three types of trade-offs will give us insight into how people evaluate decisions and form perceptions of decision-makers across multiple decision contexts.

Process-Information: Decision Time

People's choices are an obvious source of information about their moral character (Everett et al., 2016; Rom et al., 2017). But people can also make inferences about character using information about *how* the decision was made (Robinson et al., 2017; Tetlock et al., 2000). This decision process information gives people insight into the decision-maker's intentions and motivations by highlighting how a decision-maker went about processing and making the decision, independent of the actual decision that was made. Quickly declining to sell your baby tells us something different (and more positive!) about your character than if you need a long time to carefully weigh the pros and cons before declining. Consistent with this idea, decision makers who make the morally correct choice are perceived positively and even more positively if they do so quickly (Critcher et al., 2013). The key idea is that people use process information about the decision to peer into the mind of the decision-maker and help make judgments about the decision and to evaluate the decision maker.

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We conducted two experimental studies to understand how process information influences evaluations of decisions and decision-makers for different types of decision trade-offs. In both studies, we manipulated the time it took a decision

maker to decide in a taboo trade-off, tragic trade-off, and secular trade-off. Then, we measured how participants evaluated both the acceptability of the decisions and the character of decision makers. This allows us to answer two outstanding questions on the relationship between decision time and evaluations of decision makers:

1. Does the effect of decision time differ for evaluations of the decision compared to evaluations of the decision maker's character? Answering this question will help us understand if decision time is used to infer the quality of the decision itself or the qualities of the person making the decision.

2. Are moral decisions and contexts unique in their ability to influence character evaluations through decision process information? Answering this question will help us understand if trade-offs involving sacred values are perceived as qualitatively different than other types of trade-offs.

Research Question #1: Does the Effect of Decision Time Differ for Evaluations of the Decision Compared to Character Evaluations of the Decision Maker?

To examine how perceivers use process information when evaluating decisions and decision makers, we outline two perspectives based on the moral psychology and the decision-making literatures. Do people use a holistic approach, including decision time in their overall impression of the decision and its maker, or is decision time only informative for character evaluations?

Act-person dissociation perspective. According this perspective, decision time gives people unique insight into the mind and character of decision-makers, but does not color the judgments of the decision itself. Although not about decision time, some work has found that certain behaviors give more insight into decision-makers' moral character compared to the decision-makers' actions (for an overview see Uhlmann, Pizarro, & Diermeier, 2015). For example, people judge the act of beating the girlfriend as much harsher than the act of beating the girlfriend's cat. Nonetheless the cat-beater is evaluated more harshly as a person than the girlfriend-beater (Tannenbaum, Uhlmann, & Diermeier, 2011). It appears that beating a cat is considered more informative about moral character than beating a girlfriend. Other research, has found that an act can be deemed morally praiseworthy, but lead to a negative evaluation of the decision maker (Uhlmann, Zhu, & Tannenbaum, 2013). For example, someone who throws a dying man overboard to prevent a lifeboat from sinking is viewed as a bad person, although most people agree that it was the correct action to take. Yet other research on moral outrage and blame has shown that decision process information can lead

to reduction of blame for negative actions when they are made impulsively rather than deliberatively (Pizarro, Uhlmann, & Salovey, 2003).

Similarly, decision time may also be informative of moral character. If someone takes a long time to make the morally correct decision in a taboo trade-off, this might be seen as an indicator that the person is morally deficient as the morally correct choice should be obvious. According to this perspective, we should find in our experiments that decision time will only have an effect on character evaluations and not on evaluations of the decision.

Act-person association perspective. Contrary to the prior perspective, the act-person association perspective suggests that perceivers consider all decision-relevant information when judging a decision and uses all of this information when both judging the decision and the decision maker. That is, decision time gives people insight into the mind and character of decision-makers which colors their judgments of the quality of decision itself. Decision time is used to infer if the person is a bad person, and a decision made by a bad person will be judged as less acceptable. That is, there is a halo effect (Thorndike, 1920). This perspective aligns with the findings of Tetlock et al. (2000) which imply that the effects of time on decision acceptability (e.g., moral outrage and punishment) should give similar insight into the evaluations of the decision maker.

Research Question #2: Are Moral Decisions and Contexts Unique in Their Ability to Influence Character Evaluations?

Decision time gives insight into the mind of the decision maker. Does this insight function similarly for moral as for non-moral decisions? We examine whether decision time provides the same informative value about a decision maker's character in tragic trade-offs compared to secular trade-offs. We propose two possible perspectives based on findings in the moral psychology and the decision-making literatures.

Moral contamination perspective. According to this perspective, decision time is more informative of moral character in moral decisions (i.e., tragic trade-offs) than other routine decisions (i.e., secular trade-offs). The person-centered approach to moral decision-making posits that moral decisions are particularly indicative of character as they have informative value of not only the decision maker's preferences, but also their adherence to moral guidelines. Tragic trade-offs are considered more difficult (Hanselmann & Tanner, 2008) and have more at stake than secular trade-offs. Moral decisions are also laden with emotions, both on the part of the decision maker and the observer. For instance, character evaluations (i.e. trustworthiness) of a decision maker seemed to correlate more with the degree of compassion that the decision maker feels for a suffering person than their degree

of adherence to deontological moral rules (Everett, Pizarro, & Crockett, 2016). Furthermore, even small violations of moral values can lead to moral outrage and anger (Tannenbaum et al., 2011; Uhlmann et al., 2013). This indicates that including moral values into a decision-making context does not only increase the difficulty of the decision but also the affective responses towards the decision maker.

Therefore, decision time in a moral trade-off context should provide more insight into the decision maker's moral guidelines than the decision time associated with a secular trade-off. For example, taking a long time to make a choice between equivalent job offers and taking a long time to choose between saving the life of a little boy or that of a little girl reveals different things about the decision maker and therefore also leads to more emotional judgments on the part of the observer.

Structural similarity perspective. According to this perspective, the underlying structure of the trade-off decision determines how perceivers evaluate decision makers in these contexts. Both tragic and secular trade-offs are subject to the same underlying cost-benefit structure, although the absolute values of the available options may differ between the two. In a tragic trade-off, a sacred value is pitted against another sacred value, leading to a trade-off between two approximately equal values ($\infty \approx \infty$). Similarly, in traditional secular trade-offs, two secular values of approximately equal magnitude are pitted against each other. This also leads to a trade-off between two equal values ($x \approx x$). In both cases, there is no clearly correct solution based on traditional utility theory, as defined by choosing the option with the highest objective utility.

Since both types of trade-offs have equivalent structures, both types of decisions present a similar decision conflict. Therefore, perceivers should not differentiate in terms of morality between decision makers who took a long time to make a choice between equivalent job offers and decision makers who took a long time to choose between saving the life of a little boy or that of a little girl. In both cases, decision time merely reflects the inner struggle between equivalent options and in no way reflects the absolute value of these option. This is in line with theories suggesting that both moral and economic decision-making can be explained using drift diffusion models: the subjective utility of each outcome option is evaluated and compared (Cohen & Ahn, 2016). These theories are also supported by neurological data that shows moral and economic choices are made by the same brain regions and therefore have a similar underlying architecture (Hutcherson, Montaser-Kouhsari, Woodward, & Rangel, 2015).

We believe that providing answers to both of our research questions will give us a better understanding of the function and limits of process information (i.e., decision time) in evaluating decisions and decision makers. Additionally, we provide initial insight into how inclusion of sacred values affects decision evaluations particularly

whether decision time acts as a more informative cue for moral decisions or reflects the comparison of equivalent structures in tragic and secular trade-offs.

Method

We measured the effects of decision time in multiple decision scenarios in two experimental studies. To answer our two research questions, our studies included measures assessing participants' evaluations of the decision and their character evaluations of the decision maker across the three types of trade-offs: taboo, tragic, and secular. Both studies employed the same research design and were meant to complement each other by testing our research questions in different samples: European university students (Lab Study) and American online participants (MTurk study). We determined sample sizes before data collection based on power analysis based on a $2 \times 2 \times 3$ between subjects design. To detect a small to medium interaction effect of $f = 0.15$ with a power of 80%, a sample size of 432 was needed. In these studies, we report all measures, manipulations, and exclusions.

Participants

Lab Study. In exchange for course credit or €8 in cash, we recruited 571 Tilburg University students (399 women, 171 men, 1 non-binary, $M_{age} = 20.60$, $SD = 2.60$). In the social psychology laboratory, participants completed an online Qualtrics survey on computers in individual cubicles. The experiment was conducted in English, so that both Dutch and international students could participate (59% Dutch, 34.3% European, 6.7% non-European).

MTurk Study. We recruited 863 U.S. participants from the online crowdsourcing platform Amazon Mechanical using the software TurkPrime (Litman, Robinson, & Abberbock, 2016). This software enabled us to collect participants in small batches over three consecutive days. Participants with duplicate IP addresses or who did not complete any of the dependent measures were removed from analysis ($n = 20$), leaving us with a total sample of 843 participants. Due to an oversight, demographic information was not collected. Attempts were made to retrospectively contact the participants to ask them for age, gender, and U.S. citizenship status. We were able to collect this information from 516 of the participants (251 women, 265 men, $M_{age} = 37.7$, $SD_{age} = 11.7$; 100% U.S. citizens).

Procedure and Materials

Participants read scenarios (Lab Study: 8 scenarios; MTurk Study: 4 scenarios), which varied based on a 3 (Type of Trade-off: taboo, tragic, vs. secular) $\times$ 2 (Choice: A vs. B) $\times$ 2 (Decision Time: fast vs. slow) between-subjects design. For each scenario, participants were randomly assigned to one of the twelve experimental conditions, regardless of their condition in the previous scenario using the

Qualtrics built in randomizer function. After each scenario, participants indicated how difficult they thought the decision was. For exploratory purposes, we also measured, in the MTurk study, how doubtful the decision maker was while making the decision. Then, participants responded to measures assessing their evaluations of the decision (decision valence and punishment) and their character evaluations of the decision maker (warmth, competence, and morality), which were the main dependent variables of our study. Measures are described below in the order in which they appeared.

Scenarios. For our experimental studies, we made use of eight scenarios that covered different decision domains and were altered to manipulate the type of trade-off (taboo, tragic, vs. secular), the decision-maker's choice (A vs. B), and the decision speed (fast vs. slow). Tetlock et al.'s (2000) original scenario of Robert, the health care manager (Table 4.1), along with a newly created secular version of the scenario was included. For the additional scenarios, we adapted previously used moral dilemma scenarios to include all three trade-off types (inspired by the dilemmas used in Conway & Gawronski, 2013; Greene et al., 2001; Hanselmann & Tanner, 2008). In a follow-up manipulation check study (N = 338; see supplemental materials), we tested the underlying decision structures of all scenarios and their trade-off conditions by assessing the acceptability of each choice outcome option. Using the results of this manipulation check study, we conducted our analyses using only the scenarios that fit our underlying assumptions (e.g., choice options are approximately equivalent for secular and tragic trade-offs and one choice option is substantially better for taboo trade-offs). Three scenarios were removed entirely and we treated scenarios in which the tragic trade-off conditions resembled taboo trade-offs as taboo trade-offs (*Lab Study:* 2 scenario; *MTurk Study:* 1 scenarios) for the sake of analyses. All analyses reported below were conducted with 5 scenarios in the Lab Study and 3 scenarios in the MTurk Study.

Table 4.1. Wording for Two (of Eight) Scenarios for all Trade-Off Conditions.

	Organ Scenario **Tetlock et al. (2000)**	**Sophie's Choice Scenario** **(adapted from Greene et al., 2001)**
Tragic	Robert is the Director of Health Care Management at a major hospital. He is in charge of the hospital's resource allocation. Today, he is faced with the following decision: Robert can either save the life of Johnny, a five year old boy who needs a liver transplant, or he can save the life of an equally sick six year old boy who needs a liver transplant. Both boys are desperately ill and have been on the waiting list for a transplant but because of the shortage of local organ donors, only one liver is available. Robert will only be able to save one child.	It is wartime and Tim and his two children, ages eight and five, are living in a territory that has been occupied by the enemy. At the enemy's headquarters is a doctor who performs painful experiments on humans that inevitably lead to death. He intends to perform experiments on one of Tim's children, but he will allow Tim to choose which of his children will be experimented upon. Tim has twenty-four hours to bring one of his children to the laboratory. If he refuses to bring one of his children to the laboratory the doctor will find them both and experiment on both of them. Tim has to decide whether to bring his eight-year-old or five-year-old child to the laboratory.
Taboo	Robert is the Director of Health Care Management at a major hospital. He is in charge of the hospital's resource allocation. Today, he is faced with the following decision: Robert can save the life of Johnny, a five year old who needs a liver transplant, but the transplant procedure will cost the hospital €750,000 that could be spent in other ways, such as purchasing better equipment and enhancing salaries to recruit talented doctors to the hospital. Johnny is very ill and has been on the waiting list for a transplant but because of the shortage of local organ donors, obtaining a liver will be expensive. Robert could save Johnny's life, or he could use the €750,000 for other hospital needs.	It is wartime and Tim and his two children, ages eight and five, are living in a territory that has been occupied by the enemy. At the enemy's headquarters is a doctor who performs painful experiments on humans that inevitably lead to death. He informs Tim that he can offer Tim a high-status position in the new government in exchange for performing experiments on Tim's eight-year-old child. Tim has twenty-four hours to decide whether or not to bring his eight-year old child to the laboratory and accept the doctor's offer.
Secular	Robert is the Director of Health Care Management at a major hospital. He is in charge of the hospital's resource allocation. Today, he is faced with the following decision: Robert is offered a good deal on a new and updated MRI machine, but it will cost the hospital €750,000 that could be spent in other ways, such as funding medical research and enhancing salaries to recruit talented doctors to the hospital. The hospital's current MRI machine is old and out of date but is still being used frequently to diagnose patients. Robert could purchase the new MRI machine, or he could use the €750,000 for other hospital needs.	Tim and his two children, ages eight and five, are living in an apartment in a well-known, big city. His children are about to start primary school and kindergarten, respectively. Tim comes to the realization that the schools in the city do not offer the quality of education he wants for his children, however schools in the suburbs do. He considers moving with his children to the suburbs. However, if he does so his commute to work will be much longer, leading him to spend less time with his children, and they will live farther away their family and friends. Tim has to decide whether to stay in the city or move to the suburbs.

Note: These two scenarios were used in both the Lab Study and the MTurk Study.

Following the description of the trade-off, participants read how long it took the decision maker to decide: for example, "[Robert] takes a long time to decide" or "[Robert] decides quickly" (adapted from Tetlock et al., 2000). Although Tetlock et al.'s (2000) original phrasing also referred to the difficulty or ease of the decision, we excluded this information because we are interested in the unique effect of decision time.

Finally, participants also learned about the decision maker's choice. The non-monetary choice in the taboo trade-off condition and the "better choice" in the two other conditions were coded as Choice A. The monetary choice and the "worse choices" in the two other conditions were coded as Choice B. For the tragic and secular trade-off conditions, the decision whether a choice was coded as "better" or "worse" was based on the subjective evaluation of the experimenter and confirmed by the results of the manipulation check study. The two trade-off scenarios were designed to have outcomes of equal severity, so this choice should be arbitrary. The coding of all choices for each scenario can be found in the online supplemental materials.

Decision difficulty. In order to assess whether participants inferred that decision makers with longer decision times experienced more difficulty, we asked participants "How difficult do you think the decision was for [Robert]?". They responded on a seven-point scale (Lab: 1 = *extremely easy*, 7 = *extremely difficult*; MTurk: 1 = *not at all*, 7 = *extremely*)[17].

Doubt. The MTurk Study also included a measure of doubt. We asked them to respond to three items assessing how doubtful and conflicted they believed the decision maker to be (Evans & van de Calseyde, 2017). Participants responded to the following questions (1 = *not at all*, 7 = *extremely*): "How conflicted was [Robert] when he made this decision?", "How certain is [Robert] about his decision?", and "How doubtful is [Robert] about his decision?" The items were averaged into one doubt measure ($\alpha = .68$), with higher scores indicating more perceived doubt.

Decision valence. Following Tetlock et al. (2000), participants were asked to indicate whether [Robert's] decision was good-bad, foolish-wise, negative-positive, immoral-moral, fair-unfair and whether [Robert's] decision made them feel not at all disgusted-disgusted, not at all angry-angry on seven-point scales.[18] Items were coded so that higher scores indicated more negative opinions or feelings about

17 We changed the labeling of the difficulty measure from "very easy to very difficult" to "not at all difficult to extremely difficult". This was done to make the measures of doubt and difficulty comparable in the MTurk study.

18 Tetlock et al. (2001) also included items assessing whether the participant felt happy-sad and excited-upset. Their factor analysis showed that these two items did not load onto their moral outrage factor. Therefore, they excluded these items from their analysis. Following their example, we included these variables in our survey, but did not include them in our decision valence measure.

the decision. The items were averaged into one measure of decision valence (Lab α = .85; MTurk α = .87).[19]

Character evaluations. To investigate the effect of decision time on character evaluations of the decision maker, we include fifteen traits (Fiske, Cuddy, Glick, & Xu, 2002; Leach, Ellemers, & Barreto, 2007) to measure perceived competence (*competent, intelligent, confident, independent, skilled, competitive*; Lab Study α = .86; MTurk Study α = .88), warmth (*warm, tolerant, good natured, friendly, likeable*; Lab α = .85; MTurk α = .87) and morality (*honest, sincere, trustworthy, moral*; Lab α = .88; MTurk α = .92). Participants were asked to "Please indicate to what extent you think [Robert] is…" for each trait (1 = *not at all*, 7 = *extremely*).

Punishment. Following Tetlock et al. (2000), participants indicated their agreement with three statements about their punitive stance towards the decision maker (1 = *strongly agree*, 4 = *neither agree nor disagree*, 7 = *strongly disagree*). The statements read: "[Robert] should be removed from his job",[20] "[Robert] does not deserve to be punished for his decision", and "If [Robert] was a friend of mine, and I knew the decision he made, I would end the friendship over this issue". The items were recoded so that higher scores indicated a more punitive stance. Finally, the three items were averaged to create a punishment measure (Lab α = .72; MTurk α = .74).

Results

Research Question #1: Does the Effect of Decision Time Differ for Evaluations of the Decision Compared to Character Evaluations of the Decision Maker?

To answer our first question, we need to assess the unique effect of decision time on evaluations of the decision (decision valence and punishment) compared to character evaluations of decision makers (competence, warmth, and morality). The *act-person dissociation perspective* predicts that we will find effects of decision time on evaluations of decision makers, but not on evaluations of the decision. The *act-person association perspective*, on the other hand, predicts that the non-zero effect of decision time will be similar in size for both evaluations of decision acceptability and evaluations of the decision maker.

19 Tetlock et al. (2000) names this measure "moral outrage" rather than decision valence. We believe that the measure is more closely related to the overall valence of the decision rather than anger and outrage experienced by the observer.

20 This statement was adapted to fit the context. For example, in the scenario where a father decides whether or not to employ his daughter in the pornography industry, the statement read "José should be investigated by child services". As this statement varied in severity between conditions, we also conducted our analyses with a two-item measure of punishment, thus excluding this item. The analyses and results can be found in the online supplemental materials. We find the same pattern of results as for the three-item measure of punishment.

Analytic strategy. To evaluate these two perspectives, we ran two-step multilevel linear mixed effects models on each of the dependent variables, while taking into account random variance (and nesting) of participants and scenarios. In the first step, we only estimated the effects of trade-off type (orthogonal contrast coded; *T-S contrast*: Tragic vs. Secular; taboo = 0, tragic = 1, secular = -1; *Taboo-contrast*: Taboo vs. Others; taboo = 2, tragic = -1, and secular =-1), choice (orthogonal contrast coded: A = -1, B =1), and their respective interactions. In the second step, we added decision time (orthogonal contrast coded: slow = -1, fast = 1) and all possible interactions to the initial models. Then, we test if the second model provides a better fit of the data and explains significantly more variance than the first model. Explained variance is calculated with Nakagawa and Schielzeth (2013) conditional R^2 which accounts for variance explained by both fixed and random factors. This will show us if decision time influences evaluations of the decision and character evaluations above and beyond the trade-off type, choice, and scenario.

The analyses were conducted using the "lmer" function in the "lme4" package of R (Bates, Mächler, Bolker, & Walker, 2015). The "lmerTest" package was used to obtain *p*-values for regression coefficients (Kuznetsova, Brockhoff, & Christensen, 2017). The two steps of the models were compared using the "anova" function in the "stats" R package. The full models including all coefficients and standard errors are reported in Table 4.2 (Lab Study) and Table 4.3 (MTurk Study). We also report the grand means across all scenarios in Table 4.4 and the comparisons between explained variance in Figure 4.1. Finally, a detailed description of the direction of the model coefficients including time, along with their simple slope analyses, can be found in the supplemental materials.

Table 4.2. Summary of Multilevel Models for Each Dependent Variable – Lab Study (N = 571, 5 Scenarios)

	Valence		Punishment		Competence		Warmth		Morality	
	b	**SE**	**b**	**SE**	**b**	**SE**	**b**	**SE**	**b**	**SE**
Intercept	3.53***	0.14	2.72***	0.25	4.53***	0.45	4.34***	0.11	4.42***	0.13
Time	0.00	0.02	-0.01	0.03	0.04*	0.02	0.01	0.02	0.01	0.02
Choice	0.85***	0.02	0.74***	0.03	-0.18***	0.02	-0.52***	0.02	-0.55***	0.02
Tragic-Secular (T-S) contrast	0.44***	0.03	0.35***	0.04	-0.24***	0.03	-0.12***	0.03	-0.16***	0.03
Taboo contrast	0.07***	0.02	0.36***	0.02	-0.06***	0.01	-0.10***	0.02	-0.15***	0.01
Time × Choice	0.03	0.02	0.05	0.03	-0.03	0.02	-0.07**	0.02	-0.07**	0.02
Time × T-S	0.00	0.03	0.01	0.03	-0.01	0.02	-0.04	0.03	-0.03	0.03
Time × Taboo	-0.02	0.01	-0.06***	0.02	0.02	0.01	0.03*	0.01	0.05***	0.01
Choice × T-S	-0.15***	0.03	-0.11**	0.03	0.01	0.02	0.20***	0.03	0.13***	0.03
Choice × Taboo	0.59***	0.01	0.50***	0.02	-0.13***	0.01	-0.35***	0.01	-0.40***	0.01
Time Choice T-S	0.05	0.03	0.04	0.03	-0.04	0.02	-0.02	0.03	-0.02	0.03
Time Choice Taboo	0.01	0.01	0.02	0.02	-0.00	0.01	-0.02	0.01	-0.02	0.01
Random effects										
Variance of subject intercept (level-2)	0.08 (0.28)		0.15 (0.39)		0.13 (0.36)		0.14 (0.37)		0.15 (0.38)	
Variance of scenario intercept (level-2)	0.10 (0.32)		0.30 (0.55)		0.30 (0.55)		0.06 (0.24)		0.08 (0.27)	
Residual Variance	1.18 (1.09)		1.48 (1.22)		0.77 (0.88)		1.11 (1.06)		1.05 (1.02)	
$R^2_{marginal}$	.61		.49		.10		.38		.43	
$R^2_{conditional}$	.66		.61		.42		.47		.53	

Note: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; standard deviations in parentheses for random effects; $R^2_{marginal}$ = variance explained by fixed factors, $R^2_{conditional}$ = variance explained by both fixed and random factors (Nakagawa & Schielzeth, 2013).

Table 4.3. Summary of Multilevel Models for Each Dependent Variable – MTurk Study (N = 843, 3 Scenarios)

	Valence		Punishment		Competence		Warmth		Morality	
	b	**SE**	**b**	**SE**	**b**	**SE**	**b**	**SE**	**b**	**SE**
Intercept	3.63**	0.22	2.99*	0.32	4.45**	0.34	4.36**	0.18	4.48**	0.20
Time	-0.01	0.03	-0.00	0.03	0.05*	0.02	-0.03	0.03	-0.03	0.03
Choice	0.71***	0.03	0.68***	0.03	-0.34***	0.02	0.50***	0.03	-0.56***	0.03
Tragic-Secular (T-S) contrast	0.69***	0.04	0.41***	0.04	-0.40***	0.04	-0.33***	04.0	-0.35***	0.04
Taboo contrast	0.12***	0.02	0.39***	0.02	-0.11***	0.02	-0.21***	0.02	-0.22***	0.02
Time × Choice	0.01	0.03	0.03	0.03	-0.01	0.02	-0.05	0.03	-0.05	0.03
Time × T-S	-0.03	0.04	0.01	0.04	-0.00	0.03	-0.04	0.04	-0.04	0.04
Time × Taboo	0.01	0.02	-0.04*	0.02	0.03	0.02	0.03	0.02	0.04*	0.02
Choice × T-S	-0.13***	0.04	-0.20***	0.04	0.06	0.03	0.10**	0.04	0.11**	0.04
Choice × Taboo	0.67***	0.02	0.59***	0.02	-0.34***	0.02	-0.49***	0.02	-0.52***	0.02
Time Choice T-S	-0.05	0.04	-0.04	0.04	0.04	0.03	0.05	0.04	0.04	0.04
Time Choice Taboo	0.03	0.02	0.03	0.02	-0.03	0.02	-0.06**	0.02	-0.06**	0.02
Random effects										
Variance of subject intercept (level-2)	0.09 (0.30)		0.28 (0.52)		0.29 (0.54)		0.27 (0.52)		0.26 (0.51)	
Variance of scenario intercept (level-2)	0.14 (0.37)		0.30 (0.55)		0.35 (0.59)		0.10 (0.31)		0.12 (0.35)	
Residual Variance	1.69 (1.30)		2.06 (1.44)		1.21 (1.10)		1.46 (1.21)		1.59 (1.26)	
$R^2_{marginal}$	.53		.44		.24		.39		.41	
$R^2_{conditional}$	.59		.56		.50		.51		.52	

Note: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; standard deviations in parentheses for random effects; $R^2_{marginal}$ = variance explained by fixed factors, $R^2_{conditional}$ = variance explained by both fixed and random factors (Nakagawa & Schielzeth, 2013).

Table 4.4. Grand Means (M) and Standard Deviations (SD) for All Dependent Variables in Both Studies

	Valence		Punishment		Competence		Warmth		Morality	
	Lab	MTurk	Lab	MTurk	Lab	MTurk	Lab	MTurk	Lab	MTurk
	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)
Taboo Trade-Off										
Choice A										
Slow	1.75 (0.83)	1.96 (1.27)	1.98 (1.18)	2.22 (1.50)	4.62 (0.98)	4.93 (1.22)	5.14 (1.23)	5.16 (1.32)	5.21 (1.26)	5.37 (1.42)
Fast	1.59 (0.73)	1.81 (1.33)	1.56 (0.92)	1.84 (1.47)	4.83 (0.86)	5.31 (1.26)	5.51 (0.95)	5.58 (1.36)	5.63 (0.97)	5.83 (1.40)
Choice B										
Slow	5.74 (1.31)	5.92 (1.33)	5.26 (1.66)	5.71 (1.62)	3.82 (1.25)	3.04 (1.46)	2.94 (1.28)	2.52 (1.38)	2.75 (1.19)	2.48 (1.44)
Fast	5.73 (1.27)	6.04 (1.37)	5.23 (1.71)	5.73 (1.73)	3.94 (1.29)	3.19 (1.61)	2.86 (1.25)	2.28 (1.39)	2.74 (1.22)	2.29 (1.44)
Tragic Trade-Off										
Choice A										
Slow	3.75 (1.40)	4.14 (1.60)	2.40 (1.42)	2.82 (1.90)	4.63 (1.17)	4.38 (1.47)	4.38 (1.16)	4.40 (1.54)	4.55 (1.21)	4.58 (1.60)
Fast	3.68 (1.37)	4.19 (1.52)	2.41 (1.49)	3.01 (1.77)	4.72 (1.10)	4.35 (1.47)	4.34 (1.11)	4.12 (1.53)	4.49 (1.13)	4.26 (1.55)
Choice B										
Slow	3.84 (1.11)	4.10 (1.44)	2.52 (1.44)	2.65 (1.70)	4.64 (0.98)	4.42 (1.45)	4.55 (1.06)	4.48 (1.43)	4.63 (0.96)	4.61 (1.47)
Fast	4.02 (1.30)	3.88 (1.38)	2.79 (1.56)	2.66 (1.70)	4.51 (1.08)	4.51 (1.23)	4.30 (1.04)	4.38 (1.26)	4.32 (1.08)	4.46 (1.32)
Secular Trade-Off										
Choice A										
Slow	2.57 (1.08)	2.70 (1.25)	1.63 (0.91)	1.93 (1.21)	4.88 (0.92)	4.92 (1.06)	4.90 (0.98)	4.95 (1.10)	4.99 (0.93)	5.16 (1.12)
Fast	2.66 (1.12)	2.62 (1.30)	1.73 (0.97)	1.91 (1.21)	4.92 (0.97)	5.06 (1.01)	4.96 (1.05)	5.05 (1.13)	5.00 (1.00)	5.21 (1.19)
Choice B										
Slow	3.42 (1.12)	2.96 (1.36)	2.32 (1.40)	2.41 (1.62)	4.73 (0.92)	4.91 (1.16)	4.21 (1.16)	4.87 (1.33)	4.48 (1.13)	4.98 (1.37)
Fast	3.43 (1.34)	3.05 (1.43)	2.37 (1.48)	2.58 (1.68)	4.81 (1.01)	4.90 (1.19)	4.21 (1.17)	4.72 (1.34)	4.41 (1.17)	4.80 (1.37)

Note: Mean and SD scores reported on Likert-scales from 1 to 7 for all dependent variables.

Unique effect of decision time. For each dependent variable, we compared the amount of variances explained (conditional R^2) in the model excluding decision time with that of the full model including decision time (Figure 4.1). In both studies, the amount of explained variance did not increase significantly for decision valence (Lab: $x^2(6) = 7.26$, $p = .298$; MTurk: $x^2(6) = 5.14$, $p = .526$). For punishment there was only a significant increase in variance for the Lab study, (Lab: $x^2(6) = 23.36$, $p = .001$; MTurk: $x^2(6) = 9.80$, $p = .134$). These findings are generally inconsistent with the *act-person association hypothesis*. For the character evaluations of competence (Lab: $x^2(6) = 17.5$, $p = .006$; MTurk: $x^2(6) = 14.98$, $p = .020$), warmth (Lab: $x^2(6) = 24.72$, $p < .001$; MTurk: $x^2(6) = 23.55$, $p < .001$), and morality (Lab: $x^2(6) = 34.07$, $p < .001$; MTurk: $x^2(6) = 23.94$, $p < .001$), we find a significant increase in explained variance when including decision time. This indicates that information about decision time helps explain how people judge decision makers, but not evaluations of the decision, thus supporting the *act-person dissociation hypothesis*. However, it should be noted that that the change in conditional R^2 was minimal for all dependent variables ($\Delta R^2_{\text{conditionals}} < 1\%$), suggesting that decision time is relevant for character evaluations, but is far from the whole story.

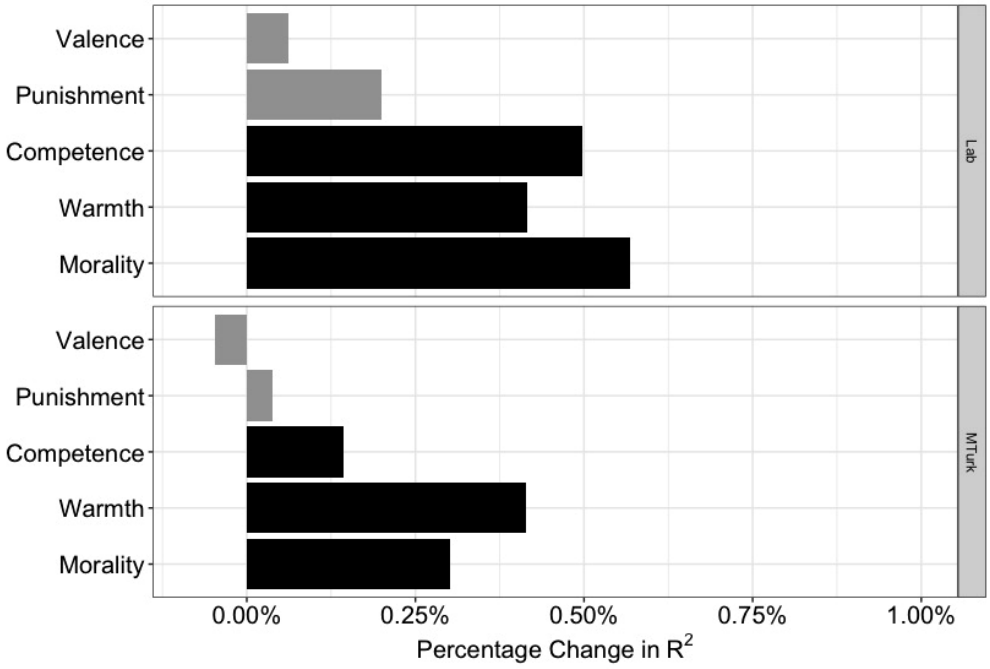

Figure 4.1. $\Delta R^2_{\text{conditonal}}$ when comparing base models to models including time for the five dependent variables. Light grey bars indicate the decision evaluation variables and black bars indicate the character evaluation variables.

Research Question #2: Are Moral Decisions and Contexts Unique in Their Ability to Influence Character Evaluations?

To understand if moral decisions and contexts are unique, we need to compare decisions including moral content (tragic trade-offs) with decisions without moral content (secular trade-offs) that are otherwise similarly structured. This was done by examining *T-S-contrast* and its interactions with decision time in the multilevel models (Tables 4.2 & 4.3). According to the *moral contamination perspective,* we will find stronger effects of decision time in tragic compared to secular trade-offs due to the moral relevance of tragic trade-offs. The *structural similarity perspective,* on the other hand, predicts that effects of decision time should not differ between tragic and secular trade-offs due to the structural similarity of both trade-offs.

We inspected the interaction effect of Time $\times$ *T-S-contrast*, which compares whether there is a different effect of decision time in tragic compared to secular conditions. We find no significant interactions of time and the *T-S-contrast*, Range_{bs} = [-0.04, 0.01] (see Table 4.2 and 4.3). Additionally, inspecting the simple slopes of the dependent variables (see Table 4.5) confirms that the effect of decision time was not significant in the tragic or secular conditions of the outcome variables. We only find one significant effect of decision time in the tragic condition for moral character evaluations in the MTurk study. It seems that making a tragic trade-off decision quickly, leads the decision maker to be viewed as less moral than when he makes it slowly. However, this finding was not replicated in the Lab study.

Finally, the unique effects of decision time in both tragic and secular trade-offs were not significantly different from zero indicating that decision time does not affect evaluations of decision valence or evaluations of decision makers in either type of trade-off. These findings are in line with the predictions of the *structural similarity perspective*.

Table 4.5. Simple slopes of decision time for each of the three trade-off conditions.

	Lab Study			**MTurk Study**		
	Taboo	**Tragic**	**Secular**	**Taboo**	**Tragic**	**Secular**
Valence	-0.04	0.03	0.02	0.00	-0.04	0.01
Punishment	-0.12***	0.06	0.04	-0.09	0.05	0.04
Competence	0.08***	0.01	0.03	0.11**	0.02	0.02
Warmth	0.07*	-0.06	0.02	0.03	-0.10	-0.02
Morality	0.11***	-0.07	-0.01	0.05	-0.11*	-0.03

Note: * $p < .05$, ** $p < .01$, *** $p < .001$. The tragic and secular columns are the most relevant for answering research question

Additional Analyses

Decision time and its interactions only account for a small amount of variance in character evaluations and an even smaller amount of variance in evaluations of the decision. These effects are largely consistent across trade-off type, although the effect of decision time may be larger in the taboo-tradeoff conditions (see Table 4.5 & online supplemental materials). So, what does account for variance in evaluations of the decision and character evaluations?

Unique effects of choice. Previous research has shown that decision makers' choices are strong predictors of how they are viewed by others (Everett et al., 2016; Rom et al., 2017). Our models also speak to the effects of choice on evaluations of the decision and evaluations of the decision makers. As our full models include decision time, we can report the effects of choice and differing effects for each trade-off condition while controlling for decision speed.

Evaluation of decision acceptability. We compared the amount of explained variance (Nakagawa & Schielzeth, 2013) for the models excluding choice and the full models. For both decision valence (Lab: $\Delta R^2 = .60$, $x^2(6) = 2735.5$, $p < .001$; MTurk: $\Delta R^2 = .48$, $x^2(6) = 1783.5$, $p < .001$) and punishment (Lab: $\Delta R^2 = .41$, $x^2(6) = 1872.2$, $p < .001$; MTurk: $\Delta R^2 = .38$, $x^2(6) = 1285.7$, $p < .001$) we find that including choice in the model explains significantly more of the variance. A closer look at the at the coefficients of the model reveals that, in both studies, there is a significant interaction effect of choice and trade-off type (for both *T-S* and *Taboo-contrasts*) on decision valence and punishment. The effects of choice differ across all three trade-off conditions. Simple slopes analyses (see Table 4.6) revealed that, in all three trade-off conditions, choice (orthogonal contrast coded: A = -1, B =1) had a positive effect on decision valence and punishment. If the decision maker made the "wrong" choice, their decision was seen as more negative and worthier of punishment. This effect of choice was strongest in taboo trade-offs and weakest in tragic trade-offs (which is expected due to the different structure of these choices).

Decision-maker evaluations. We compared the amount of explained variance (Nakagawa & Schielzeth, 2013) for the models excluding choice and the full models. For competence (Lab: $\Delta R^2 = .07$, $x^2(6) = 291.22$, $p < .001$; MTurk: $\Delta R^2 = .20$, $x^2(6) = 691.48$, $p < .001$), warmth (Lab: $\Delta R^2 = .39$, $x^2(6) = 1377.3$, $p < .001$; MTurk: $\Delta R^2 = .34$, $x^2(6) = 1163.6$, $p < .001$), and morality (Lab: $\Delta R^2 = .41$, $x^2(6) = 1614.8$, $p < .001$; MTurk: $\Delta R^2 = .37$, $x^2(6) = 1243.5$, $p < .001$), we find that including choice in the model explains significantly more of the variance. In both studies, we found that there was a significant interaction between choice and trade-off type (for both *T-S* and *Taboo-contrasts*) for all three measures of character evaluations: warmth, competence, and morality. Simple slopes analyses (see Table 4.6) revealed that, in all three trade-off conditions choice, had a negative effect on competence, warmth, and morality. If the decision maker made the "wrong" choice, they were seen as less competent, less warm, and less moral.

The simple slopes for choice also reveal that in most cases choice did not affect evaluations of the decision or the decision maker in the tragic trade-off condition. This suggests that in our (recoded) scenarios, the choice outcomes in tragic trade-offs were equivalent as per this trade-off's definition. However, we do not see this equivalence in the secular trade-off condition. It seems that even in secular trade-offs without any moral content, one choice option is viewed a superior than the other, thus influencing both decision and character evaluations. Interestingly, choice did not seem to have a (strong) effect on competence ratings in the secular condition, indicating that making the "better" choice is not related to competence, but instead to morality and warmth.

Table 4.6. Simple slopes of choice for each of the three trade-off conditions.

	Lab Study			MTurk Study		
	Taboo	**Tragic**	**Secular**	**Taboo**	**Tragic**	**Secular**
Valence	2.04***	0.10*	0.41***	2.05***	-0.09	-0.17***
Punishment	1.75***	0.13*	0.35***	1.86***	-0.11	0.28***
Competence	-0.43***	-0.04	-0.06*	-1.01***	0.07	-0.06
Warmth	-1.23***	0.04	-0.37***	-1.49***	0.09	-0.11*
Morality	-1.34***	-0.02	-0.29***	-1.61***	0.07	-0.15***

Note: * $p < .05$, ** $p < .01$, *** $p < .001$.

Perceived difficulty and doubt. Although decision time has small effects on our outcome variables of interest, our measures of difficulty and doubt can give some insight into the information participants are inferring from decision time. In previous research, researchers have manipulated decision time and difficulty simultaneously (e.g., Tetlock et al., 2000), under the assumption that longer decisions are harder and shorter decisions are easier. In our study, we only manipulated decision time to focus on this single piece of process information. We asked participants to indicate how difficult they thought the decision was for the decision maker to help us understand if people inferred difficulty from decision time. Other work has suggested that decision time may be related to doubt or uncertainty (Evans & Van de Calseyde, 2017). Therefore, in our MTurk study, we also assessed whether participants infer doubt from the decision time.

We compared the amount of explained variance (Nakagawa & Schielzeth, 2013) for the models excluding decision time and the full models. For both difficulty (Lab: $\Delta R^2 = .07$, $x^2(6) = 250.74$, $p < .001$; MTurk: $\Delta R^2 = .07$, $x^2(6) = 208.53$, $p < .001$) and doubt (MTurk: $\Delta R^2 = .05$, $x^2(6) = 174.33$, $p < .001$), we find that including decision time in the model explains significantly more of the variance. A closer look at the coefficients of the models reveal that difficulty and doubt vary along with decision time (see Table 4.6). We find a significant negative main effect of decision time; the quicker the decision, the less difficulty and doubt the decision maker is believed to experience. This main effect is consistently qualified by Time $\times$ *Taboo-contrast*

interaction, indicating that the negative relationship between time and difficulty is strongest in the taboo condition.

Table 4.7. Summary of Multilevel Models for Difficulty and Doubt

	MTurk				Lab Study	
	Difficulty		Doubt		Difficulty	
	b	SE	b	SE	b	SE
Intercept	5.13***	0.04	4.30***	0.10	5.26***	0.14
Time	-0.45***	0.04	-0.32***	0.03	-0.43***	0.03
Choice	0.22***	0.04	0.23***	0.03	0.22***	0.03
Tragic-Secular (T-S) contrast	0.71***	0.05	0.80***	0.04	0.60***	0.04
Taboo contrast	-0.50***	0.02	-0.41***	0.02	-0.25***	0.02
Time × Choice	-0.02	0.04	-0.07*	0.03	0.01	0.03
Time × T-S	0.10*	0.05	0.05	0.04	0.08	0.04
Time × Taboo	-0.09***	0.02	-0.09***	0.02	-0.06**	0.02
Choice × T-S	0.09	0.05	0.02	0.04	-0.02	0.04
Choice × Taboo	0.25***	0.02	0.26***	0.02	0.18***	0.02
Time Choice T-S	0.05	0.05	0.02	0.04	-0.01	0.04
Time Choice Taboo	-0.04	0.02	-0.01	0.02	-0.01	0.02
Random effects						
Variance of subject intercept (level-2)	0.33 (0.57)		0.15 (0.39)		0.28 (0.53)	
Variance of scenario intercept (level-2)	0.00 (0.00)		0.03 (0.17)		0.08 (0.29)	
Residual Variance	2.75 (1.66)		1.89 (1.37)		2.28 (1.51)	
$R^2_{marginal}$	.28		.33		.20	
$R^2_{conditional}$	.36		.39		.31	

Note: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$, standard deviations in parentheses for random effects. $R^2_{marginal}$ = variance explained by fixed factors, $R^2_{conditional}$ = variance explained by both fixed and random factors (Nakagawa & Schielzeth, 2013).

These findings suggest that participants use decision time to infer the underlying difficulty and doubt the decision maker was experiencing during the decision-making process. Interestingly, these seem to only weakly translate into character and decision evaluations as witnessed by the small effects of decision time on our dependent variables.

General Discussion

We addressed two outstanding questions about the role of decision process information, specifically decision time, in evaluating decisions and decision makers across three different trade-off contexts: We find a consistent, unique effect of decision time in both studies. In line with the *act-person dissociation perspective,* decision time helps observers evaluate the character of the decision maker, but does not influence the evaluation of the decision itself. Furthermore, our results provide initial evidence that decision time functions similarly for tragic and secular trade-offs; lending support to the *structural similarity perspective*. Nonetheless, the small effect sizes of decision time, especially in comparison to those of choice, call into question the practical significance of including decision time as proxy for other decision process information (e.g., doubt and difficulty indicators) when measuring evaluations of decisions and decision makers.

Answering Research Question #1: Does the Effect of Decision Time Differ for Evaluations of the Decision Compared to Character Evaluations of the Decision Maker?

We proposed two perspectives on the role of decision time in evaluating decisions and decision makers: The *act-person dissociation perspective* posits that people only use decision time as a window into the decision maker's mind and do not use this information to evaluate the decision itself. The *act-person association perspective* posits that decision time is used to infer if the person is a bad person, and a decision made by a bad person will be judged as less acceptable. We tested these perspectives against each other by examining the amount of decision evaluations and character variance explained by decision time and found support for the *act-person dissociation perspective.*

By including decision time, along with all its interaction effects, in our models we account for significantly more of the variance in competence, warmth, and morality perceptions (i.e., evaluations of the decision maker) as opposed to a model that did not include decision time. This was *not* the case for decision valence (i.e., evaluations of the decision). Our findings support perspectives highlighting that moral decisions and moral decision makers can be evaluated differently (Tannenbaum, Uhlmann, & Diermeier, 2011). Our research suggests that such differences in evaluations result from the inferences made by observing decision process information. Observers use this information to peek into the decision makers mind and make inferences about their motives. These inferences seem to primarily shape (moral) character evaluations and not the evaluation of the decision itself.

For punishment we find mixed results, with the Lab study showing a significant increase in explained variance of punishment when including decision time, while our MTurk Study did not. This indicates that punishment may lie somewhere

between decision and character evaluations. On the one hand, unacceptable actions should be punished, regardless of who commits them. On the other hand, observers may believe that "bad" people, or people with immoral motives, deserve punishment to a larger extent if they commit a misdeed than "good" people, or people with moral motives. This supports the idea that intention is related to blame when evaluating moral decision (Pizarro, 2011; Pizarro et al., 2003).

Our models also speak to the effects of choice on both evaluations of the decision and evaluations of the decision makers. We find that choice is a much stronger predictor of evaluations than decision time because the unique effect of choice explains much more of the variance in our models than unique effect of decision time. This finding supports previous research on the effects of decision outcomes on impression formation (Rom & Conway, 2018; Rom et al., 2017). Here, we consistently find that making the "wrong" choice leads to more negative evaluations of both the decision and the decision maker. With taboo trade-offs being judged most harshly (see also Hanselmann & Tanner, 2008; Tetlock, 2003) compared to other types of trade-offs, for both decision evaluations, character evaluations, and punishment. Compared to the large effects of choice, we propose that information about decision speed only adds a little nudge to evaluations. If you decide to sell your baby you will be evaluated very negatively and doing so slowly will barely tip the scale in your favor.

This is not to say that decision time is uninformative. In addition to our dependent variables, we also included measures of difficulty and doubt in our studies. Previous research has shown that decision time may act as a proxy for difficulty and doubt or other indicators of decision-conflict (Evans & van de Calseyde, 2017). Our studies support this finding. Decision time explains a significant amount of variance in whether the participants believed that the decision maker was experiencing difficulty or doubt while making the decision. Decision time can act as a window into a decision makers mind, thereby making more abstract decision processes, like difficulty and doubt, more visible. However, we cannot yet explain why these inferences of difficulty and doubt only translate into rather weak effects on the evaluation of the decision makers character. More evidence on the mechanisms linking decision process information to character evaluations is needed; for example, a direct study of the unique effects of difficulty or doubt on evaluations of the decision and the decision maker.

Future research should also investigate the role of character evaluations themselves and their relation to decision process information in moral character evaluations. In our research, we provided decision process information together with the outcome of the decision. However, decision process information may be more useful in other stages of the evaluation processes. Decision time may also be used for predictive purposes. People use decision time to predict whether an interaction partner will cooperate with them as well as whether that partner

is trustworthy (Evans & Rand, 2018). Similarly, decision time may be used in a predictive fashion in (moral) trade-off scenarios. Knowing that someone is taking a long time to consider the offer of selling their baby, may give us a hint as to what they will eventually decide to do.

Answering Research Question #2: Are Moral Decisions and Contexts Unique in Their Ability to Influence Character Evaluations?

We proposed two perspectives about how including moral elements in a decision context can influence how decision time is interpreted: The *moral contamination perspective* posits that decision time in a moral context is more informative than in a secular context. The *structural similarity perspective* posits that the similarity of tragic and secular trade-offs' underlying structures, lead to similar effects of decision time. Decision time merely reflects the conflict of choosing between two equal options. We tested these perspectives against each other by examining the interaction effect of decision time and the relevant trade-off conditions (*T-S contrast*: tragic vs. secular) and found support for the *structural similarity perspective*.

We found no significant interaction effects of Time $\times$ *T-S* contrast for any of our independent variables. A closer look at the simple effects, reveal that decision time had a null-effect in both tragic and secular trade-offs (see Table 4.4) for all but one of the independent variables. These findings support the *structural similarity perspective*, suggesting that inferences formed from decision time are not affected by the inclusion of moral content in a decision context. Trade-off structures, in which outcomes of equal value are compared, lead to an internal conflict which is reflected in the decision maker's decision process. According to this perspective, observers are aware of the difficulty of choosing between two equal options. Consequently they do not use decision time as a predictor for character evaluations or even evaluations of the decision.

It is necessary to keep in mind one limitation of our study when considering these results. Both the tragic and secular trade-offs were designed to be structural similar. We aimed to create scenarios in which the outcomes of both options were considered equal. However, as mentioned in the method section, post-hoc we subjectively categorized decision outcomes into a "better choice" (Choice A) and a "worse choice" (Choice B). The participants seemed to agree with these categorizations as confirmed by our manipulation check study. Therefore, we decided to run our analyses only with scenarios that fit our underlying assumptions or with inconsistent tragic trade-offs recoded into taboo trade-offs (see Methods & Supplemental Materials.

Additionally, we conducted four sensitivity analyses to ensure that our selection/coding of scenarios did not impact our conclusions: In the supplemental materials we report the results of our analyses using 1) all scenarios with their original

coding, 2) only the scenarios that fit the assumed underlying trade-off structures without any recoding, 3) all scenarios with all inconsistent tragic trade-offs recoded into taboo trade-offs, and 4) excluding the scenarios that imposed a time limit on the decision maker's decision (i.e. Sophie's Choice and Smother Father Scenarios). Overall, we find similar patterns across all sensitivity analyses, with some few exceptions in which the coefficients no longer reach statistical significance but still point in the same direction. However, most differences between the main results and the sensitivity analyses can be found in the tragic trade-off conditions when these were not recoded. This is to be expected given the reasoning behind recoding.

Why did some scenarios not conform to the assumed underlying trade-off structures? It is uncertain if we failed to create structurally similar scenarios for our Lab and MTurk studies or if participants interpret trade-offs malleably. Participants may mentally reconstruct trade-offs which do not allow for a cost-benefit analysis into a structure that does allow for a systematic evaluation. Even in tragic trade-offs in which both outcomes have harsh consequences (e.g., not letting your daughter work in pornography leads to the entire family starving), people intuitively make conclusions about which the better option is. This is in line with many experimental findings in the domain of moral dilemmas. Despite there being no objectively optimal outcome in a moral dilemma, a considerable number of people agree that deontological choices are considered to be "better" choices. For example, when presented with Thompson's (1985) footbridge moral dilemma, in which participants could either let five people die or actively sacrifice on person to save the five people, 90% of participants supported deontological (not actively sacrifice one person) and only 10% of participants supported the utilitarian choice (Bartels & Pizarro, 2011; Mikhail, 2007). Furthermore, people tend to see moral decision-makers who make the deontological choice as warmer compared to those who make the utilitarian choice (Rom et al., 2017). Something similar may occur in our study. In tragic and secular trade-offs, which consist of two equivalent options, people may be consistently drawn to one option over the other.

We propose that people use salient, decision irrelevant cues in the scenario to tip the scale in favor of one option over the other allowing for systematic evaluation or a type cost-benefit of analysis. For example, in the tragic trade-off version of Tetlock et al.'s (2000) scenario, the hospital manager can either save Jonny or an equally sick six-year old boy. Although the lives of both children are considered equally valuable, naming Jonny while leaving the other boy anonymous may tip the scale in favor of Jonny (Burnham, 2003; Charness & Gneezy, 2008). In other scenarios, inaction (Haidt & Baron, 1996; i.e., not selling your daughter into pornography) resulting in harsh consequences (i.e., your family starving) may be viewed as "better" than actively participating in the tragic trade-off.

Conclusion

Research has established that the decision time is used as an insight into the decision-making process and can influence how a decision maker is viewed. We tested this idea in multiple trade-off contexts and measured the effects of decision time on decision and character evaluations. We find that decision time is related to forming impressions of decision maker's characters but is not related to evaluating their decisions. This supports the *act-person dissociation perspective*. Additionally, we provide support for the *structural similarity perspective*. Decision time is used similarly when evaluating decisions and decision makers in tragic and secular trade-offs. However, the magnitudes of the effects of decision time show us that decision time, while statistically significant, may be of little use practically. It only nudges evaluations in the direction already proposed by the choice. Consequently, we encourage taking a closer look at the processes underlying decision time and its perception. Maybe directly measuring the influence of difficulty and doubt can paint a clearer picture of what people care about when evaluating others' decision processing.

5

CHAPTER 5.

Comparing the Effects of Decision Time and Direct Decision Processing Information on (Moral) Character Evaluations

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Abstract

Which decision processing information is most diagnostic for assessing (moral) character? We test if decision time is a more ambiguous cue than more direct types of decision processing information, such as difficulty, doubt, or effort. Our *direct information hypothesis* predicts that these more direct cues will have a larger effect on competence, warmth, and morality ratings than decision time. Participants (N = 871) evaluated a decision maker who made a moral or monetary choice in four scenarios (within-subjects) and were provided with five different types of decision process information (time, difficulty, doubt, effort, control condition with no information). Inconsistent with the hypothesis, the effect of direct types of process information on warmth and morality evaluations were no different than that of decision time. However, for competence we found that doubt and difficulty (though marginally) had stronger effects on competence ratings than decision time, thus partially supporting our hypothesis. Observers may use any type of decision process information, ambiguous or direct, as a cue to make inferences about the decision maker's moral motives. For competence evaluation, however, results suggest that this same decision process information may be interpreted differently, as cognitive capacity.

Keywords: moral decision-making, decision process information, decision time, doubt, effort, taboo trade-offs, sacred values, character evaluations, preregistered

Comparing the Effects of Decision Time and Direct Decision Processing Information on (Moral) Character Evaluations

How we go about making decisions does not just affect our choices, but also how others see us. This may be particularly true in the domain of moral decision-making. According to the person-centered approach to moral decision-making (Uhlmann, Pizarro, & Diermeier, 2015), observers do not just judge the acceptability of moral or immoral choices but also the moral character of the people making them. A person's moral decisions provide observers with vital information about the moral character of the decision maker, as it allows them to assess whether this person's moral values are in line with their own moral values. Simply put, whether we make moral or immoral choices leads us to be viewed as a good or bad person by others. However, research shows that moral impression formation may not be as simple as "good people do good things" and "bad people do bad things" (Pizarro & Tannenbaum, 2011). Some types of moral decisions are more diagnostic of moral character than others (Pizarro & Tannenbaum, 2011). According to Critcher, Inbar, and Pizarro (2013) moral decisions can sometimes be non-diagnostic for two reasons. First, actions may only be weak signals of character. For example, observers are aware that sometimes even immoral people can make moral choices (Reeder & Spores, 1983) and moral choices are sometimes be perceived to have underlying selfish motives (Critcher & Dunning, 2011). A second reason why moral decisions may not always be informative of character is due to situational factors (Jones & Davis, 1965; Jones, Davis, & Gergen, 1961). Some contexts may promote more moral or immoral decisions compared to others, thus making them less useful for determining the underlying character of the decision maker. Given the limitations of only using choices to diagnose (moral) character, observers are constantly on the lookout for more diagnostic pieces of information within the decisional context.

A newer line of research within the domain of moral impression formation has begun to focus on decision processing as a diagnostic cue (Critcher et al., 2013; Robinson, Page-Gould, & Plaks, 2017). It suggests that not only the choices we make, but also *how* we make moral decisions provides valuable information to the observer. The decision processes provide observers with a window into the decision maker's mind and their motives. Decision time, one type of decision processing information, has indeed been found to be more effective at shaping judgements about character than actions (Chapter 4: Spälti, Brandt, & Zeelenberg, 2019). Now the question arises if decision time is the most informative decision processing cue for diagnosing (moral) character?

The effectiveness of different types of decision processing information on character evaluations has been experimentally examined in moral decision-making. Most work has focused on how sharing the time it took to make the decision shaped character evaluations of the decision maker (Critcher et al., 2013; Tetlock, Kristel, Elson, Green, & Lerner, 2000). Other research has tested the effect of the effort put into making a decision (Robinson et al., 2017) or the difficulty of a decision (Kupor, Tormala, Norton, & Rucker, 2014; Tetlock et al., 2000) on character evaluations. While all of these different types of decision processing information are effective in shaping how we see a decision maker, it is not clear how they directly compare to each other. In fact, in many cases, it is even unclear whether their effect on reputation is due to an individual piece of information regarding decision processing or a combination including decision time. For example, in Tetlock et al.'s (2000) Study 2, decision time and decision difficulty are conflated because the decision maker is described as "seeing his decision as an easy one and is able to decide quickly" (Tetlock et al, 2000, p. 858). This is also the case in some experiments reported by Robinson et al. (2017), where effort and time are conflated, saying that the decision maker "took a month to gain as much knowledge as possible by engaging in research and careful deliberations before making his decision". Other research, not in the field of moral decision-making, has also conflated decision time and thoughtfulness, instructing participants that the decision maker "gives each option a thorough examination […]. He puts a great deal of time and thought into his decision, taking 10 minutes to decide" (Kupor et al., 2014, p. 265). As such, it is unclear whether decision time or these other cues of decision processing are driving the effects on character reputation.

Knowing which decision processing cue is most impactful in influencing (moral) character evaluations will help us gain a better understanding of the inferences decision makers make when forming impressions of moral decision makers. While it is likely that all types of decision processing that allow observers to make inferences about conflicted motives (i.e. time, difficulty, doubt, effort) are incorporated into impression formation similarly, the strength of these cues may differ. If researchers or practitioners wish to use these cues to measure or strategically alter reputation, it is useful to know which cue has the highest potential do so. Therefore, the aim of the current research is to test the effectiveness of providing observers with different types of decision processing information as cues for the decision maker's character.

Decision Processing Information Affects Character Evaluations

People who observe moral decision makers making the right choice after taking too much time (Critcher et al., 2013; Tetlock et al., 2000) or exerting effort (Robinson et al., 2017), are more likely to judge them as less moral. For example, if a decision maker, let us call him Mark, takes a long time to decide whether or not to sell his child for 100,000 dollars (and – in this example - eventually decides against it) he will most likely be judged as more immoral than if he refused without hesitation. Conversely, making the immoral choice slowly has been shown to make negative moral evaluations slightly less harsh. These findings have been referred to as a polarization effect or extremity effect of quick decisions (Critcher et al., 2013). Observers use decision time to infer the motives of a decision maker and use this information to form character evaluations rather than only focusing on the outcome of the moral decision.

The idea here is that people have both moral and selfish motives. If a decision was made quickly, with no conflict, it means that one of these motives was significantly stronger than the other, most likely the one the decision maker ended up choosing. So, if Mark decides to sell his child quickly, it is likely that his selfish motive of acquiring money was much stronger than his moral motive of protecting his child. The reverse is also true. If Mark decides to keep his child quickly, it is likely that his moral motive was significantly stronger than his selfish motive. Slow decisions, on the other hand, are believed to convey a battle between these moral and selfish motives, until one finally wins. So, if Mark instead takes a long time to sell his child, the observer can infer that his motive to protect his child was only slightly weaker than that of acquiring money, making him less immoral than if he had made the decision quickly. These types of inferences can be made from any decision processing information provided to an observer that can be used to infer clear or conflicted motives, such as difficulty, effort, or doubt. The decision processing styles compromising of quick, easy, no doubt, and no effort information have been associated with a lack of internal conflict, while decision processing styles comprising slow, difficult, doubt, and effort information have been associated with high internal conflict.

The question arises of which of these types of decision process information is most informative for observers when evaluating moral decision makers. Are all types of decision processing equally effective letting decision makers make inferences about internal conflict or lack thereof? Previous research consistently finds effects of decision time on character evaluations (Critcher et al., 2013; Chapter 4: Spälti et al., 2019; Tetlock et al., 2000). However, these effects are much smaller than the effects of making the right or wrong choice. One experiment found that the unique effects of decision time only explain 1% more variance in character evaluations than choices alone (Chapter 4: Spälti et al., 2019). This calls into questions the practical significance of decision time while making character evaluations. We

propose that decision time is relatively ambiguous cue for internal motives. Did Mark take a long time to decide whether or not to sell his child because he was conflicted, because he put a lot of effort into the decision, or because he found it a particularly difficult decision?

Decision time has been found to be highly related to difficulty of the decision (Kupor et al., 2014), decisional doubt (Evans & van de Calseyde, 2017), and also the effort put into making a decision (Robinson et al., 2017). When judging moral decision makers who have made fast or slow decisions, observers perceive these different types of decision process information to be highly correlated (Chapter 4: Spälti et al., 2019), leading us to assume that observers infer these more direct types of process information from decision time information. We propose that these more direct types of decision processing information are less ambiguous to observers, letting them gain a clearer picture of what is going on in the mind of the decision maker and more clearly assess their motives. As such, our *direct information hypothesis* predicts that direct types of decision process information will have a stronger boosting (when the decision is moral) or attenuating (when the decision is selfish) effect on character evaluations than the more ambiguous information of decision time.

Taboo Trade-Offs

We test our *direct information hypothesis* with scenarios describing decision makers in taboo trade-offs. Taboo trade-offs are characterized by a decision maker who needs to make a choice between money or some other type of personal gain and a sacred value. Sacred values (for an overview see Tetlock, 2003), also known as protected values (Baron & Spranca, 1997), are religious, ideological, or relational values (i.e., the sanctity of human life, nature, purity, etc.) that are resistant to trade-offs. In other words, these sacred values take on infinite value to the decision maker, leading them to overwhelmingly opt for the option in favor of maintaining the sacred value. Opting to forgo sacred values in turn is seen as immoral: While selling a child's toy is a perfectly acceptable transaction, selling a child is morally reprehensive.

These taboo trade-offs lend themselves particularly well to assessing character evaluations, given the simplicity of detecting the morally correct choice. A large majority of decision makers recognize at a glance what the morally "correct" options is (i.e. the sacred value option) and therefore should be able to make the decision without much decision processing and deliberation (Chapter 4: Spälti et al., 2019). Thus, observing someone who took a long time to decide not to sell a child, tells us something about the decision maker, most likely negative. Either, they are unable to recognize what the morally right choice is, which is worrisome, or they had to battle with more selfish or immoral motives before they could finally make the "right" choice. In either case, such inferences about a moral decision maker could suggest that they are not a very competent, sociable, or moral person.

The Current Research

We hypothesize that direct types of decision processing information are more diagnostic when assessing the moral character of a decision maker, compared to decision time. We test this *direct information hypothesis* that giving observers more direct indicators of decision processing will lead to stronger effects on character evaluations than information about decision time, by providing participants with four taboo trade-off scenarios. Along with receiving information regarding the choice that the decision maker finally makes, we also give participants information about how long it took to make the choice (time), how much effort they put into making the choice (effort), how difficult they believed the choice to be (difficulty), or how much doubt they experienced while making the choice (doubt). Unlike previous experiments testing the effects of decision processing in moral decision-making, we also include a control condition, in which participants receive no decision processing information[21]. This allows us to explore how providing different types of decision processing information shapes decisions compared to situations in which such information is not communicated.

Method

Participants

We aimed to collect a minimum of 50 participants per cell, which is similar sample size to previous studies in the field (Critcher et al., 2013; Chapter 4: Spälti et al., 2019). With an experimental design of 18 cells (see Table 5.1), this required a minimum of 900 participants. Due to potential drop-outs and our preregistered exclusion criteria[22], we decided to collect an additional 100 participants. We recruited a total of 1017 participants from Prolific (Palan & Schitter, 2018) in return for a £1.12 participation fee. Recruitment was limited to British citizens. After excluding participants who did not complete the entire survey (n = 12), participants who took more than one hour (n = 1) or less than five minutes to complete the survey (n = 133), a final sample of 871 participants remained (596 women, 274 men, 1 other, M_{age} = 37.29, SD_{age} = 2.55).

21 Additional analyses highlighting the control condition compared to conditions including decision processing information can be found in the online supplemental materials at https://osf.io/abexc/?view_only=8cb39acb75af467a9c52c36348f64db1

22 The preregistered exclusion criteria can be found in the preregistration form available on the Open Science Framework: https://osf.io/nxpkb/register/5771ca429ad5a1020de2872e

Experimental Design

Participants read four scenarios that varied based on a 2 (control condition levels) + 4 (process type: time, doubt, effort, vs. difficulty) × 2 (process style: signaled conflict vs. signaled no conflict) × 2 (Choice: sacred vs. monetary) (18 conditions in total, see Table 5.1). For each scenario participants were randomly assigned to one of the 18 experimental conditions, with participants remaining in the information type condition for the entire experiment (i.e. time, difficulty, doubt, effort, or control condition) and the other conditions varying across scenarios.

Table 5.1. Overview of the 18 Experimental Conditions

	Time	**Difficulty**	**Doubt**	**Effort**	**Control**
Sacred Choice	Slow	Difficult	Doubt	Effort	"No information"
	Fast	Easy	No Doubt	No Effort	
Monetary Choice	Slow	Difficult	Doubt	Effort	"No information"
	Fast	Easy	No Doubt	No Effort	

Procedure and Materials

After giving informed consent, participants read four scenarios and answered questions assessing their character evaluations of the decision maker (warmth, competence, and morality) for each scenario. Next, participants responded to measures of perceived decision process information (e.g. perceived doubt, perceived difficulty, etc.), which acted both as manipulation checks and to measure to what extent different types of decision process information were perceived to be related. Finally, participants provided demographic information (i.e., age, gender) and were debriefed. Measures are described below in the order in which they appeared to participants.

Scenarios. The four taboo trade-off scenarios were altered to manipulate the type of decision process information provided (time, doubt, effort, difficulty, & control condition), the decision-maker's choice (sacred vs. monetary), and the style of the decision-making processes information (high vs. low). For example, we included the scenario of Robert, the health care manager, previously used by Tetlock et al. (2000, p. 858):

> Robert is the Director of Health Care Management at a major hospital. He is in charge of the hospital's resource allocation. Today, he is faced with the following decision:
>
> Robert can save the life of Johnny, a five year old who needs a liver transplant, but the transplant procedure will cost the hospital [€750,000] that could be spent in other ways, such as purchasing better equipment and enhancing salaries to recruit talented doctors to the hospital. Johnny is very ill and has

> been on the waiting list for a transplant but because of the shortage of local organ donors, obtaining a liver will be expensive. Robert could save Johnny's life, or he could use the [€750,000] for other hospital needs.

The other three scenarios were adapted from previously used moral dilemma scenarios (inspired by the dilemmas used in Conway and Gawronski, 2013; Greene, Sommerville, Nystrom, Darley, and Cohen, 2001; Hanselmann and Tanner, 2008). The exact wording for all scenarios is available in the supplemental materials.

Following the description of the taboo trade-off, participants read about the decision maker's decision process information. For example, "[Robert] takes a long time to decide" or "[Robert] decides quickly" (adapted from Tetlock et al., 2000). Wording for the five types of decision process information are provided in Table 5.2. Finally, participants also learned about the decision maker's choice. In the sacred choice, the decision maker decided to uphold the sacred value (e.g. "He decided to save Jonny"), and in the monetary choice the decision maker chose the financial gain over the sacred value (e.g. "He decided to use the €750,000 for other hospital needs).

Our design also included a control condition in which no information about decision processing was included. This condition allowed us to assess the attenuating or boosting effect of if decision processing information on character evaluations, compared to providing participants with no such information at all.

Table 5.2. Wording of Decision process Information

Type	High	Low
Time	Robert takes a long time to decide.	Robert decides quickly.
Difficulty	Robert finds it difficult to make a decision.	Robert finds it easy to make a decision.
Doubt	Robert is in doubt when he makes his decision.	Robert has no doubts when he makes his decision.
Effort	Robert puts a lot of effort into making this decision.	Robert put no effort into making this decision.
Control Condition	No information about decision process information was provided to the participants. Participants only read the decision maker's choice.	

Character evaluations. To investigate the effect of the type of decision process information on character evaluations of the decision maker, we include fifteen traits (Fiske, Cuddy, Glick, & Xu, 2002; Leach, Ellemers, & Barreto, 2007) to measure perceived competence (*competent, intelligent, confident, independent, skilled, competitive*; α = .84), warmth (*warm, tolerant, good natured, friendly, likeable*; α = .84) and morality (*honest, sincere, trustworthy, moral*; α = .87). These were the dependent variables in our experiment. Participants were asked "Please indicate

to what extent you think [Robert] is…" for each trait on a seven-point Likert scale (1 = *not at all*, 7 = *extremely*). The order in which the traits appeared was randomized for each participant.

Perceived decision process information. Participants responded to the following questions on a seven-point Likert scale (1 = *not at all*, 7 = *extremely*): "How long did it take [Robert] to make his decision?", "How doubtful is [Robert] about his decision", "How conflicted was [Robert] when he made this decision?", "How certain is [Robert] about his decision?", and "How difficult do you think this decision was for [Robert]?". Finally, participants also responded to the question "How much effort did [Robert] put into making this decision?" on a seven-point Likert scale (1 = *no effort at all*, 7 = *a lot of effort*).

Participants responded to all measures in the order in which they are described here.

Results

Manipulation Checks and Perceived Decision Processing

In order to test whether our manipulations of decision process information were successful, we measured the participants' perceived decision processing on the part of the decision maker. Using these measures, we conducted 2 (process style: fast/easy/no doubt/no effort vs. slow/difficult/doubt/effort) × 2 (choice: sacred vs. monetary) analyses of variance (ANOVAs) for each of the decision processing information conditions: time, difficulty, doubt, and effort. Specifically, in the time condition we measured perceived time, in the difficulty condition we measured perceived difficulty, etc. There were significant effects of process style ($\boldsymbol{\eta}^2$s = Range[0.35, 0.68]) on perceived decision process information across all manipulation checks indicating that all our experimental manipulations were successful.

Consistent with prior work showing an overlap in how people perceive decision process information (Chapter 4: Spälti et al., 2019), participants also inferred other types of decision process information from the decision process information that was provided as the experimental manipulations. For example, when we provided participants with information regarding the decision maker's decision time we found significant main effects of process style on difficulty, $F(1,772) = 230.16$, $p < .001$, $\boldsymbol{\eta}^2 = 0.23$, doubt, $F(1,772) = 233.26$, $p < .001$, $\boldsymbol{\eta}^2 = 0.23$, effort, $F(1,772) = 291.65$, $p < .001$, $\boldsymbol{\eta}^2 = 0.26$, and uncertainty, $F(1,772) = 86.31$, $p < .001$, $\boldsymbol{\eta}^2 = 0.10$, perceptions. In other words, if participants were told that the decision maker took a long time to decide, they inferred that the decision maker also believed the task to be difficult, experienced doubt, put a lot of effort into making the decision, and was uncertain whether or not he was making the right choice.

A full description of the manipulation checks and the relationship between experimentally provided decision process information and perceived decision process information can be found in the supplemental materials.

Analytic Strategy

The results are presented in Figure 5.1. We preregistered our analysis plan to test our *direct information hypothesis* using multilevel linear effects models on each of the dependent variables, while taking into account random variance (and nesting) of participants and scenarios. All analyses were conducted using the "lmer" function in the "lme4" package of R (Bates, Mächler, Bolker, & Walker, 2015). The "lmerTest" package was used to obtain *p*-values for regression coefficients (Kuznetsova, Brockhoff, & Christensen, 2017).

We preregistered which predictors we would include in our models (i.e. process type, process style, and choice), but not how we would code the predictor "process type". We decided to test our *direct information hypothesis* with two coding methods: 1) As a more global omnibus test of our hypothesis, we used Helmert contrast coding of processing type (Table 5.3). This allows us to compare decision time simultaneously with *all types* of decision processing information combined. 2) We also aimed to test more specifically how each type of direct processing information differed from decision time. To do this we used dummy coding with decision time as the reference category. This allowed us to make pair-wise comparisons of the different types of direct processing information with decision time.

Table 5.3. Helmert Contrast Codes for Type of Decision Process Information

	Control	Time	Difficult	Doubt	Effort
$C1_{\text{control vs. information}}$	4	-1	-1	-1	-1
$C2_{\text{direct vs. time}}$	0	3	-1	-1	-1
$C3_{\text{difficult vs. doubt/effort}}$	0	0	2	-1	-1
$C4_{\text{doubt vs. effort}}$	0	0	0	1	-1

All models estimate the effects of process style (orthogonal contrast coded: fast/easy/no doubt/low effort = -1, control condition = 0, slow/difficult/doubt/high effort = 1,), choice (orthogonal contrast coded: monetary choice = -1, sacred choice =1), type of decision process information (Helmert contrast coded or dummy coded), and their respective interactions[23]. The full models including all coefficients and standard errors are reported in Table 5.4 (contrast coded) and Table 5.5 (dummy coded).

23 Our experimental design includes 18 conditions. The control condition did not include a manipulation of process style, as no decision process information was given to participants in this condition. Analytically, we handled this by coding the process style for the control condition as 0. However, the lack of process style information leads to certain comparison to be impossible. As such our models do not include information regarding interactions of process style which include the control condition. Also, the interactions including both $C1_{\text{control vs. information contrast}}$ and process style are not included in our models. This is also true for models using dummy coding, reported below.

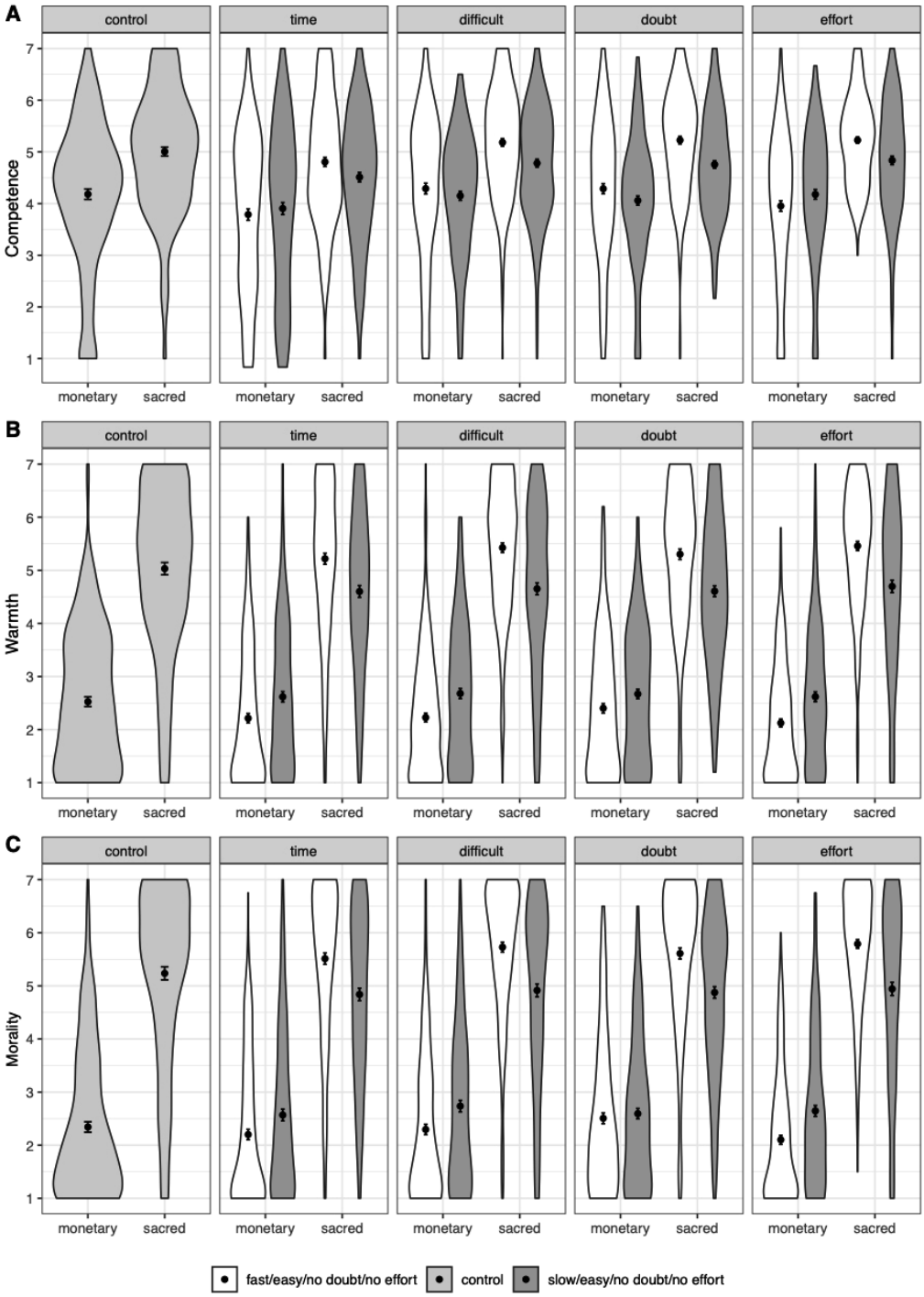

Figure 5.1. Violin plots of competence (panel A), warmth (panel B), and morality (panel C) for the five types of decision-process information. Error bars represent standard errors.

Table 5.4. Summary of Multilevel Models for Competence, Warmth, and Morality Evaluations with Contrast Coding

	Competence		Warmth		Morality	
	b	**SE**	**b**	**SE**	**b**	**SE**
Intercept	4.52***	0.35	3.73**	0.36	3.85**	0.42
Choice	0.42***	0.02	1.28***	0.02	1.43***	0.02
Style	-0.11***	0.02	-0.08***	0.02	-0.10***	0.02
$C1_{\text{control vs. information}}$	0.02	0.02	0.01	0.02	-0.02	0.02
$C2_{\text{direct vs. time}}$	-0.08***	0.01	-0.02	0.01	-0.03†	0.02
$C3_{\text{difficult vs. doubt/effort}}$	0.01	0.02	0.00	0.02	0.01	0.02
$C4_{\text{doubt vs. effort}}$	0.02	0.04	0.01	0.04	0.01	0.04
Choice × Style	-0.09***	0.02	-0.27***	0.02	-0.28***	0.02
Choice × C1	0.00	0.01	-0.00	0.01	0.01	0.01
Choice × C2	0.00	0.01	-0.01	0.01	0.00	0.01
Choice × C3	-0.01	0.02	0.01	0.02	-0.00	0.02
Choice × C4	-0.05†	0.03	-0.07*	0.03	-0.07*	0.03
Style × C2	0.02†	0.01	0.00	0.01	0.00	0.01
Style × C3	-0.01	0.02	0.00	0.02	0.01	0.02
Style × C4	-0.07*	0.03	-0.02	0.03	-0.05	0.03
Choice × Style × C2	-0.00	0.01	0.01	0.01	0.01	0.01
Choice × Style × C3	0.01	0.02	-0.01	0.02	-0.01	0.02
Choice × Style × C4	0.02	0.03	0.02	0.03	0.06†	0.03
Random Effects						
Variance of subject intercept (level-2)	0.27 (0.52)		0.21 (0.46)		0.21 (0.45)	
Variance of scenario intercept (level-2)	0.49 (0.70)		0.52 (0.72)		0.69 (0.83)	
Residual Variance	0.95 (0.97)		1.22 (1.10)		1.40 (1.18)	
R^2_{marginal}	0.11		0.47		0.48	
$R^2_{\text{conditional}}$	0.51		0.67		0.68	

Note: † p < .10, * p < .05; ** p < .01; *** p < .001; standard deviations in parentheses for random effects; R^2_{marginal} = variance explained by fixed factors, $R^2_{\text{conditional}}$ = variance explained by both fixed and random factors (Nakagawa & Schielzeth, 2013). Highlighted rows are most informative for our *direct information hypothesis*.

Table 5.5. Summary of Multilevel Models for Competence, Warmth, and Morality Evaluations with Dummy Coding

	Competence		Warmth		Morality	
	b	SE	b	SE	b	SE
Intercept	4.25**	0.36	3.66**	0.36	3.78**	0.42
Choice	0.43***	0.04	1.27***	0.04	1.42***	0.04
Style	-0.05	0.04	-0.06	0.04	-0.09†	0.04
$D1_{control}$	0.34***	0.09	0.12	0.09	0.01	0.09
$D2_{difficult}$	0.35***	0.07	0.08	0.07	0.14†	0.08
$D3_{doubt}$	0.33***	0.07	0.08	0.07	0.12	0.08
$D4_{effort}$	0.30***	0.07	0.06	0.07	0.09	0.08
Choice × Style	-0.10**	0.04	-0.25***	0.04	-0.26***	0.04
Choice × D1	-0.00	0.07	0.00	0.07	0.04	0.08
Choice × D2	-0.03	0.05	0.04	0.06	-0.01	0.06
Choice × D3	-0.05	0.05	-0.05	0.06	-0.07	0.06
Choice × D4	0.05	0.05	0.08	0.06	0.07	0.06
Style × D2	-0.10†	0.05	-0.01	0.06	0.01	0.06
Style × D3	-0.14**	0.05	-0.04	0.06	-0.08	0.06
Style × D4	-0.01	0.05	0.01	0.06	0.01	0.06
Choice × Style × D2	0.03	0.05	-0.06	0.06	-0.05	0.06
Choice × Style × D3	0.02	0.05	-0.01	0.06	0.04	0.06
Choice × Style × D4	-0.02	0.05	-0.05	0.06	-0.07	0.06

Note: † p < 0.10, * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; standard deviations in parentheses for random effects; Random effects information is identical to the contrast coded model and can be found in Table 5.4. Highlighted rows are most informative for hypothesis testing.

Replicating the Polarization Effect of Decision Time

Our experiment is a conceptual replication of Critcher et al. (2013) who found a polarizing effect of quick decisions on moral character evaluations. Quick moral decisions lead to higher morality ratings than slow moral decisions. Conversely, quick immoral decisions lead to lower morality ratings than slow immoral decision. Consistent with this, using our dummy coded model (where decision time is the reference category), we can test if process style leads to a polarization effect in our data. If we do replicate the polarization effect, we should find significant interaction effects choice × processing style. This was indeed the case. We find the predicted significant interaction effects for competence ($p = .008$), warmth ($p < .001$), and morality ($p < .001$).

We conducted simple slope analyses to determine how decision processing style affected character evaluations in sacred choices compared to monetary

choices. For competence ratings, we found a significant effect of process style in sacred choices. If the decision maker made the sacred choice slowly, he was rated a less competent than if he made it quickly, b = -0.15, SE = 0.05, p = .005. However, for monetary choices, decision makers' processing style did not affect their competence reputations, b = 0.05, SE = 0.05, p = .337. Thus, we only find a polarization effect on competence for sacred value upholding choices.

For warmth and morality ratings, we fully replicated Clayton R Critcher et al. (2013) polarization effect. We find that when a decision maker makes the sacred choice slowly, he is evaluated as less warm, b = -0.31, SE = 0.06, p < .001, and moral, b = -0.34, SE = 0.06, p < .001, than if he makes it quickly. Conversely, if he makes the monetary choice slowly, he is evaluated as more warm, b = 0.18, SE = 0.06, p = .002, and moral, b = 0.17, SE = 0.06, p = .006, than if he made it quickly. Thus, the polarization effect seems to be universal for moral choices, but unique to warmth and morality evaluations when evaluating immoral decisions.

Comparing Decision Time (Proxy) with Direct Decision Process Measures

The *direct information hypothesis* predicts that more direct decision process information (difficulty, doubt, and effort) will have stronger boosting and attenuating effects on character evaluations than decision time. In our contrast coded models, the $C2_{\text{direct vs. time}}$ contrast code provides information regarding the difference between decision time and the three direct types of decision processing on the dependent variables. According to our hypothesis, we should find that the interaction of $C2_{\text{direct vs. time}}$ × process style to be statistically significant and positive. In other words, we should find that the effect of process style is smaller for decision time compared to all direct cues combined. In our dummy coded models, the *direct information hypothesis* predicts that all interactions with including processing style and a dummy will be negative and significant. Additionally, it is possible that there may be differences depending on the choice of the decision maker, although not explicitly hypothesized by our *direct information hypothesis*. Therefore, we also investigate the three-way interaction of style × choice × $C2_{\text{direct vs. time}}$/dummy.

Contrary to our hypothesis, we do not find the predicted interaction effect of $C2_{\text{direct vs. time}}$ × process style or the three-way interaction including choice for any of the three character evaluations in the contrast coded models. This indicates that for competence, warmth, and morality the effect of processing style is the same for decision time and all direct types of processing information combined. However, it is possible that our null findings in this global test of our hypothesis are due to differing effects between the different types of direct processing information (e.g., a positive effect of one cancelling out the negative effect of another). Therefore, our pairwise comparisons can give us a better understanding of the individual effects underlying our non-significant omnibus test.

Confirming the findings of our contrast coded models, we do not find support for our *direct information hypothesis* for warmth or morality evaluations. However, we do find a significant interaction effect of $D3_{doubt}$ × process style (p = .008) for competence evaluations, suggesting that the effect of process style differs for decision time compared to decisional doubt. A simple slopes analysis shows competence ratings are not affected by whether the decision maker makes the decision quickly or slowly, b = -0.05, SE = 0.04, p = .199, but the decision maker is rated as significantly more competent if he makes the decision with no doubt than if he make it with lots of doubt, b = -0.19, SE = 0.04, p < .001. Although the interaction does not reach statistical significance (p = .059), a similar pattern can be found $D2_{difficult}$ × process style, with easy decisions leading to higher competence ratings.

Overall, we find partial support for our *direct information hypothesis* in the domain of competence evaluations and only when comparing decision doubt to decision time. Although the omnibus test did not support our hypothesis, the estimate was in the predicted direction for competence even if it did not reach statistical significance. We believe that this non-significant finding may have resulted from the very small effect of the decision processing style of effort (p = .850) compared to decision time, thus leading to an insignificant result despite the predicted differences found for doubt and marginally for difficulty.

Discussion

Decision processing information can act as a diagnostic cue to determine the moral character of a decision maker. We tested whether decision time is an ambiguous cue compared to more direct types of decision processing information, such as difficulty, doubt, or effort. Specifically, we assume that observers of moral decisions use decision time to infer these more direct types of decision processing in order to assess the decision makers motives. Our *direct information hypothesis* predicted that providing observers with these more direct types of decision processing information, rather than letting them infer them from decision time, should led to stronger effects on character evaluations as there is less room for interpretation. We did not find evidence for this prediction.

In our experiment we presented participants with four taboo trade-off scenarios in which a decision maker either made the sacred choice (generally believed to be the moral choice) or the monetary choice (generally believed to be the immoral choice). We also manipulated the type of decision process information that participants received (time, difficulty, doubt, effort, or no information) and the style of this information, whether this information is believed to portray conflicting motives (slow, difficult, doubt, effort) or one strong motive (quick,

easy, no doubt, no effort). Participants then provided evaluations of the decision maker on competence, warmth, and morality dimensions.

In a first step, we conceptually replicated the polarization effect of decision processing information Critcher et al. (2013). For warmth and morality evaluations, quick decisions boost character evaluations while slow decisions attenuate character evaluations. This was only partially true for competence evaluations. Here we replicate this pattern for decision makers who decide in favor of the sacred value. The reputation of decision makers who opt for the monetary choice are not affected by their decision processing style.

In a next step, we tested our *direct information hypothesis* using two methods of coding. Our results did not support our hypothesis for warmth or morality ratings. Both our omnibus test comparing decision time with all direct types of decision processing combined and the pairwise comparisons of decision time with the direct types found no difference in the effect of process style. It seems that in all cases, decision processing that suggests low levels of conflict lead to more extreme warmth and competence evaluations and the strength of this effect does not depend on the direct or ambiguous nature of the information provided (see choice × processing style).

For competence ratings we found a different pattern of results. Providing participants with doubt or difficulty information lead to more extreme competence evaluations than for decision time. We found that competence ratings did not differ significantly between quick or slow ratings, but for doubt/difficult or no doubt/easy ratings they did. Experiencing doubt while making a decision or believing a decision is difficult can significantly decrease your competence ratings. This shows that certain types of direct process information may lead to more polarized competence evaluations than the more ambiguous cue of decision time. Nonetheless, these findings only provide partial support for the direct information hypothesis in the competence domain. Not all direct types of decision processing information had stronger effects on character evaluations than decision time (e.g., effort). Additionally, the omnibus test of our hypothesis did not yield the predicted interaction effect.

A closer look at our data, however, does reveal some other areas in which competence ratings differ from warmth and morality ratings, even if not specifically predicted by our hypothesis. For example, even when making the immoral choice, competence ratings rarely drop below the scale midpoint, while warmth and morality ratings take a huge hit. Additionally, in our supplemental materials we report exploratory analyses comparing the effects of decision processing information conditions compared to the control condition. For competence ratings, we found that including decision process information did not lead to significantly different competence ratings than when no such information was provided.

However, for warmth and morality we find that that including decision processing information can significantly lower or boost warmth/morality ratings compared to the control condition, but only when the decision maker made a choice in favor of the sacred value. In other words, explicitly communicating decision processing information may be useful in boosting or attenuating warmth and morality reputations (provided you made the moral choice) but not competence ratings. These divergent findings are in line with previous research showing that in moral decision-making contexts moral evaluations take precedent over agency ratings (Brambilla & Leach, 2014; Brambilla, Rusconi, Sacchi, & Cherubini, 2011)

Previous researchers studying the effects of decision processing information on character evaluations suggest that this information is used to infer moral motives (Critcher et al., 2013). Our findings in the warmth and morality domains lend support in favor of this polarization effect which can be explained by inferences about moral motives. However, our findings in the competence domain may be better explained by a "cognitive capacity" account of decision process information. It seems obvious that making finding a decision difficult may suggest limited cognitive capacity. What is interesting here is that the same information (e.g., difficulty of the decision for the decision maker) is used to infer different things depending on the task: judging competence or warmth/morality. This is in line with research in decision science showing that people can use the same information in different ways which fit best with the task demands at hand[24] (Asch, 1940; Elliot & Freyer, 2008; Pecher, Zeelenberg, & Raaijmakers, 1998).

We propose that these differences in how decision processing information is interpreted by observers could also explain why we clearly reject the *direct information hypothesis* for warmth and morality, but find partial support for the hypothesis for competence. When evaluating whether someone is a warm and moral person, motives matter. Any cue that has the potential to imply conflicted or clear motives is used, regardless of the specificity of that cue. In other words, *any* hint at internal conflict can act as a warning signal that maybe the decision maker is not a person to interact with in the future. For competence, on the other hand, decision process information may not be used to infer motives but rather cognitive capacity. More direct information, such as doubt and difficulty, are more informative when gaging cognitive capacity than decision time. In some cases, competent people may take a longer time to deicide than less competent people, because they are taking the time to obtain all necessary information and weigh each choice outcome. Conversely, a competent people may be expected to be confident rather than doubtful about their final choice, thus leading to a stronger effect of doubt on competence ratings than time. Our data cannot speak directly for this interpretation of our findings.

24 For an overview of Henry J. Watt and Narzies Asch's seminal works on the topic of how stimuli will be processed and used in different ways depending on the instructions given by the experimenter, see Elliot and Freyer (2008).

Practical Implications and Directions for Future Research

Our research along, with many others, finds some differences between competence and warmth/morality evaluations (Fiske, Cuddy, & Glick, 2007; Fiske et al., 2002). We find that some cases of decision processing information may be a more diagnostic cue more when making competence evaluations than decision time. This is not the case for warmth and morality ratings. As such, we urge future researchers to be selective in their choice of decision processing information manipulations when assessing or altering competence evaluations. For warmth and morality evaluations, on the other hand, any type of decision processing information seems equally diagnostic and informative. This is good news for both past and future research testing decision processing information on reputation. For example, this research suggests that the confound of decision time with difficulty (Tetlock et al., 2000) or with effort (Robinson et al., 2017) is not problematic. However, future research should test whether the compilation of multiple types of decision processing information leads to different effects on reputation than just providing one type of information (e.g., "taking their time and putting in a lot of effort" vs. "effort" and "time" separately). Of particular interest could be what happens if these different types of decision information are inconsistent (e.g., the decision maker was very doubtful but made the decision quickly). Such experimental tests could give us the opportunity to assess which types of decision processing information is attended to, which is ignored, or if they are combined.

Conclusion

We tested the idea that providing observers with more direct types of decision processing information compared to decision time information would lead to larger fluctuations in character evaluations. We found no evidence for our *direct information hypothesis* for warmth and morality evaluations. It seems that any hint of someone being a bad person will be used to the same extent, regardless of the ambiguous or direct nature of the information. Conversely, for competence ratings we find partial support for the *direct information hypothesis*. Doubt and difficulty information shapes competence ratings to a larger extent than decision time. We propose that the same decision processing information may be used differently depending on the type of character judgment. Specifically, following the person centered approach to morality (Uhlmann et al., 2015), we assume that decision process information is used to infer moral motives or the conflict thereof. For competence ratings, however, decision process information may be used to infer cognitive capacity and thus more direct information may be more informative. Finally, we advise future researchers in to be more selective in their use of decision processing information when measuring reputation in the competence domain.

6

CHAPTER 6.

Discussion

Discussion

I examined how decision processing helps us *"make our decisions"* and how these processes lead *"our decisions [to] turn around and make us"*. In the first section of this dissertation, I tested how memory retrieval processes not only have the power to both shape and change decisions, but also can be used to detect which cue is most salient to decision makers within the decision-making context. In the second section, I shifted my focus away from the internal experience of the decision maker and, in turn, investigated how making observers aware of decision processing can affect character evaluations. In the context of moral decision-making, I found that the inclusion of decision processing information is mainly used to infer character evaluations whereas different types of decision processing information are equally impactful when shaping warmth and morality evaluations. Overall, I find that decision processes not only affect what and how we choose, but also have downstream consequences for our reputations.

In this chapter, I will first summarize and discuss the findings of each empirical chapter. I will also highlight any complimentary or divergent findings between the chapters in sections one and two. Next, I will move on to in depth discussion of three things I learned from my research projects: 1) How relevant cues shape our memory retrieval, choices, and character evaluations, 2) which methods may be most effective at changing decisions, and 3) whether decision processing affects all types of character evaluations equally. Furthermore, I discuss two open questions which could lead to interesting future research projects, for both myself and other researchers, and provide an overview of the diverse methodologies I used to answer my research questions. I end this chapter with my conclusion.

Chapter Summaries

Section 1: We Make our Decisions…

Summary of Chapter 2. I applied a query theory approach (Johnson, Häubl, & Keinan, 2007) to understand, predict, and change the incumbency advantage, a status quo bias in political decision-making. I found that, in line with the premises of query theory, the order in which voters retrieve information from memory is predictive of their preferences for a political incumbent. Voters first query information in favor of the candidate labeled as the incumbent and only later about their opponent. Additionally, experimentally altering query order alters the incumbency advantage. It can be boosted by emphasizing query orders in favor of the incumbent and attenuated by asking participants to first query information in favor of the opponent. In a final experiment, I found that the incumbency advantage can be completely overridden and even reversed by including a more relevant cue into the decision-making context, in this case the cue of political ideology. Political ideology became the most salient cue to voters. Including this

cue led to queries supporting the politically similar candidate to be retrieved earlier in the memory retrieval sequence and, consequently, resulted in a choice in favor of that ideologically similar candidate. It should also be noted that decision-makers seemed to be especially sensitive to this relevant cue. Participants easily detected this cue even though it was embedded in candidate descriptions along with other information and was not otherwise highlighted.

Summary of Chapter 3. I tested how memory retrieval processes shape a status quo bias in a consumer decision-making context. The endowment effect is a strong, robust, and replicable effect in the decision-making sciences (Kahneman, Knetsch, & Thaler, 1990) and endowment is believed to act as a reference point for the status quo (Moshinksy & Bar-Hillel, 2010). However, endowment does not happen in a vacuum. People may have pre-existing preferences that either correspond to or diverge from the product they are endowed with. Drawing from what I learned in Chapter 2 regarding the effectiveness at boosting or overriding a status quo by including a more relevant cue, I decided to include a measure of pre-existing preferences in an exchange paradigm of the endowment effect.

I used query theory as a diagnostic tool to learn which cue within the status quo was predictive of choices: endowment or pre-existing preferences. In two experiments, I endowed participants with a consumer product[25] either in line with their preferences or contrary to their preferences[26]. Similar to the findings of Chapter 2, I found that participants were most likely to choose the endowed product when it was in line with their strongly held previous preference. In other words, it is possible to boost the already robust endowment effect by incorporating participants' brand preferences or purchasing habits into the mix.

Unlike political ideology, pre-existing preferences did not completely override the endowment effect. Nonetheless, they were not ineffective. The endowment effect was attenuated when the endowed product was not in line with pre-existing preferences. Including pre-existing preferences as a predictor for choices resulted in either an interaction effect with endowment, as in Experiment 3.1, or a main effect of pre-existing preferences, as in Experiment 3.2. When the endowed product was not in line with preferences, the likelihood of preferring and choosing this product was reduced. This was particularly true for participants with very strong pre-existing preferences. These findings were also corroborated by participants' memory retrieval sequences. I found that, by measuring query order, it is possible to determine which cue, endowment or pre-existing preferences, is most relevant to participants and in turn predicts their choices.

Discussion of conflicting findings. Why are pre-existing preferences not able to completely override or even reverse the endowment effect? In Chapter 2, I found

25 Experiment 3.1: a smartphone; Experiment 3.2: a soda beverage
26 Experiment 3.1: brand loyalty; Experiment 3.2: purchasing habits

that it was possible to reverse the status quo bias by including a more relevant cue which contradicted the status quo (i.e., the incumbency label of the candidate was not in line with the participant's ideology). This was not the case for the endowment effect. There is a number of reasons why pre-existing preferences may not be as effective at shaping choices as political ideology. First, voting for a political candidate is a more consequential decision than choosing a smartphone or a soda beverage. Even though I only measured hypothetical voting behavior and preferences in Chapter 2, voting for a representative may still be considered to be more important to participants than choosing a "real" soda beverage. Voting is to considered to be a civic duty (Galais & Blais, 2016) and political representatives have the power to influence societal level policies. Additionally, once you have voted for a candidate, you can no longer change your vote (at least until the next election). Consumer purchases, on the other hand, are less consequential. For example, if I am unhappy with my Coca-Cola purchase, I can always buy a new can of soda at very small cost to myself. The role of decision importance may also explain why we find a different effect of pre-existing preferences for smartphone and soda beverage choices. Smartphones are significantly more expensive than soda beverages and are purchased less frequently. Most smartphone providers in the Netherlands require a one- or two-year contract commitment, leading most consumers to only update their smartphones every one to two years. Additionally, the high costs of smartphones make them a substantial and riskier purchase than a can of soda.

Second, the strength of these decision relevant cues is different. While we did not directly measure how important their political ideology was to participants (Chapter 2), ideology is usually considered to be a very strongly held relational and personal world-view (Jost, Ledgerwood, & Hardin, 2008). Even strongly held product and brand preferences are unlikely to compete with ideological beliefs. Research on moral conviction has shown that attitudes held with strong moral conviction have greater consequences than strong non-moral attitudes (Skitka, Bauman, & Sargis, 2005). Ideological beliefs are often coupled with beliefs about what is morally right and wrong in our society (Graham, Haidt, & Nosek, 2009; Haidt, Graham, & Joseph, 2009); thus they may be more impactful cues for altering decisions. Conversely, product preferences are generally non-moral. Pre-existing preferences may simply not be relevant enough cues to alter consumer choices. Cues other than pre-existing preferences, for example price, may have much stronger effects. Thus, future research should try to determine a priori which cues is most salient in consumer contexts when designing interventions to change product choices and purchases.

Section 2: Then Our Decisions Turn Around and Make Us…
During my PhD trajectory, my interests began to shift away from how decision processes shape our choices to how these processes shape in what way others see us. For instance, does sharing my difficulties and uncertainties in making difficult decisions shape how other people see me? Fueled by this question, I focused on the consequences of letting observers know, in a moral decision-making context, about these decision processes. Moral decisions are a particularly interesting domain in which to study interpersonal perceptions and reputation due to their informative content of the (moral) motives and values of others (Uhlmann, Pizarro, & Diermeier, 2015).

Summary of chapter 4. I measured the effects of making observers aware of decision time across three different types of sacred value trade-offs: 1) *Taboo trade-offs*, where a sacred value is pitted against a monetary value. For example, deciding whether or not to sell your child (sacred value) for 10,000 euros (monetary value). 2) *Tragic trade-offs*, where two sacred values are pitted against each other. Sophie's choice is the typical example of a tragic trade-off because it asks the decision maker to choose between her children (both sacred values). 3) *Secular trade-offs*, where two secular (non-moral) values are pitted against each other (Tetlock, 2003). For example, choosing between job offer X and job offer Y (both secular values). This approach allowed me to test two outstanding questions: First, is decision time informative for only character evaluations or for acceptability ratings of decisions as well? Second, do the effects of decision time on character evaluations differ for moral as compared to non-moral decisions? In line with the person-centered approach to moral decision-making (Uhlmann et al., 2015), I found that including the cue of decision time shapes character evaluations, but does not affect how acceptable the observer believed the decision to be.

I also examined whether decision time differs between tragic and secular trade-offs to test how decision time differs between two types of trade-offs with a similar underlying structure that only differ in their moral content. I found no differences in the effect of decision time. In fact, decision time did not seem to change character evaluations in these two types of trade-offs at all. Conversely, decision time did affect character evaluations of decision makers in taboo trade-offs. This suggests that decision time may be most useful in decision contexts where it is clear to observers which option represents the (morally) "correct" choice. Taboo trade-offs are considered to be easier (Hanselmann & Tanner, 2008) and have clearer expectations about appropriate decision processing. Thus, it is easier for observers to make inferences about character from decision time in this type of trade-off. Finally, it should be noted that the unique effects of decision time explained less than 1% of the variance in competence, warmth, and morality evaluations. This suggests that decision time, while statistically significant, may not have much practical significance when attempting to alter reputations.

Summary of Chapter 5. I took a closer look at the effects of providing decision processing information to observers in taboo trade-offs. The goal was to determine the impact of different types of decision processing information on character evaluations. Decision time, the decision process information I studied in Chapter 4, is believed to provide observers with a glimpse into the internal conflict, or lack thereof, that decision makers experience while making their decision. I hypothesized that decision time is less effective in providing information about this conflict than more direct cues of decision processing. Decision time can be unclear and ambiguous, and is generally used to make inferences about difficulty, doubt, or effort on the part of the decision maker. As such, giving participants this information directly (i.e., difficulty, doubt and effort) would be more effective at shaping character evaluations, than letting them infer this information from decision time.

I did not find support for this hypothesis for warmth and morality evaluations. It seems that *any* type of information that provided even a hint of internal conflict was used when evaluating the decision maker's warmth and morality. For competence ratings, I found a slightly different pattern of results which partially supported the hypothesis. Doubt and, to some extent, difficulty were better predictors of competence ratings than decision time. I suggest that the same decision processing cue is interpreted differently depending on the task at hand, that is, determining warmth/morality or competence traits. Rather than being used to determine internal conflict, decision processing information is used to determine cognitive capacity in the competence domain, for which certain types of decision processing are more informative than others.

Discussion of conflicting findings. One main difference between the findings reported in Chapters 4 and 5 is the amount of variance in character evaluations uniquely explained by decision process information. In Chapter 4, I voiced my concern that the unique effects of decision time only explain less than 1% of the variance in competence, warmth, and morality evaluations. Instead, choices seem to have driven character evaluations to a much larger extent. In the online supplemental materials for Chapter 5, I report the variance explained uniquely by the four different types of decision process information: time, difficulty, doubt, and effort. All four types of decision processing explained more than 1% of variance in character evaluations of warmth and morality (ΔR^2 = Range[0.01, 0.03]). Variance explained for competence evaluations fluctuated more, ranging from less than 1% for time and effort, and more than 3% for doubt. Overall, in our second experiment we find that decision processing information explains almost three times as much variance in our models than in Chapter 4.

I believe that the reasons for this inconsistency is methodological in nature. The models predicting character evaluations in Chapter 4 included different types of sacred value trade-offs. I found that decision processing was only effective for

taboo trade-offs. The ineffectiveness of decision time at shaping evaluations in in tragic and secular trade-offs reduced the overall variance explained in the models. In Chapter 5, the experimental methodology focused only on taboo trade-offs, thus allowing me to capture the explained variance of decision processing without diluting it by including tragic and secular trade-offs. Overall, I believe that these findings do not contradict my conclusions from Chapter 4. Decision processing information can alter reputations, however, only to a small extent compared to the effects of choice.

Relevant Cues Shape Memory Retrieval, Choices, and Character Evaluations

Traditional, normative models of decision-making proposed that all information is available to decision makers and is incorporated into the decision-making process. However, soon the question arose as to whether all information is available to decision makers and, if so, if it is all incorporated into the decision-making process. Newer models were soon devised, which incorporated knowledge from cognitive psychology on how information is acquired, stored, and retrieved. This resulted in a paradigm shift in the decision-making sciences which now focus on decision-making models that incorporate cognitive processes (Oppenheimer & Kelso, 2015). Following this paradigm shift, I studied how choices are shaped by cognitive processes, specifically memory retrieval processes. My research shows that a common decision-making bias, the status quo bias (Samuelson & Zeckhauser, 1988), can be understood by the order in which people retrieve decision relevant information from memory (Johnson et al., 2007; Weber & Johnson, 2006). These findings are complimentary to heuristic decision-making accounts of biases (Gigerenzer & Goldstein, 1996).

Shah and Oppenheimer (2008) suggest that heuristic decision-making reduces cognitive effort during decision processing by 1) examining fewer cues, 2) reducing the difficulty associated with storing and retrieving cues, 3) simplifying the weighting of cues, 4) integrating less information, and 5) examining fewer choice alternatives. My findings support and expand on this heuristic explanation of two distinct instances of the status quo bias. In Chapters 3, I find that participants query information about the relevant cue of incumbency status earlier in the decision retrieval process than cues about the alternative. Due to output interference, later queries are inhibited, leading to an examination of a smaller subset of cues than available within the decision-making context. Additionally, most participants only listed between 1 and 6 queries, suggesting that they are using less information to make the decision than is available to them. Not only does this complement Shah and Oppenheimer (2008), but it is also in line with the definition of heuristics proposed by Gigerenzer and Gaissmaier (2011, p. 454): “A heuristic is a strategy

that ignores part of the information, with the goal of making decision more quickly, frugally, and/or accurately than more complex models."

Including different types of information ("cues") into decision-making contexts affects preferences, choices, and evaluations. These cues come in many different forms: labeling a choice as a status quo, political ideology, endowment, previous preference, decision time, or more direct types of decision processing information; to name a few. Especially if these cues are relevant and strong, they have the potential to alter decisions because they draw attention away from other cues within the decision-making context. In other words, decision makers ignore or put less weight on previously salient cues (e.g. incumbency labeling) while attending to the new more relevant cue (e.g., political ideology) in order to make their decision quickly, frugally, and hopefully accurately.

The story becomes slightly more complex when you include different cues within the same status quo. Here, both cues are integrated into the decision-making process. Given the strong boosting effects of two cues pointing in the same direction (e.g., endowment of a smartphone in line with your brand loyalty), I suggest that heuristic decision-making becomes more prevalent in these situations. This can be seen when examining participants' query orders. In the compatible condition, query orders are strongly in favor of the endowed and preferred option. However, when inconsistency is introduced the decision becomes more complex, which is also apparent in query orders showing that people retrieve information about both options. Thus, it is likely that when there is no clear and strong cue in the decision-making process, people's decision-making style shifts away from simple heuristics rules of thumb and begins to attend to more cues.

My research also speaks to the versatility of decision processing. Not only can it predict and change choices, it can also act as a cue to others. When evaluating the character of another person, people need to sample, store, integrate, and retrieve information, thus making impression formation subject to the same "rules" as other judgment and decision-making models. In other words, the observer needs to decide about the traits of the decision-maker. Although not directly tested in this dissertation, including cues of decision processing information shapes the memory retrieval processes underlying the observer's impression formation. For example, the strong cue of "choice" may lead observers to first think about whether the decision maker made the moral or immoral choice. Next, they may think about how the decision maker went about making that choice; and so on. Indeed, thought listing has been shown to mediate changes in moral attitudes (Luttrell, Philipp-Muller, & Petty, 2019). To my knowledge, memory retrieval processes have not yet been used to understand moral character judgments. Nevertheless, it seems plausible that decision processing information is a strong enough cue to be included during impression formation, even when you are trying to be fast and frugal in your judgment of others.

Changing Decisions: How to Best Alter Decision Processing?

Using memory retrieval processing as described by query theory (Johnson et al., 2007), I predict and explain people's choices. I also assess how decisions can be changed. In Chapter 2, I use two different methods to change choices in favor of the status quo: 1) Following previous research on query theory, I altered decisions by altering the order in which participants retrieved information from memory. By experimentally emphasizing the status quo option, we can increase the status quo bias. By experimentally reversing query order so that the alternative option is retrieved first, we can attenuate the status quo bias. 2) Including a more relevant cue into the decision context significantly changed query orders and choices. Including the strong and relevant cue of political ideology, resulted in even stronger boosting and attenuating effects than altering query order, with this new cue driving the effects. While both methods seem to be effective in changing choices to some extent, I recommend including new decision-relevant cues over altering query order.

Experimentally altering query orders is possible, but not easy. In Chapter 2, I found that participants had trouble following instructions that went against their "natural" memory retrieval processes. Many participants did not follow the instructions, instead reverting back to memory retrieval processes focusing on the status quo, even when explicitly told not to do so. Given the difficulty of altering decision processing in a controlled experimental environment, implementing this method in real-world contexts seems especially problematic. Altering your decision processing requires deliberative and focused attempts at thinking in a different, potentially unnatural, way. In other words, it requires effort, attention, and willingness on the part of the decision maker. Thus, I do not believe it will be useful when trying to target more automatic or habitual decision-making.

Including different cues into the decision-making processes may prove more effective at altering decisions, which is also supported by my findings in Chapters 2 and 3. While this approach also alters query orders, it alters them by shifting reference points or attention naturally rather than by means of external instructions. Including new cues is also in line with the principles of choice architecture and nudging (Thaler & Sunstein, 2008), which suggest that, by changing the context and information surrounding a choice, we can change choices by using people's automatic decision-making "against" them. My research supports this approach. By including more relevant decision cues into the decision-making context, we can use people's natural decision processing mechanisms to move them towards making the desired choice.

Nonetheless, the inclusion of strong, relevant cues into the decision-making process may not be as easy as portrayed above. In many decision contexts, it can be unclear what the most relevant cue is for decision makers. In Chapter 3, I find that

when choosing consumer products both endowment and pre-existing preferences are relevant to decision-makers. In Chapter 4, I find that including a cue regarding decision processing on the part of the decision maker is only informative for character evaluation in certain types (moral) trade-offs: taboo trade-off. I also find that that including decision time as a cue for character evaluations can only slightly boost or attenuate character evaluations, but not override them completely. Thus, the difficulty of using new cues as a method for changing choices is that their effectiveness is both context dependent and subject to the strength of the other cues present in the decision-making context. In other words, if the most salient cue in the original decision context is already extremely strong (e.g., choices in moral decision) than finding a cue that is strong enough to override these cues is extremely difficult and may not be known a priori.

There are methods to determine cue strength and salience a priori. In the first section of this dissertation, I use query theory as a diagnostic tool which shows that the most salient information and its corresponding choice options is retrieved earlier from memory than less salient cues. Additionally, we know from social psychology that some types of attitudes, values, and beliefs are held very firmly by decision makers and are particularly hard to change or override. Some examples are political ideology, which has been shown to be strong enough to override racial divides (Iyengar & Westwood, 2015), and moral convictions which have been linked to greater rejection of alternative options (Skitka, Washburn, & Carsel, 2015). This can also explain why including decision processing information in moral trade-offs only slightly alters character evaluations compared with choices, which are more tightly paired with moral convictions.

If you could frame a decision as a moral decision, you may be able to shift choices. In the realm of sacred value trade-offs, it has been shown that reframing taboo trade-offs as tragic trade-offs, by including a second sacred value as a cue, can change decisions that previously seemed unmovable (Tetlock, 2003). Overall, such an approach is promising especially if we can identify values or attitudes that are strongly held by individuals, for example pro-environmental attitudes, political ideology, and moral beliefs among others, in advance. For example, if you want to change the policy of receiving free plastic bags in stores to a policy of paying for plastic bags in stores, you can highlight the positive impact on the environment of reducing plastic waste. This should be particularly effective for gaining the support of decision makers who have strong pro-environmental attitudes, even though this change away from the status quo comes at a financial cost.

Caution is advised when including moral cues into a decision-making context. Attitudes with high moral convictions are unshakeable, have high action-potential, and have the potential to backfire (Skitka & Mullen, 2002). It has been shown that people will oppose interventions and nudges if they believe that the intervention is designed by the opposing political party (Tannenbaum, Fox, & Rogers, 2017).

In the case stated above, someone who does not believe in climate change may experience reactance when presented with a pro-environment cue (Brehm, 1966). They would be even less likely to support the store's policy change and even actively protest it if pro-environmental attitudes are used to justify it. Thus, the trick of including moral cue is to target specific populations with them, e.g. people with pro-environmental attitudes. For other populations, it may be better to exclude these cues or highlight different cues, such as positive attitudes towards free market capitalism. For example, the money earned from paying for bags helps promote the success of the store compared to its competitors. Despite the potential for backfire, I still suggest the use of relevant cue inclusion (or exclusion when called for) as a method for changing decisions because it can be implemented easily and is particularly effective.

Do Decision Processing Cues Impact All Character Evaluations Equally: The Warmth vs. Morality Debate

People use decision processing information to form impressions and evaluations of decision makers. Forming impression of others is a fundamental task of social cognition. Most influential models of impression formation propose that we use two distinct dimensions to judge others, which comprise agentic and communal traits (for an overview see Abele and Wojciszke, 2014). Agentic traits capture goal achievement orientation and task functioning; communal traits capture maintenance of interpersonal relationships and social functioning. These two dimensions of character evaluation have gained traction, especially after the development of the stereotype content model (Fiske, Cuddy, Glick, & Xu, 2002) which states that we evaluate others based on their competence (similarly defined as agency) and warmth (similarly defined as communion). As such, two-dimensional models have been used not only to understand perceptions of groups (Fiske et al., 2002; Fiske, Xu, & Cuddy, 1999) but also individuals (Peeters, 1979; Rosenberg, Nelson, & Vivekananthan, 1968; Wojciszke, 1994).

Another perspective on impression formation proposes a three-dimensional model which splits warmth into two distinct categories: sociability (often still called warmth) and morality (Leach, Ellemers, & Barreto, 2007). The idea is that two-dimensional models conflate two types of interpersonal information in the warmth dimension: that of being likable and sociability and that of trustworthiness and honesty (Goodwin, 2015). A large body of research has now been dedicated to showing that moral character predominates in impression formation. For example, people search for more information about moral traits of others than for information about their warmth or competence (Brambilla, Rusconi, Sacchi, & Cherubini, 2011). Moral information is more predictive of final evaluations of both real and hypothetical targets compared to warmth and competence information (Goodwin, Piazza, & Rozin, 2014). Additionally, moral information is more powerful

in changing previous impressions of someone than other types of information (Brambilla, Carraro, Castelli, & Sacchi, 2019). Overall, this body of research shows that morality is a dimension in and of itself, giving observers information about whether someone is a good or bad person, out to help us or harm us, respectively.

In Chapters 4 and 5, I used moral decision-making contexts to test the effectiveness of including decision processing information at shaping character evaluations. Therefore, I deemed it appropriate to measure three dimensions of character evaluations, in order to capture morality evaluations as well. I did not specifically predict differences between competence, warmth, and morality, instead engaging in exploratory analyses of all three types of character evaluations. Contrary to the projections of a three-dimensional model of impression formation, I found only miniscule differences, if any, between warmth and morality evaluations. In other words, it seems that both the inclusion of decision processing information in these moral trade-offs lead to similar impressions of sociability and morality on the part of the decision maker. Looking back, this is slightly puzzling given the moral nature of the decision context. I would not have been surprised if morality evaluations would have been affected most strongly by decision processing information.

There are two possible explanations for the high overlap between morality and sociability findings in my work. First, and unlikely given the body of research supporting the three-dimensional model of impression formation, a two-dimensional model of impression formation better captures the effects of decision processing information than a three-dimensional model. Second, it may be that when there is no conflicting information about warmth and morality in the decision context, both dimensions are assed similarly and pushed in the same direction. For example, if you are assessing an extremely well-liked and charitable CEO of a fortune 500 company, it is to be expected that she would be evaluated as highly competent, warm and moral, even though these dimensions are theoretically distinct. Similarly, in the case of decision processing information, it seems unlikely that that a sociable person or a moral person would have different decision processes. In other words, I would not expect someone who is likable to react more quickly than someone who is moral, when making the morally correct choice. Following this idea, when decision processing information is provided it is used similarly to construct warmth and morality impressions.

However, this is not the case for competence evaluations. I find different patterns of results for competence than for warmth/morality evaluations in both Chapters 4 and 5, although these differences are more pronounced in Chapter 5. I should note that this was not necessarily to be expected, despite the predictions of both two- and three-dimensional models of impression formation. Although we know that people can differ in their competence and warmth ratings, research has also found that people tend to make global evaluations of others (e.g., halo effect: Thorndike, 1920). For example, in an unpublished project I conducted during my

Research Master studies, I found unexpectedly high, positive correlations between all three dimensions of competence, warmth, and morality that when judging groups. In this dissertation, however, I find that competence evaluations differed significantly from warmth/morality evaluations.

Observers infer different information from decision processing information when they are asked to evaluate competence compared to warmth/morality evaluations. In Chapter 5, I propose that decision processing information is interpreted differently depending on the (experimental) task demands. If you are asked to evaluate moral character of a decision maker, you will use their decision processing to infer how much conflict they experience between moral and selfish motives (Critcher, Inbar, & Pizarro, 2013). If you are asked to evaluate the competence of a decision maker, you will use their decision processing to infer their cognitive capacity or ability to cope with complex information. Thus, the same information is used differently to understand different traits of the moral decision maker.

Open Questions

Here I briefly discuss two open questions that have the potential to make interesting projects for future research.

Does making people aware of their decision processing change their choices? Query theory posits that retrieving information from memory can be both a conscious or unconscious process. However, dual systems theories of decision-making suggest that automatic and deliberative processes can result in different choice outcomes (Greene, 2009; Kahneman 2011). It is also suggested that automatic and heuristic processing is why biases, such as the status quo bias, occur (Eidelman & Crandall, 2012). Given that choosing the current state of affairs is not always rational, it can be assumed that decision makers are not always aware of their own mental processes (Nisbett & Wilson, 1977) that lead them to favor the status quo.

The methodology traditionally used to test query theory is aspect listing (Johnson et al., 2007; Dinner, Johnson, Goldstein, & Liu, 2011; see also Cacioppo, Harkins, & Petty, 1981). In aspect listing, participants are instructed to list all of the thoughts that pass through their minds, one at a time. This requires some awareness on the part of the participant. They need to consciously think of and report their memories during the memory retrieval process. In other words, aspect listing, by definition, cannot test unconscious memory retrieval processes. Instead, it assumes that the reported aspects are equivalent for both conscious and unconscious processing. Thus, I urge future researchers to test the premises of query theory using non-obtrusive decision processing tracing methodologies (for an overview of different types of processing tracing methods see Schulte-Mecklenbeck et al.,

2017) and corroborate these with the results of aspect listing. I expect that for automatic and habitual decision-making, non-obtrusive measures of information processing may be more adept at predicting choices, while for more deliberative and rational decision aspect listing may serve just as well as other process tracing methodologies.

By making participants aware of their memory retrieval, it is possible that the task of aspect listing itself shifts participants away from automatic decision-making and towards deliberative decision-making. This may be particularly worrisome because participants are asked to engage in aspect listing before they report their final preferences or choices. Therefore, it is possible that the act of listing these thoughts consciously results in different choices (e.g., in favor of what enters consciousness first) than if these thoughts and their retrieval had remained unconscious. One simple way to rule out this possibility while using a query theory approach, is to include a control condition in which participants are not asked to engage in aspect listing and compare the choices in this control condition with a condition measuring query theory with aspect listing.

Can decision processing be used strategically to shape reputation?
It is possible that moral decision makers are aware of how their decision processing shapes their choices. However, are they also aware that their decision processing can boost or attenuate their reputations in the eyes of an observer? The emotion of regret has been shown to not only serve a private cognitive function for the decision maker, but also a social function (Summerville & Buchanan, 2014). Expressing regret to others is motivated by a social closeness goal and generally decision makers believe that sharing their regrets with others brings them closer together. Similarly, in one of my research projects, not reported in this dissertation, I investigate the expected consequences of sharing decisional doubt (for the preregistered predictions see osf.io/pk895 and osf.io/k8htp). My initial findings show that participants expect positive interpersonal consequences of sharing their doubts, particularly among those who reported to have shared their doubts about an important decision with others. The accuracy of these expectations is yet to be assessed. The question arises, if decision makers are indeed aware of the reputational consequences of their decision processing, then they use this information strategically to shape how others see them.

Emotions can be used strategically. Following the example above, regret can be expressed strategically to mitigate culpability and receive less severe punishment for crimes (Cohen, 1999) and organizational transgressions (Pace, Feduik, & Botero, 2010). Furthermore, moral decision makers have been found to shift their decision in moral dilemmas to appear more favorably to perceivers (Rom & Conway, 2018). In order to appear warmer, decision makers publicly reported greater support for a deontological choice. Conversely, to appear more competent, decision makers publicly reported greater support for a consequentialist, outcome-maximizing

choice. This shows that moral choices can be altered strategically to modify perceptions by others. Additionally, decision time has been shown to be used strategically in a trust game (Jordan, Hoffman, Nowak, & Rand, 2016). Decision makers were more likely to make uncalculated quick decisions in a trust game when observed by others. This decision strategy is thought to signal trustworthiness to the observer.

If decision makers are aware that their decision processing can change how other see them, they may use this information strategically. This may be particularly true for decision makers who have to make an unpopular or immoral choice, yet hope to mitigate any damage to their reputations. Thus, a CEO communicating that he only decided to maintain the bottom line at the cost of firing many employees after much deliberation and with much difficulty may appear slightly less immoral than if he had not shared this decision processing information at all. Thus, it is possible to communicate decision processing information strategically. Future research should test if this is indeed the case and which decision processing information is most effectively communicated and how.

Another avenue for future research is if people can strategically change their decision processing, or if they only strategically *communicate* decision processing. There is some indication that people do change how they incorporate information when deciding in order to appear most favorable or maintain a positive self-image. When sampling information in a dictator game, participants explicitly avoided information so that they can in good conscious make selfish choices (Grossman & Van der Weele, 2017). After all, they were not aware (because they did not attend to this information) that their choice had the potential to harm the other player. This may also be the case for memory retrieval processes or the experiences of internal conflict during moral decision-making. Is it possible that moral decision makers will speed up their choices, experience more doubt, or change their query orders when their (im)moral decisions are observed by others?

Diverse Methodology

In this dissertation I employed a variety of different theories, methods, and statistical procedures to gain a better understanding of how decision processing shapes both our choices and our reputations: In order to ensure the generalizability of my findings, I have used both online Amazon's Mechanical Turk (MTurk) workers (Buhrmester, Kwang, & Gosling, 2011) and University students as participants in my experiments, often replicating my findings across both types of samples. This supports previous findings showing that responses in student samples are equivalent to MTurk responses (Casler, Bickel, & Hackett, 2013; Kees, Berry, Burton, & Sheehan, 2017). The use of both of these samples also show that my findings are generalizable to two Western countries, the Netherlands (students)

and the United States (MTurk). With the exception of the incumbency study, which was specifically designed for an American electoral context, I am confident that my findings are generalizable within a Western context but still encourage multinational replications (e.g., projects like the Open Science Collaboration, 2015).

In order to test the premises of query theory, I conducted content analyses of participants' queries and computed their SMRD (standard mean rand differences) scores to understand participants' memory retrieval sequences (Johnson et al., 2007). In Chapter 2, I applied this same approach and method in a laboratory setting. This approach also allowed me to test my hypotheses with an incentivized, behavioral, and consequential choices. In Chapter 3, participants could participate in a raffle for the smartphone of their choice (Experiment 3.1) and could keep the soda beverage of their choice (Experiment 3.2). This experiment allowed me to bridge the intention-behavior gap, a common criticism of hypothetical choice experiments. The intention-behavior gap is the common finding in social and decision sciences that attitudes and intentions do not always translate into actions (Sheeran & Webb, 2016). In Chapter 2, I only measure voting intentions; therefore, I cannot claim that including a more relevant cue will change votes, only voting intentions. In Chapter 3, I move on to show that these relevant cues do indeed shape "real" and consequential choices.

To measure the effects of decision processing information on impression formation, I shifted my experimental paradigm away from query theory to hypothetical scenario studies. In each of my studies, I tested my hypotheses with experiments including multiple scenarios in order to rule out scenario specific effects (Wagenaar, Keren, & Lichtenstein, 1988), instead testing the underlying decision structure of sacred value trade-offs. Additionally, this approach allowed me to test my hypotheses with multilevel, crossed designs, thereby increasing my statistical power by including the within-subjects component of multiple scenarios (Charness, Gneezy, & Kuhn, 2012). Overall, this approach also led me to familiarize myself with multilevel statistical analyses and their wide application, due to their great flexibility (Hoffman & Rovine, 2007). All analyses were conducted in R and the syntax have been made publicly available at osf.io/jr9m8/. I am happy to announce that working on my dissertation has allowed me to broaden my methodological and statistical skillset.

Conclusion

Decision processing shapes both our choices and our reputations. In four empirical chapters, I investigated how decision processing is driven by salient relevant cues, and how, in turn, it can act as a cue when making judgements about the character of decision makers. In the first section of this dissertation, I found that memory retrieval processes can explain, predict, and even change choices in favor of the status quo. In particular, I highlighted how the inclusion of relevant cues is a powerful method for changing decisions, and that memory retrieval orders can also be used as a diagnostic tool to determine which cues are most relevant to decision makers. In the second section, I moved away from the internal experience of decision makers, showing the downstream consequences of decision processing. Making information about decision processing available to observers during moral decision-making can slightly alter character evaluations. This seems to be independent of the type of decision processing information provided when making warmth and morality judgments. For competence judgments, this same decision process information may be used to infer different information. Nonetheless, it seems that decision process information may not be the strongest cue in our studies. Moral vs. immoral choices seem to be the driving force behind character evaluations. The "right" communication of decision process information has the power to attenuate or boost our reputations.

In sum, decision processing information can function as both an independent and dependent variable, and potentially create feedback loops when we try to understand how people make interpersonal inferences. Decision processing is not just an internal mechanism for making decision; it also has a social function for evaluating others.

"We make our decisions, and then our decisions turn around and make us."
- F.W. Boreham

S

SUPPLEMENTAL MATERIALS

Supplemental Materials Chapter 2

Power Analyses

In Experiment 2.1, we were interested in the differences between our two experimental conditions of incumbency. However, we also varied display order and content of the candidate descriptions in order to control for these variables. As such, our experimental design included eight cells. We aimed to have 35 to 40 participants per cell (including those of less of interest to our questions), leading us to open a HIT for 300 MTurk workers.

For Experiments 2.2 and 2.3, we determined the necessary sample size with a power analysis conducted with the software GPower. We based our power analysis on effect size of query order on the incumbency advantage observed in Experiment 2.1. We transformed the observed $d = 0.35$ into the equivalent $f = 0.175$. In order to find the predicted 2 × 3 interactions effect, with 95% power, a sample size of 508 was required. Thus, for Experiment 2.2 we decided to round up this number to a stopping rule of 100 participants per cell and open a HIT for 600 MTurk workers.

MTurk samples are usually skewed towards the political liberalism. In order to ensure that we would have enough conservative participants in Experiment 2.3, which tested the effects of ideological compatibility, we decided to increase our sample size. Thus, opted for a stopping rule of about 130 participants per cell and opened a Hit for 600MTurk workers.

Supplemental Materials Chapter 4

Manipulation Check Study: Scenario Acceptability
In this manipulation check study, we aim to test the acceptability of the choice options across the three different trade-off conditions for each scenario. This allows us to test whether our designed scenarios and their conditions conform to the assumed underlying structures of each trade-off type: In taboo trade-off decisions one of the two choice options (sacred value) should be more acceptable than the other choice option (personal/monetary gain). In the tragic and secular conditions, the acceptability for both trade-off options should be similar, as they have a similar underlying structure of equivalent values being pitted against each other.

Methods

Participants. We recruited 368 U.S. participants from the online crowdsourcing platform Amazon Mechanical using the software TurkPrime (Litman, Robinson, & Abberbock, 2016). This software enabled us to collect participants in small batches over two consecutive days and prevent people with the same IP address from taking the survey. Additionally, we excluded any participants from completing this survey who had participated in our original MTurk Study. Following our preregistered[27] exclusion criteria we removed participants who responded to less than five of scenarios (n = 13), or who took less than 3 minutes (n = 16) or more than 1 hour (n = 1) to complete the survey, leaving us with a final sample of 338 participants (129 women, 206 men, 2 other =, M_{age} = 35.70, SD_{age} = 10.86; 100% U.S. citizens) [28].

The stopping rule for data collection of 350 was determined before data analysis. We aimed to collect a minimum of 100 participants for each of our three experimental conditions. Since we anticipated some drop outs, we decided to collect an additional 50 participants.

Procedure and Materials. Participants read nine scenarios which described a decision maker in a trade-off decision context. For each scenario, participants were randomly assigned to one of the three experimental conditions (trade-off type: taboo, tragic, vs. secular), regardless of their condition in the previous scenario. After each scenario, participants indicated how acceptable each of the two choice options were, how difficult they thought the decision was for the decision maker, and how much time they thought it would take the decision maker to make a choice. Participants then indicated what they themselves would choose if they found themselves in the same situation as the decision maker. Finally, participants

27 The preregistration for this experiment is available at https://osf.io/2mja4
28 The demographics are reported for 337 participants, because one participant did not respond to the demographic questions.

responded the demographic items of age, gender, and U.S. citizenship status. Measures are described below in the order in which they appeared to participants.

Scenarios. Eight of the nine scenarios used in this study, were the same as in the original Lab and MTurk studies. We included one additional scenario, taken from Hanselmann & Tanner (2008), for exploratory purposes. All nine scenarios manipulated the type of trade-off: taboo, tragic, vs. secular. However, in this study, no information was provided to participants regarding the decision maker's decision time or final choice.

Option acceptability. To assess how acceptable the participants thought each of the choice options were, we asked participants how acceptable it was for the decision maker do choose each of the two options. For example, in the taboo trade-off condition of the Tetlock et al. (2000) scenario the question read "How acceptable is it for Robert to…?" and the two choice options were "...save Jonny?" and "and use the $750,000 euros for other hospital needs?" Participants responded to each choice option on a 100-point slider (-50 = *extremely unacceptable*, 50 = *extremely acceptable*). This allowed us to make a within-subjects comparison of the acceptability of the choice options.

Difficulty. To measure how difficult participants thought the decision was for the decision maker, we asked participants "How difficult do you think this decision is for [Robert]?". They responded on a seven-point Likert scale (1 = *extremely easy*, 7 = *extremely difficult*).

Time. To measure how much time participants thought it would take the decision maker to make a choice, we asked participants to respond to the following item: "How much time do you think it will take Robert to make this decision? He will make the decision...". They responded on a seven-point Likert scale (1 = *extremely slowly*, 7 = *extremely quickly*).

Choice. Finally, we asked participants what they themselves would do if they found themselves in the same position as the decision maker. Following the example above, they were asked to indicate if they would "save Jonny, the five year old boy" or "use the $750,000 for other hospital needs" (dichotomous choice). All response options were coded so that one options was the "better" choice and one the "worse" choice, following the coding from the original study.

Results

Individual Scenarios. We tested the acceptability of the "better" compared to the "worse" choice option in each trade-off condition for each of the nine scenarios individually. We conducted multilevel linear mixed effects models on the acceptability ratings for each scenario, while taking into account random variance (and nesting) of participants. Our models estimated the effects of trade-off type (dummy coded; *D1*: Taboo vs. Tragic; taboo = 0, tragic = 1, secular = 0; *D2*: Taboo vs. Secular; taboo = 0, tragic = 0, and secular = 1), choice option ("better" choice = -1, "worse" choice = 1), and their respective interactions. The analyses were conducted using the "lmer" function in the "lme4" package of R (Bates, Mächler, Bolker, & Walker, 2015). The "lmerTest" package was used to obtain *p*-values for regression coefficients (Kuznetsova, Brockhoff, & Christensen, 2017). The coefficients of all models as well as the simple slopes analyses for the three different trade-off conditions can be found in in Tables S2-S10 of the online supplemental materials at osf.io/wg395/.

Aggregate Results

Acceptability. To test the acceptability of the "better" compared to the worse" choice option in each trade-off condition across all nine scenarios, we conducted a multilevel linear mixed effects model on each of the acceptability ratings, while taking into account random variance (and nesting) of participants and scenarios. Our model estimated the effects of trade-off type (dummy coded; *D1*: Taboo vs. Tragic; taboo = 0, tragic = 1, secular = 0; *D2*: Taboo vs. Secular; taboo = 0, tragic = 0, and secular = 1), choice option ("better" choice = -1, "worse" choice =1), and their respective interactions. The analyses were conducted using the "lmer" function in the "lme4" package of R (Bates, Mächler, Bolker, & Walker, 2015). The "lmerTest" package was used to obtain *p*-values for regression coefficients (Kuznetsova, Brockhoff, & Christensen, 2017). The coefficients of the model as well as the simple slopes analyses for the three different trade-off conditions can be found in Table S1.

The significant interaction effects reveal that all three trade-off conditions differed significantly from each other on the effect of acceptability ratings between the "better" and the "worse" choice options. A closer look at the simple slopes analyses, show that in secular trade-off choice options are evaluated as equal. In taboo trade-off conditions, making the "worse" choice is evaluated as significantly less acceptable than making the "better" choice. Contrary to the assumed underlying structure of tragic trade-offs, there was a significant difference in acceptability ratings of choice options in this condition. It seems that one option was considered to be significantly more acceptable than the other, even if not to the magnitude of taboo trade-offs. Therefore, we also test our models for each individual scenario (see above), so that we can determine which scenarios have tragic conditions that deviate from our underlying assumed structure. These are reported in the online supplemental materials at osf.io/wg395/ .

Table S1. Summary of Multilevel Model and Simple Slopes Analyses on Acceptability Ratings

	b	**SE**	***p***
Intercept	11.52	2.81	.003
Choice Option	-25.83	0.59	<.001
D1: taboo vs tragic	1.55	0.87	.076
D2: taboo vs secular	14.82	0.87	<.001
D1 x Choice Option	12.29	0.84	<.001
D2 x Choice Option	25.14	0.84	<.001
Random Effects			
Variance of subject intercept (level 2)	88.87	9.43	
Variance of scenario intercept (level 2)	65.40	8.09	
Residual variance	714.25	26.725	
$R^2_{margianl}$	.28		
$R^2_{conditional}$	.35		
Simple slopes of acceptability of choice options across trade-off type			
Taboo condition	-25.83	0.59	<.001
Tragic condition	-13.53	0.62	<.001
Secular condition	-0.69	0.62	.267

Note: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; standard deviations in parentheses for random effects; $R^2_{marginal}$ = variance explained by fixed factors, $R^2_{conditional}$ = variance explained by both fixed and random factors (Nakagawa & Schielzeth, 2013)

Organ Scenario

Table S2. Tetlock et al. (2000) Scenario (Lab Study & MTurk Study)

	Scenario	Choice
Introduction	Robert is the Director of Health Care Management at a major hospital. He is in charge of the hospital's resource allocation. Today, he is faced with the following decision:	
Tragic	Robert can either save the life of Johnny, a five year old boy who needs a liver transplant, or he can save the life of an equally sick six year old boy who needs a liver transplant. Both boys are desperately ill and have been on the waiting list for a transplant but because of the shortage of local organ donors, only one liver is available. Robert will only be able to save one child.	He decides to save Jonny. He decides to save the six year old boy.
Taboo	Robert can save the life of Johnny, a five year old who needs a liver transplant, but the transplant procedure will cost the hospital €750,000 that could be spent in other ways, such as purchasing better equipment and enhancing salaries to recruit talented doctors to the hospital. Johnny is very ill and has been on the waiting list for a transplant but because of the shortage of local organ donors, obtaining a liver will be expensive. Robert could save Johnny's life, or he could use the €750,000 for other hospital needs.	He decides to save Jonny. He decides to use the €750,000 for other hospital needs.
Secular	Robert is offered a good deal on a new and updated MRI machine, but it will cost the hospital €750,000 that could be spent in other ways, such as funding medical research and enhancing salaries to recruit talented doctors to the hospital. The hospital's current MRI machine is old and out of date but is still being used frequently to diagnose patients. Robert could purchase the new MRI machine, or he could use the €750,000 for other hospital needs.	He decides to purchase the MRI machine. He decides to use the €750,000 for other hospital needs.

CEO Scenario

Table S3. CEO Scenario (Lab Study)

	Scenario	Choice
Tragic	Michael is the CEO of a global company that has been criticized for poor working conditions in a Chinese factory. The management is discussing whether substantial investments to improve safety at work should be made. In this case, however, Michael would have to accept the layoff of a third of the workforce due to financial reasons, thereby jeopardizing the future of many families. As CEO, Michael has to decide between investing in safety at work and preserving jobs.	He decides to invest in safety at work. He decides to preserve the workers' jobs.
Taboo	Michael is the CEO of a global company that has been criticized for poor working conditions in a Chinese factory. The management is discussing whether substantial investments to improve safety at work should be made. In this case, however, Michael would have to give up the goal of a profit increase. As CEO, Michael has to decide between investing in safety at work and increasing profit.	He decides to invest in safety at work. He decides to increase the company's profit.
Secular	Michael is the CEO of a global company. The management is discussing whether substantial investments to expand the company into new markets should be made. In this case, however, Michael would have to give up the goal of a profit increase for this financial year. As CEO, Michael has to decide between investing in expanding the company and increasing profit.	He decides to invest in expanding the company. He decides to increase the company's profit for this financial year.

Hard Times Scenario

Table S4. Hard Times Scenario (Lab Study & MTurk Study)

	Scenario	Choice
Introduction	José the head of a farming household in a developing country. His crops have failed for the second year in a row, and it appears that he has no way to feed his family. José's sons, ages eight and ten, are too young to go off to the city where there are jobs, but his sixteen year-old daughter could fare better.	
Tragic	José knows a man from the village who lives in the city and who makes sexually explicit films featuring girls such as José's daughter. He tells José that in one year of working in his studio his daughter could earn enough money to keep his family fed for several growing seasons. José has to decide whether he will employ his daughter in the pornography industry in order to keep your family alive.	He decides NOT to employ his daughter in the pornography industry. He decides to employ his daughter in the pornography industry.
Taboo	José knows a man from the village who lives in the city and who makes sexually explicit films featuring girls such as José's daughter. He tells José that in one year of working in his studio his daughter could earn enough money to replace the farm's old but still functioning tractor with a brand-new model. José has to decide whether he will employ his daughter in the pornography industry in order to purchase a brand-new tractor.	He decides NOT to employ his daughter in the pornography industry. He decides to employ his daughter in the pornography industry.
Secular	José knows a family from the village who lives in the city and who are looking for a maid to do housework for a fair salary. They tell José that in one year of working as maid his daughter could earn enough money to replace the farm's old but still functioning tractor with a brand-new model. José has to decide whether he will employ his daughter as a maid in the city in order to purchase a brand-new tractor.	He decides NOT to employ his daughter as a maid in the city. He decides to employ his daughter as a maid in the city.

Animal Research Scenario

Table S5. Animal Research Scenario (Lab Study)

	Scenario	Choice
Tragic	Oliver is a chemist who has been offered a job by a pharmaceutical company to conduct research on their products. Since products must be fit for human use, they are first tried out on animals. Oliver's job is to test the effects various chemicals have on rats, pigeons, rabbits, and monkeys, to find out if the chemicals lead to sever discomfort or even permanent damage. The chemicals Oliver is researching are slated to form part of a new diabetes drug cocktail that will relieve patients pain and reduce the health risks associated with diabetes. Oliver has to decide whether to accept the job offer or not.	He decides NOT to accept the job offer from the pharmaceutical company. He decides to accept the job offer from the pharmaceutical company.
Taboo	Oliver is a chemist who has been offered a job by a pharmaceutical company to conduct research on their products. Since products must be fit for human use, they are first tried out on animals. Oliver's job is to test the effects various chemicals have on rats, pigeons, rabbits, and monkeys, to find out if the chemicals lead to severe discomfort or even permanent damage. The chemicals Oliver is researching are slated to form part of a beauty and make-up product line that will launch in the spring. Oliver anticipates that the products will make a huge profit which will lead to a quick increase in Oliver's salary. Oliver has to decide whether to accept the job offer or not.	He decides NOT to accept the job offer from the pharmaceutical company. He decides to accept the job offer from the pharmaceutical company.
Secular	Oliver is a chemist who has been offered a job by a pharmaceutical company to conduct research on their products. This new job offer comes with a significant increase in salary. However, the pharmaceutical company is much farther away than his current place of work. If Oliver accepts the job, his commute would consist of a 1.5 hour drive to work each morning. Oliver has to decide whether to accept the job offer or not.	He decides NOT to accept the job offer from the pharmaceutical company. He decides to accept the job offer from the pharmaceutical company.

Sophie's Choice Scenario

Table S6. Sophie's Choice Scenario (Lab Study & MTurk Study)

	Scenario	Choice
Tragic	It is wartime and Tim and his two children, ages eight and five, are living in a territory that has been occupied by the enemy. At the enemy's headquarters is a doctor who performs painful experiments on humans that inevitably lead to death. He intends to perform experiments on one of Tim's children, but he will allow Tim to choose which of his children will be experimented upon. Tim has twenty-four hours to bring one of his children to the laboratory. If he refuses to bring one of his children to the laboratory the doctor will find them both and experiment on both of them. Tim has to decide whether to bring his eight-year-old or five-year-old child to the laboratory.	He decides to bring his five-year-old child to the laboratory. He decides to bring his eight-year-old child to the laboratory.
Taboo	It is wartime and Tim and his two children, ages eight and five, are living in a territory that has been occupied by the enemy. At the enemy's headquarters is a doctor who performs painful experiments on humans that inevitably lead to death. He informs Tim that he can offer Tim a high-status position in the new government in exchange for performing experiments on Tim's eight-year-old child. Tim has twenty-four hours to decide whether or not to bring his eight-year old child to the laboratory and accept the doctor's offer.	He decides NOT to bring his eight-year-old child to the laboratory. He decides to bring his eight-year-old child to the laboratory.
Secular	Tim and his two children, ages eight and five, are living in an apartment in a well-known, big city. His children are about to start primary school and kindergarten, respectively. Tim comes to the realization that the schools in the city do not offer the quality of education he wants for his children, however schools in the suburbs do. He considers moving with his children to the suburbs. However, if he does so his commute to work will be much longer, leading him to spend less time with his children, and they will live farther away their family and friends. Tim has to decide whether to stay in the city or move to the suburbs.	He decides to stay in the city. He decides to move to the suburbs.

Smother Father Scenario

Table S7. Smother for Dollars Scenario (Lab Study & MTurk Study)

	Scenario	Choice
Tragic	Kevin is in the hospital lounge waiting to visit his sick father. His father is very ill and the doctors believe that he has a week to live at most. Last night, Kevin's father told him that he no longer wishes to live in pain. He tells Kevin that he thinks that no good will come from living a few more days and asks Kevin to instruct the doctors to put him out of his misery. The doctors inform Kevin that these wishes can be fulfilled in two ways: Method 1 will kill his father very quickly, but will cause some pain. Method 2 will last hours, but will only cause some slight discomfort. Kevin has to decide whether to put his father out of his misery using Method 1 or Method 2.	He decides to use Method 2. He decides to use Method 1.
Taboo	Kevin is in the hospital lounge waiting to visit his sick father. His father is very ill and the doctors believe that he has a week to live at most. Last night, Kevin realized that his father has a substantial life insurance policy that expires at midnight. If his father dies before midnight, Kevin will receive three million euros. The money would mean a great deal to him and he thinks that no good will come from his father living a few more days. Kevin considers going up to his father's room and smothering his father with a pillow before midnight.	He decides NOT to smother his father with a pillow. He decides to smother his father with a pillow.
Secular	Kevin is in the hospital lounge waiting to visit sick father. His father is recovering from surgery and the doctors believe he will be able to return home in a few days. In the waiting room, Kevin receives a phone call from his boss. His company is about to close an important deal that could lead to a promotion for Kevin. However, this will only be possible if Kevin attends the last-minute meeting across town. Kevin has to decide whether to skip the visit with his father to attend the meeting and close the deal.	He decides to skip the meeting and stay with his father. He decides to skip the visit with his father to close the deal.

Taxes Scenario

Table S8. Taxes Scenario (Lab Study)

	Scenario	Choice
Tragic	Sebastian is the owner of a small business trying to make ends meet. Things have not been going well financially and Sebastian is scared that his business will fail. The business is his family's only source of income. It occurs to Sebastian that he could lower his taxes by pretending that some of his personal expenses are business expenses. For example, he could pretend that the groceries for his family are for business lunches or that his son's school supplies are office supplies. However, if his tax fraud is discovered he could go to jail. When Sebastian fills out his tax form he has to decide whether to declare his personal expenses as business expenses.	He decides NOT to declare his personal expenses as business expenses. He decides to declare his personal expenses as business expenses.
Taboo	Sebastian is the owner of a small business. It occurs to Sebastian that he could lower his taxes by pretending that some of his personal expenses are business expenses. For example, he could pretend that the plasma TV in his bedroom is being used in the lounge at the office, or that his romantic dinners out with his wife are dinners with clients, or that his new expensive car is the company vehicle. However, if his tax fraud is discovered he could go to jail. When Sebastian fills out his tax form he has to decide whether to declare his personal expenses as business expenses.	He decides NOT to declare his personal expenses as business expenses. He decides to declare his personal expenses as business expenses.
Secular	Sebastian is the owner of a small business and just received a small inheritance from his deceased uncle. Sebastian is considering how to spend the money. He could either use the money to repay his business loan or he could spend it on a luxurious vacation with his wife, that she has long been wishing for but knew they could never afford. Sebastian is about to tell his wife about the inheritance. However, first has to decide what to do with the money.	He decides that he will use the money to go on a luxurious vacation. He decides that he will use the money to repay the business loan.

Kidney Scenario

Table S9. Kill for Kidney Scenario (Lab Study)

	Scenario	Choice
Tragic	Ian's six-year-old daughter is very ill and the doctors think that she will not survive the next month if she does not receive a heart transplant. However, the doctors also inform him that his daughter is very low on the transplant list and it seems extremely unlikely that a heart will become available for the next few years. Ian is told to prepare for his daughter to die. Ian realizes that another sick child in the hospital is a match for his daughter's blood type. If this child dies, than his heart could be used for the transplant. However, this child is recovering quickly and seems to too be healthy enough to go home soon. Ian has to decide whether to kill this child to save his daughter.	He decides NOT to kill the sick child to save his daughter. He decides to kill the sick child to save his daughter.
Taboo	Ian's six-year-old daughter is ill and the doctors think that she will need a kidney transplant to recover fully. However, right now his daughter is stable and is expected to live for at least a year with no complications. The doctors inform Ian that his daughter is quite high the transplant list and it seems extremely likely that a kidney will become available within the next three months. Ian realizes that there is a black market for organs. If Ian buys a kidney from black market, his daughter could have her transplant by the end of the week. Ian has to decide whether he will illegally buy a kidney from the black market.	He decides NOT to buy a kidney from the black market. He decides to buy a kidney from the black market.
Secular	Ian has undergone major surgery. The doctors think that he will need remain in the hospital for at least four weeks to recover. Right now, Ian is sharing a room with three other recovering patients. Ian cannot sleep because the nurses need to give the other patients their medication every hour during the night. However, today he is informed that a private room has just become available. He can be transferred to the private room right away. However, his insurance will not cover the extra fees associated with a private room and he will have to pay the €8,000 himself.	He decides to stay in the shared room. He decides to be transferred to the private room.

Flood Scenario

Table S10. Flood Scenario (Manipulation Check Study ONLY)

	Scenario	Acceptability
Tragic	Mark is the president of the local authority of a village that has been severely affected by a flood. The local authority is discussing whether to invest a considerable amount of the annual budget in improved flood protection measures. In this case, however, the village would have to forego a planned project for vocational training and integration for unemployed adolescents. As president, Mark has to decide between the improvements in flood protection and the project for vocational training and integration.	How acceptable is it for Mark to… …invest in improvements in flood protection …invest in the project for vocational training and integration?
Taboo	Mark is the president of the local authority of a village that has been severely affected by a flood. The local authority is discussing whether to invest a considerable amount of the annual budget in improved flood protection measures. In this case, however, the village would have to forego a planned facelift for the village square. As president, Mark has to decide between the improvements in flood protection and the facelift for the village square.	…invest in improvements in flood protection? …invest in the facelift for the village square?
Secular	Mark, as a parent, is solely responsible for his family's livelihood. He has made several applications to find a new job. He just received two offers, and it is now up to him to select one of them. Company A offers an annual salary of $66,000 and 20 vacation days per year, whereas company B offers an annual salary of $50,000 and 30 vacation days per year. Mark now has to decide between the job with a greater annual salary and the job with a greater number of vacation days per year.	…accept the job with a greater annual salary? …accept the job with the greater number of vacation days per year?

Supplemental Materials Chapter 5

Table S11. Wording of Scenarios and Their Corresponding Choice Conditions

Scenario	Wording	Choice
Tetlock et al. (2000)	Robert is the Director of Health Care Management at a major hospital. He is in charge of the hospital's resource allocation. Today, he is faced with the following decision: Robert can save the life of Johnny, a five year old who needs a liver transplant, but the transplant procedure will cost the hospital €750,000 that could be spent in other ways, such as purchasing better equipment and enhancing salaries to recruit talented doctors to the hospital. Johnny is very ill and has been on the waiting list for a transplant but because of the shortage of local organ donors, obtaining a liver will be expensive. Robert could save Johnny's life, or he could use the €750,000 for other hospital needs.	He decides to save Jonny. He decides to use the €750,000 for other hospital needs.
Hard Times	José the head of a farming household in a developing country. His crops have failed for the second year in a row, and it appears that he has no way to feed his family. José's sons, ages eight and ten, are too young to go off to the city where there are jobs, but his sixteen year-old daughter could fare better. José knows a man from the village who lives in the city and who makes sexually explicit films featuring girls such as José's daughter. He tells José that in one year of working in his studio his daughter could earn enough money to keep his family fed for several growing seasons. José has to decide whether he will employ his daughter in the pornography industry in order to keep your family alive.	He decides NOT to employ his daughter in the pornography industry. He decides to employ his daughter in the pornography industry.
Smother Father	Kevin is in the hospital lounge waiting to visit his sick father. His father is very ill and the doctors believe that he has a week to live at most. Last night, Kevin realized that his father has a substantial life insurance policy that expires at midnight. If his father dies before midnight, Kevin will receive three million euros. The money would mean a great deal to him and he thinks that no good will come from his father living a few more days. Kevin considers going up to his father's room and smothering his father with a pillow before midnight.	He decides NOT to smother his father with a pillow. He decides to smother his father with a pillow.
CEO	Carl is the CEO of a global company that has been criticized for poor working conditions in a Chinese factory. The management is discussing whether substantial investments to improve safety at work should be made. In this case, however, Carl would have to give up the goal of a profit increase. As CEO, Carl has to decide between investing in safety at work and increasing profit.	He decided to invest in safety at work. He decides to increase profit.

A

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Social psychology peeps, you are amazing! Even on the days when I didn't feel like working (Mondays….also Tuesdays… most days), I still wanted to go to work, because it meant seeing all of you. The encouraging, friendly, and creative environment that you all created on the fourth floor of the Simon building made my PhD some of the best years of my life. I still miss our daily lunches, starting with the "LUUUUNNNCH" call (imagine a Dutch accent), continuing with "Albert Heijn" being screeched in the hallways, and reaching its cumulation in eating around the pantry table. I will never forget the funny stories, the profound discussions, and truly disturbing/disgusting/WTF conversations (my favorites) we shared. In addition to all the fun times and jokes, you all always had time to chat or answer my questions. At any point throughout the day, I could just walk in to your offices to ask for help (Micheal: you never failed to know everything about anything), get input on a research idea (shout-out to Tony), or just to chat over a Starbucks coffee about life (yes, you Yvette!). Thank you for always having time for me. I hope that you always felt welcome to plop down in a chair in my office and hang out in return. In sum, I came to see you all as friends rather than as colleagues. What could be better than being able to work with friends?!?

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To my paranymphs, Willem, Fieke, and Rabia, my former office mates and partners in crime[29] , I couldn't have imagined better people to be stuck in an office with. You have made both my work life and personal life more enjoyable than I ever could have imagined. The ultimate work-life balance! Coming to the office every day and seeing you there always brightened my day. But even better, I also got to see you all after work; be it at game night, drinks on a Friday, hanging out, and so much more. Just one example of how amazing my paranymphs are: In my first year of my PhD[30] , I was feeling very discouraged about research and had been leaving the office early most days. So one day, I was sitting on my couch at home and Willem stopped by (as ordered by Fieke, of course) to see if I was alright and cheer me up with a gift, Oli de olifant! Thank you all for being there to support me both in and outside of the office.

Friends, you are the most important people in my life. I will always cherish the times we spent together; be it playing board games, traveling to new cities to avoid carnival, or just eating and gossiping. Simply put, I don't know how I would have gotten through these last four years without you. You are all amazing, supportive, funny, intelligent, caring, and everything I could have ever imagined from a group of friends. I love you all. Here are just a few things I treasure about all of you:

Let's start with the paranymphs.

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29 By crime I mostly mean decorating Willem's office with Microsoft logos…ok, so maybe Willem was more of a victim than a partner lol

30 Rabia, this was before your time. I'm old!

Willem: We jokingly call you "special". But the truth is, you are very special to me. You have become an amazing friend and confidant throughout the years. It probably started when we shared an office. Honestly, I never got anything done! You would start these debates about relevant issues and me, being me, just couldn't help but get into the discussion with you. You made me so frustrated and happy at the same time (I like to debate). So believe it or not, I was actually happy when you left our office, because it meant that I could actually get some work done. But this never stopped you from randomly dropping by the office to chat. Also, even though you no longer were my office mate, you were always there to help me. I remember pitching research ideas and theories to you with weird drawings on a white board, you gave me feedback on my initial dissertation cover design ideas [31], and were always available to help with a coding problem… even if you spent more time making my code look elegant rather than solving the problem. Also outside of work, you always had time for me. Be it just hanging out, going for a walk in the woods, or complaining about relationships after a heartbreak. Thank you for all those special moments. But most importantly, you introduced me to the "friend group". Without you and your social glue, I never would have met the amazing people in my life now. For that I will be forever grateful.

Rabia: I met you a bit later on in my PhD. This time I was the experienced one and you were the new one… I didn't feel experienced at all. I believe most of the PhD is just thinking "what the hell am I doing" until one day you are miraculously done. Anyway, I realized that you were cool right from the start and I wanted to become your friend. Luckily you got stuck in an office with me soon so you couldn't escape!!! I always enjoyed talking about research with you because we had similar interests and because you had such a cool applied topic. But soon, I realized we had much more in common. We could talk about dance classes together (although I dropped out of Salsa classes pretty soon), you were into board games too, and you understood what it was like to come to the Netherlands from abroad. For example, learning Dutch is almost impossible when everyone speaks English! But the real moment of bonding happened when you became a cat lady to rival my inner crazy cat lady. To this day I can't believe you went from being scared of cats to owning two adorable fur balls. I know I joke about this a lot, but I am honestly in awe of you. I don't think I would have had the courage to face my fears head on and take such a drastic step. This is just one of the many things I admire about you. You are always open to try new things, meet new people, and test new boundaries. I wish I could be more like you. You have quickly become a close friend of mine (not just because of the cat bonding) and I wouldn't have it any other way. Especially, when you also managed to wow my parents in one meeting. Now, we just need to get you a UK visa so you can come visit me!

31 My dissertation cover look nothing like that now hahahah.

Lizzy: I look up to you so much. You are one of the strongest and hardest working people I know. You are always there to remind me not to take shit from anyone, to be a strong independent women, and, best of all, do it with a hilariously dry sense of humor. Also, you need to take me shopping one day, I love your dresses!

Maaike: You are my longest friend in the Netherlands! How could we not become friends in the high pressure environment of the REMA. It was intense! Nevertheless, you always seem to keep your cool and just being around you makes me feel calm. This may have something to do with the amazing cocktails you make, as well!

Gaby: Fierce, strong, caring, supportive Gaby. You are one of the people who I can talk to about the difficult things in life and get a truly honest and heart-felt response. I think it took a while for us to become close, but now I just feel grateful to call you my good friend. I trust you to always lead me down the right path… not just when wandering the streets of Nice and Lisbon!

Michèle: Our rising star! I think I secretly want to be you…. not just for being a great researcher (I would kill for your publications) and someone who actually enjoys cleaning (WTF), but also for being an amazing friend. You have always made me feel welcome and made me laugh. Also, you feed me!

Paulette: We always joke that you could turn any boy's head with your smile and that way of looking at them like they are the only person in the world. Well… you turned my head too! You have this way of making me feel like what I say is important and interesting no matter what. Also, I admire you so much for being unapologetically yourself. You know who you are, what you like, and you go for it with everything you have.

Christina: My favorite "laying on the beach and doing absolutely nothing" buddy. You are such an intelligent, loving, and creative woman[32]. Most of all, you bear yourself with such a calm modesty, just until you let the façade slip and say something hilarious or unexpected. These are my favorite moments with you! And watching Drag Race together of course.

Byron: There are no words. You barged into my life, happy, flamboyant, caring, and full of joy and I wouldn't have it any other way. You are the person who makes sure that our girls' nights don't turn into boring talks about folding sheets and who is always open to share his feeling with us. This has allowed me to share my feeling in return, which isn't always easy for me. You have shown me what it means to be proud of your own identity and has always encouraged me to be myself, no matter what!

32 P.s. I totally want one of your paintings one day!

Tünde: I remember the first time I really got to know you. You invited me to your birthday party and I was really confused (and extremely flattered) because I didn't know you that well. Thankfully, that changed very soon. Now I count you as one of my closest friends. No matter what, you always have made time for me. Be it having long talks full of honestly, showing up unexpectedly at the University to have coffee with me, or just hang out together. I cherish these moments more than you will ever know and I hope that I can be there for you just like you were always there for me.

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I may be the only person ever to write an acknowledgement for "people" who will never read it (yes, cats are people too!). But in these pages, I will fully embrace my crazy cat lady status and, therefore, will thank my cats for contributing to my PhD. Venna and Pebbles, thank you for all the playful moments and kitty cuddles throughout the years. Writing my dissertation wouldn't have been nearly as enjoyable or frustrating, without a cat sitting on my lap (or on my laptop) while I was trying to get work done. Especially in tough times, it was always a reassurance to know that I wouldn't be going home to an empty house and would have two loving, unique, and special beings waiting for me…. Also, cats make for great office gossip and bonding moments with your paranymphs!

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Mom, I will always cherish our walks, with or without a dog (R.I.P. Lucky dog). We talked about everything under the "mountains", from girly talks to mathematical proofs. This is when I first learned to love debating, reasoning, and thinking about things from new perspectives… (yes, you did convince me about affirmative action when I was 15 years old). More than anything though, I got to spend time with you. And eat sushi with you!

Dad, I mean this in the best sense of the word: I am a daddy's girl. We always shared our interests and you have always understood me. For example, we both are great at "learning the internet by heart"; we both love learning languages, even if it is just to sound smart "mais, bien sûr!"; we both have a weirdly dry sense of humor. Some of my favorite memories are of our travels together. Going to Paris and seeing the Sacré-Coeur at night or going to see Ice Dancing together in Turin (You loved it. Admit it!). I will always cherish these memories and hope we can create many more together.

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R

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