Motivator and Moralizer: How Agency Shapes Choice and Judgment

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Submitted in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy
under the Executive Committee
of the Graduate School of Arts and Sciences

COLUMBIA UNIVERSITY

2021

ABSTRACT

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The subjective experience of agency is a dimension of inner life that has consequences for motivation and moral judgment. Cognitive psychologists have studied the processes that underlie conscious will and metacognition of agency while social psychologists have examined how comparable constructs, such as autonomy and self-efficacy, relate to human needs and wellbeing. However, the consequences of the transient feeling state that accompanies agential experiences have received less attention. This dissertation examines the consequences of agency for motivation and moral judgment across seven experiments that manipulated feelings of agency via motor control games, episodic simulations, and autobiographical recollections. In its entirety, this work suggests that people seek experiences that confer high feelings of agency while both high- and low-agency experiences influence how we judge others' actions. Chapter I reviews prior literature on agency and related constructs and introduces the conceptual and theoretical framework. Chapters II – IV discuss how feelings of agency manipulated via proximal, action-oriented cues and distal, outcome-oriented cues affect task preference. Findings suggest that people generally like experiences of high agency, and that motivation is more sensitive to proximal rather than distal disturbances. People tend to make choices to increase their likelihood of experiencing high agency via retention of action control, even at the expense of desired outcomes. Chapters V – VIII explore the relationship between agential experiences and moral judgments of others' behavior. Results reveal a novel effect such that both high- and low-agency experiences lead to more intense judgments. In addition, people who are most

sensitive to factors that influence their sense of agency also tend to deliver the harshest judgments. The findings suggest a two-process model of attributive projection and compensatory control mechanisms. They also imply a self-amplifying effect of extreme agency states such that both experiences of high and low agency may enhance activation of self-related schema, which in turn influence moral judgments. Chapters IX and X summarize the experiments and discuss the broader significance of this work for research on motivation and moral psychology.

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Acknowledgments

I feel immense gratitude for having had the opportunity to learn from such an accomplished and supportive group of scholars during my PhD journey. The biggest thanks go to my advisor, Janet Metcalfe, whose enduring support and intellectual guidance made this work possible. I truly cannot imagine an advisor more dedicated to the work or more devoted to her students' scholarship. I also feel very lucky that Tory Higgins played a key role in this endeavor. His infectious enthusiasm for the field spurred my motivation and his insights nudged me to think about this work from different angles. I would also like to thank Mariam Aly and Lila Davachi, whose thoughtful comments along the way helped sharpen my thinking and strengthen the work. Thanks as well to Mauricio Delgado, whose work influenced my earliest thinking about agency, and to Niall Bolger, who always made time to help me think through analyses and taught me most of what I know about statistics. In addition, I would like to thank Myeong-Ho Sohn, whose openness and support helped to spark my interest in cognitive psychology many years ago.

I would also like to thank all members, past and present, of the Metcalfe Lab at Columbia who joined me along this journey. Particular thanks go to Lisa Son, whose perennial positivity and constructive comments helped keep my morale high and inspired me to constantly think about this work in different lights. Special thanks also go to Matti Vuorre and Judy Xu, who were my role models and mentors in the lab. I cannot thank them enough for the many hours of guidance, support, and advice. Thanks also to Lisa Pegram for bringing a fresh perspective to this work over this past year. And, of course, I am beyond grateful for the dedication and enthusiasm of the many research assistants who helped keep this work moving. I would like to particularly mention Evangeline Giannopoulos, Treva Kennedy, Ryan Saloma, Carolina Lacs,

and Alex Muresanu, who went beyond the call and devoted countless hours to supporting these efforts.

My graduate school experience was so rewarding and meaningful thanks to the support and companionship of my fellow graduate students. I feel so lucky to have become friends and colleagues with so many brilliant, kind, and fun people. Special thanks go to Basak Akdogan, Natalie and Dan Biderman, Paul Bloom, Mark Conley, Ray Crookes, Brittany DeFeis, James Dunlea, Celia Durkin, Andrea Fields, Morgan Firestein, Abdiel Flores, Hale Forster, Raphael Gerraty, Greg Jensen, Maayan Malter, Chris Medina-Kirchner, Rebecca Mohr, Mike Naft, Emily Nakkawita, Travis Riddle, Claudia Schneider, Brian Silston, Matt Sisco, Monica Thieu, Kate Turetsky, Michelle VanTieghem, Margaux Wienk, Cait Williamson, and Katherine Zee.

Finally, I would like to thank my family. I could not have completed this journey without their love and support. Mom, Dad, Melissa, Aunt Linda, Uncle Jerry, Aunt Nancy and Uncle Ron, Emily, Hunter, Jenna, Wes, Liza, and Jude – thank you!

Dedication

To the memories of Albert M. Hartig (1921 – 2016) and Joy L. Bucknoff (1926 – 2019).

I. Introduction

Human agency is the bedrock of history. Beneath the tumult of revolution, the horror of war, and the persistence of grassroots activism lies the perpetual human impulse to take action in pursuit of desired ends. Many of the Founding Fathers of the United States of America were deists, who believed that God created the world but then left its fate in the hands of humanity (Holmes, 2006). The insight that humans can act according to their own intentions reverberates through our country's founding documents. Indeed, our founding creed emphasizes action, as we are endowed with the unalienable right *to pursue* happiness, not to wait passively for ethereal forces to bestow it upon us (Jefferson, 1776).

While happiness and other noble human aims are of course worthwhile ambitions, one wonders about the significance of the pursuit itself. As the saying goes, "Life's a journey, not a destination," and that notion pervades religious teachings (e.g., Cumming, 1855), self-help frameworks (Rubin, 2009), and even popular music (Alexander & Mabe, 2009; Supa & Tyler, 1993). The idea implies that more value exists in the *means* of goal pursuit than in the ends of goal achievement.

What is the nature of that value? Does the purpose of an action lie exclusively in its ends? Or is there something special about the means – the experience of agency itself? Eminent psychologists have long theorized about constructs similar to the human sense of agency. White (1959) introduced the concept of competence to address shortcomings in drive reduction and psychoanalytic theories. Bandura (1977) used self-efficacy to explain adaptive behavioral change in clinical contexts. Deci and Ryan (1985) included competence and autonomy in a framework of basic human needs. Higgins (2011) advanced the idea of control effectiveness and claimed that the need to "manage what happens" represents a fundamental and distinct

motivational system. A common theme across these theories is that humans seek opportunities that afford a sense of control over their behavior and the environment.

Recently, scholars have conducted experiments to test that claim. A common method uses the act of making a choice as the operational definition of control, which allows researchers to compare behavior in conditions where people make a choice to conditions where no choice is permitted. Studies show that, in general, people prefer conditions that afford opportunities to make choices (Bown, Read, & Summers, 2003; Suzuki, 1997). These effects have moderating factors, such as the relationship between choices and potential gains and losses. Research suggests that people's affinity for making a choice is enhanced when the positive outcome associated with that choice is a monetary gain rather than loss (Leotti & Delgado, 2014). In some cases, however, people persist in preferring choice contexts over no-choice contexts, even at the expense of gains. For example, in simple tasks where people can choose whether to retain decision-making authority or delegate to another, people strongly prefer to choose for themselves, even when delegation would result in higher gains (Bobadilla-Suarez, Sunstein, & Sharot, 2017; Wang & Delgado, 2019). Neuroscience research provides additional evidence that choice is desirable, revealing that the opportunity to choose relates to activation in brain circuitry responsible for reward processing (Leotti & Delgado, 2011). Such findings suggest that, in certain contexts, the right to choose is inherently rewarding and valuable (Leotti, Iyengar, & Ochsner, 2010).

As the choice literature begins to help us understand the significance of the *ability* to take action, other scholars have focused on the particular motivational consequences of the relationship between actions and effects. Instead of comparing behavior between choice and no-choice conditions, researchers use response selection paradigms to study the roles of effect

contingency and temporal contiguity. Findings suggest that a person's motivation to take an action positively relates to contingency; the greater the likelihood that the action will have an effect, the greater the likelihood the person will act (Eitam, Kennedy, & Higgins, 2013; Karsh, Eitam, Mark, & Higgins, 2016). A similar relationship exists between motivation and temporal contiguity. People tend to show greater motivation to take actions whose effects follow immediately rather than after a delay (Karsh & Eitam, 2015). Therefore, not only do people like to choose, they prefer situations when their actions produce desired effects reliably and quickly and are more motivated to perform in those contexts.

The existing work on choice lays a solid foundation for our understanding of the significance of agential experiences themselves. But gaps remain. First, choice research limits inquiry to the difference between active and passive states. In choice conditions, people actively make a choice. In no-choice conditions, people passively accept others' choices. In life, however, rarely do we find ourselves in *purely* active or passive contexts. No human is omnipotent nor impotent. Rather, we often take action yet encounter obstacles that affect our sense of agency and likelihood of success. For example, consider the suburbanite who sets out on a Saturday morning with a list of errands. Perhaps his car will not start, or the items he's looking to buy are out of stock, or the road to the shopping center is under construction and he must take a detour. Despite his best efforts, his ability to follow through on his intended plan is frustrated by forces beyond his control. Importantly, he is not rendered completely passive. He can still make attempts and decide how to respond. But his sense of agency will be diminished by external events.

The binary distinction between active and passive states, therefore, bears little resemblance to our subjective experiences of agency in the world. Our sense of agency is

subject to a dynamic interplay between our actions and external factors and forces that influence our success. We can be active yet still lack feelings of agency. Indeed, research supports the notion that feelings of agency can differ among active states (Metcalfe, Eich, & Miele, 2013). Thus, a better approach for studying the importance and consequence of experiences of agency – not merely active states relative to passive ones – would allow for variability *within* active states and examine differences in behavior across that spectrum.

A second gap in the existing literature relates to the reliance on effect manipulations. Response selection paradigms (Eitam et al., 2013; Karsh & Eitam, 2015; Karsh et al., 2016) rely exclusively on *distal, outcome-oriented* cues to the sense of agency. Such category of cues represents only one input to metacognition of agency (Metcalfe, 2013). Other *action-oriented* cues may also play critical roles. One dimension on which cues to agency vary is their proximity to the agent and the action, which relies on the distinction between basic actions and effects (Danto, 1965). We can think of cues as falling into one of two large groups – proximal, action-oriented cues and distal, effect-oriented cues. Proximal cues relate to the execution of an action itself and lie closer to the agent in space and time, whereas distal cues pertain to the effect (e.g., contingency, contiguity). Consider turning on a light. That seemingly simple act consists of the proximal action of flipping the switch and the distal effect of the light coming on. If a person cannot find the switch, or if the switch will not budge, their ability to execute the action becomes comprised. In contrast, the distal effect of the light turning on is influenced by a different set of factors, such as the wiring between the light and the switch, or the functioning of the light bulb. The response selection experiments examined the influence of distal cues only, and, thus, leave unexplored the relationship between motivation and action.

There is reason to believe that proximal and distal cues may differentially influence motivation. Metcalfe et al. (2013) investigated the differences in the relationships between proximal and distal cues and metacognition of agency. These experiments used a simple motor-control task where people moved the computer mouse to maneuver an on-screen cursor to "catch" objects as they scrolled down from the top of the screen. Participants made judgments about their perceived feelings of agency and perceived performance in the task. It was found that proximal cues more strongly influenced perceived agency than distal cues, and the influence of distal cues could be explained by perceived performance. The researchers concluded that these "cues exhibit different psychological profiles." Given that stark contrast, and the existing empirical and theoretical work linking the sense of control to motivation, it is possible that a person's desire to act may be differentially influenced by proximal and distal cues. Chapters II – IV investigate that question.

The second half of this dissertation addresses the consequences of agency for two other important domains of human behavior: moral judgment and memory. To judge the rightness and wrongness of others' actions is a fundamental human motivation that takes psychological primacy over many other social judgments (Pizzaro & Helzer, 2010). Indeed, the tendency to make judgments of responsibility is so strong that many texts, from scripture to self-help, urge us – often to little avail – to curb our judgmental impulses (Weiner, 1995). While research into the factors that influence moral judgment has traditionally focused on the actor, the action, or its context (e.g., Gray & Wegner, 2009; Nicholes & Knobe, 2007; Pizarro, Uhlmann, & Bloom, 2003), more recent work has switched focus to how states and traits of the observer may impact moral judgments (e.g., Graham, Haidt, & Nosek, 2009; Miller & Cushman, 2013; Schnall, Haidt, Clore, & Jordan, 2008). Research suggests that the observer's motivational orientation

(Cornwell & Higgins, 2013), political ideology (Janoff-Bulman, Sheikh, & Baldacci, 2008), and even physical sensations (Eskine, Kacinik, & Prinz, 2011) can all influence the moral lens through which they judge the behavior of others.

One feature of the observer's subjective experience that scholars have begun to investigate as it pertains to moral judgments is the observer's sense of control (Cornwell & Higgins, 2019). Published work that examines this relationship directly is limited to one paper, and only one of the four studies in that paper used an experimental manipulation of the sense of control. But the work suggests that the sense of control may positively relate to moral judgment intensity. The more in-control a person feels over themselves and their own actions, the more harshly they judge the actions of others (Cornwell & Higgins, 2019). That finding implies an effect of attributive projection (Murstein & Pryer, 1959) such that people use their own internal states to anchor their perceptions of others. If an observer feels a high degree of control, his judgment of an actor will be biased in the direction of high control. Because people generally believe that a person in greater control of his actions is more responsible and culpable (Weiner, 1995), the observer will then give more extreme moral judgments when he feels strongly in control himself. The experiments described in chapters V – VIII sought to extend and generalize that finding.

In addition to motivation and moral judgment, prior research on the sense of agency suggests that memory function may be a third domain of human behavior influenced by agency (Bucknoff & Metcalfe, 2020). Studies have shown that the simple act of making a choice during a memory task can enhance memory performance at test (e.g., Cloutier & Macrae, 2008). Such findings implicate the sense of agency as a causal mechanism (Murty, Dubrow, & Davachi, 2015). Indeed, classic memory findings, such as the generation effect (Bertsch, Pesta, Wiscott,

& McDaniel, 2007; Slamecka & Graf, 1978), the testing effect (McDaniel, Roediger, & McDermott, 2007), and the enactment effect (Cohen, 1989; Nyberg, 1993) may be explained, in part, by greater feelings of agency in the experimental conditions relative to control conditions (e.g., read-only). The experiments introduced in chapters V – VIII included a recall task to test hypotheses related to the association between agency and memory.

II. Motivational Consequences of Agential Experiences

Introduction

This study investigated the consequences of feelings of agency for motivation. The experiment examined whether people are more likely to choose tasks that afforded them stronger feelings of agency over those where they experienced a lower sense of agency. The experiment asked participants to choose between two tasks in which they were active agents but experienced different feelings of agency. Feelings of agency were manipulated by disrupting participants' actions and the consequences of their actions during task performance. By exploring the choices people make under such conditions, the study aimed to further our understanding of the relationship between agency and motivation.

Prior research has used the ability for participants to make choices during a task as the operational definition of control. Findings have revealed that people prefer circumstances that afford the opportunity to make choices relative to situations where no choice is permitted (Bown et al., 2003; Suzuki, 1997). Framing can influence these effects such that people like opportunities to choose more when the outcome is a monetary gain rather than loss (Leotti & Delgado, 2014). Choice preference persists even at the expense of gains; people prefer to make choices themselves rather than delegate, even when delegation would result in higher gains (Bobadilla-Suarez, Sunstein, & Sharot, 2017; Wang & Delgado, 2019). The opportunity to choose also relates to activation in brain circuitry responsible for reward processing (Leotti & Delgado, 2011). Such findings suggest that, in certain contexts, the right to choose is inherently rewarding and valuable (Leotti, Iyengar, & Ochsner, 2010).

Other research has operationally defined control as the ability for actions to produce desired outcomes reliably and quickly. These experiments have shown that motivation to

perform an action is directly related to probability of the action generating the desired outcome and inversely related to the temporal lag between action and outcome (Eitam, Kennedy, & Higgins, 2013; Karsh & Eitam, 2015; Karsh, Eitam, Mark, & Higgins, 2016). Instead of comparing behavior between choice and no-choice conditions, these experiments used response selection tasks to manipulate the probability that the action produces desired outcomes and the temporal contiguity between action and outcome. Common measures of motivation in these tasks include reaction time and selection frequency. People respond more quickly when their actions have a higher probability of having desired outcomes, and when those outcomes occur immediately following the action (Eitam et al., 2013; Karsh et al., 2016). People are also more likely to select actions associated with higher desired-outcome probabilities (Karsh & Eitam, 2015; Karsh et al., 2016). A person's motivation to perform an action, therefore, depends, in part, on the relationship between action and the desired end result of taking the action.

While the above findings suggest that feelings of agency are motivating and desirable, the existing experimental work is limited to studies related to active-passive choice states or distal disturbances. Researchers have investigated how the ability to make a choice and the reliability of outcomes influence motivation to perform actions. But, as the example of the suburbanite running errands in chapter I illustrates, the way humans experience feelings of agency in their everyday lives depends on many factors beyond the mere ability to choose which action to take. People may experience their own sense of agency along a spectrum of no control to complete control, and those states are informed by many cues (Metcalfe, 2013). Indeed, there is reason to believe that disturbances to the course of carrying out an action may influence motivation, and this proximal, action-orientated interference may play a larger role than its distal counterpart.

Metcalfe et al. (2013) examined the differences between proximal and distal cues to the sense of agency. Participants played different versions of a game where they used the mouse cursor to strike Xs and avoid Os as they scrolled down the screen. The proximal disturbance entailed introduction of random interference into the movement of the mouse cursor. When the participant moved the mouse, the cursor responded erratically. The distal disturbance involved reducing the proportion of Xs that popped when struck by the cursor. Researchers found significant effects on agency judgments of both the proximal and distal manipulations. Notably, the effect was stronger for the proximal manipulation and could not be accounted for by performance judgments, suggesting that proximal, action-oriented information acts as a diagnostic cue to the sense of agency. Given the apparent supremacy of proximal cues, it is possible that proximal, action-related information more strongly influences motivation than distal, outcome-related information. The experiment described in this chapter tested that prediction.

This experiment differed from prior research on the motivational consequences of perceived control in two key ways. Certain prior research has focused only on differences between active and passive states (Bobadilla-Suarez et al., 2017; Leotti & Delgado, 2011; Leotti & Delgado, 2014; Wang & Delgado, 2019) whereas the current experiment examined the motivational consequences of various active states that differ in terms of self-reported feelings of agency. In addition, prior response selection research has manipulated distal cues only (Eitam et al., 2013; Karsh & Eitam, 2015; Karsh et al., 2016) whereas the task used in the current study included interference of both the proximal and distal domains. The current study, therefore, went beyond active-passive and distal manipulation contexts to assess the motivational consequences of active agential experiences that differ in terms of felt agency.

The experiment tested people's preferences for different versions of the game used by Metcalfe at al. (2013). The game is as a dynamic motor control paradigm known as the space pilot game (due to its resemblance to the videogame "Space Invaders"). The task has been used extensively in prior research on metacognition of agency (Metcalfe & Greene, 2007; Metcalfe, Eich, & Castel, 2010; Sidarus, Vuorre, Metcalfe, & Haggard, 2017). In the task, players try to pop Xs and avoid Os as they scroll down the computer screen (see Figure 1). The player does this by moving the mouse, which controls a cursor on the bottom of the screen. The cursor moves horizontally across the bottom of the screen according to the player's mouse movements. In the standard version of the game, Xs pop whenever they are hit with the cursor. When an X pops, it disappears from the screen and is replaced briefly by a small firework graphic and a *ping* sound. When a player inadvertently hits an O, they hear a *thud* sound.

In this study, participants played different versions of space pilot, provided judgments about their experience, and made choices as to which versions they would like to play again. The player's subjective experience of agency was assessed by asking participants for judgments of agency (JOAs) following each game during the third block of trials. Prior research on metacognition of agency suggests that the strongest predictor of feelings of agency is perceived performance (Metcalfe, 2013; Metcalfe & Greene, 2007). Perceived performance was also measured in the experiments that follow by collecting participants' judgments of performance (JOPs) after each game. But insofar as the JOP was highly redundant with the more direct JOA, it is not discussed in detail. We measured the proportion of total Xs struck in a game ("hit rate"), the proportion of Xs popped ("pop rate"), and the proportion of Os struck ("false alarm rate"). In the standard version of the game, hit rate and pop rate are equal. However, in versions that reduce the probability that a given X will pop (see next paragraph), the two measures differ.

JOAs were solicited only in the final third block of trials. The intent was to observe the effect of the game experience alone, and to avoid any potential confounding due to the act of making the judgments, on choice. Accordingly, judgments were reserved for only the final block of trials. After playing each pair of games and making the required judgments, participants responded to a question that asked them to indicate which game in the pair they would like to play again. The choices were purely hypothetical and had no impact on the sequence of games presented.

Three different versions of the task – designed to impact people's judgments of agency differentially – were used in this experiment: the standard game, without any manipulations; a "turbulence" game, which manipulated the proximal action of the cursor via random interference introduce into cursor movement; and a "duds" game, which manipulated the distal outcome by reducing the probability of an X popping when struck. To create the turbulence condition, the computer program added a random draw from a sine function to the player's mouse movement, which caused the cursor to move erratically. During some moves, the program added a small magnitude of noise, resulting in only slight deviations from the player's intended path. During other moves, the program added a large amount of interference, creating wild swings in the movement of the cursor. To create a so-called 'duds' condition, the game assigned each falling X a 50% probability of popping when struck. Thus, some Xs were "duds", meaning they failed to pop and moved through the cursor to the bottom of the screen as if it were not in its path.

These versions of the game were chosen to allow for a variety of agential experiences during gameplay. Prior research has shown that the standard game generates the highest feelings of agency, games with duds generates moderate feelings of agency and the turbulence game produces very low feelings of agency (Metcalfe, Eich, & Miele, 2013; Metcalfe & Greene, 2007). Hit rates were equal to pop rates in the standard game as well as in the turbulence game

because in those games, 100% of struck Xs popped. But in the duds game, the pop rate was equal to some proportion of the hit rate, depending on the level of duds. For example, in a 50% duds game, pop rate was approximately equal to 50% of hit rate because, on average, only 50% of Xs struck or hit proceeded to pop.

In this experiment, a 50% duds level was selected for the duds condition because pilot work suggested that this level of duds would generate a pop rate in the duds condition roughly equal to that in the turbulence condition. This would allow the analysis to examine the role of feelings of agency on choice behavior in the pairing that forced a choice between duds and turbulence, when occurrence of the desired outcome (i.e., pop rate) would be approximately the same. Seven participants completed three versions of the space pilot game with dud levels ranging from 25% to 75%. The findings showed that the 50% duds condition brought pop rate down to a level approximately equal to that which occurs during a turbulence game. Thus, the 50% duds game was selected for inclusion in the experiment.

Finally, to investigate the possibility that individual differences might influence choice behavior, the regulatory mode questionnaire (RMQ) (Kruglanski et al., 2000) was administered in this experiment. Regulatory mode theory (Higgins, Kruglanski, & Pierro, 2003) offers predictions for why some people may show stronger preferences for certain games in certain pairings. Individuals with strong locomotion orientations are motivated by movement and action; therefore, they may be more sensitive to proximal interference that disrupts the smooth flow of movement. In contrast, individuals with strong assessment orientations are motivated by the desire to "do the right thing" and are thus more sensitive to feedback. It is possible, then, that assessors would show greater sensitivity to disruptions to distal, outcome-oriented information.

Including the RMQ allowed for the collection of data that could help explain potential individual differences in choice behavior.

Given prior work highlighting the value and desirability of perceived control (e.g., Leotti, Iyengar, & Ochsner, 2010), it was predicted that people would prefer games associated with the highest feelings of agency. Thus, the hypothesis was that participants would tend to select the game in each pair that generated the higher JOA. In both the standard – turbulence and standard – duds pairings, it was predicted that people would prefer the standard game. In the duds – turbulence pairing, it was predicted that people would prefer the duds game. In addition, as discussed above, prior research has suggested that proximal, action-oriented information plays a stronger role than distal, outcome-oriented information in metacognitive processes that give rise to the sense of agency (Metcalfe at al., 2013). Therefore, it was also predicted that this distinction would manifest in differences in task preference.

Method

Participants. Participants were 25 male (N = 11) and female (N = 14) Columbia University undergraduates enrolled in an introductory psychology class. Participants ranged in age from 18 to 34 (M = 21.54, SD = 4.07). Data from 1 participant were omitted from all analyses due to a computer error in the middle of the experiment. Thus, data from 24 participants were used in all reported analyses. All participants, in this and all subsequent experiments, gave informed written consent and were treated in accordance with the ethical principles of the American Psychological Association. In addition, Columbia University's Institutional Review Board approved our procedures.

Materials. The space pilot game was built using PsychoPy2 v1.81.02 (Peirce, 2009). Following the game, participants completed two questionnaires: the regulatory mode

questionnaire (RMQ) (Kruglanski et al., 2000), which allowed us to investigate the relation between regulatory mode and choice, and a brief demographics questionnaire. Participants completed the regulatory mode questionnaire on paper and the demographics questionnaire via a Google Form.

Procedure. Participants were instructed to play a game in which they would use the computer mouse to move a box horizontally across the screen. Xs and Os would scroll down the screen, and they were told to explode all of the Xs by touching them with the cursor and avoid all of the Os (Figure 1).

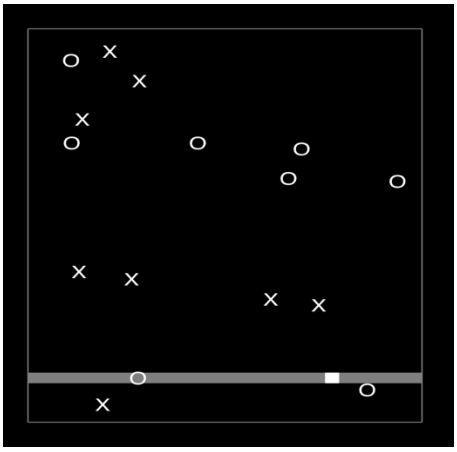

Figure 1. Screenshot of space pilot game

Xs and Os scrolled down the screen at a constant rate while the participant maneuvered the cursor using the computer mouse. The object of the game was to hit as many Xs with the cursor as possible while avoiding as many Os as possible.

They were told that each trial consisted of two versions of the game followed by a prompt asking them to select the version they wished to play again. They were told the differences between the games were subtle, so it was important to pay close attention as they play each game. Participants were also told they might have a chance to play their chosen games again at the end of the experiment. They began with one practice trial and had the option to play additional practice trials until they felt they understood the task.

Participants viewed a 1s message before starting each game that read, "Get ready." After the pre-game message, the game began. Each game lasted 20s. After playing both games, a prompt appeared that asked, "Which game would you like to play again?" Participants made a choice – either the first game or the second game in that pair – by pressing the appropriate key on the keyboard. That process repeated for two blocks of 18 trials each.

After the first two blocks of trials, participants rested for 1min. Before continuing, they were told to make JOAs and JOPs following each game for the final block of 18 trials. To provide JOAs, participants responded to an on-screen prompt that asked, "How much in control did you feel in this trial?" Participants used the mouse to indicate their response along a sliding scale from "No Control" to "Full Control." For JOPs, participants responded to an on-screen prompt that asked, "How would you rate performance in this trial?" Participants used the mouse to indicate their response along a sliding scale from "None Correct" to "Completely Correct." Entries on both scales were converted to a number between 0 and 1.

After completing all trials, participants completed the regulatory mode questionnaire and the demographics questionnaire.

Design. The three game conditions used were turbulence, 50% duds, and the standard game. Each trial required the participant to play two different game conditions as a pair then choose which game in the pair they would like to play again. Other game-level dependent variables were performance (the proportion of Xs popped) and the proportion of Xs ("hit rate) and Os ("false alarm rate") hit in each game. The primary trial-level dependent variable was the participant's choice of which game in each pair he or she would like to play again.

Since three different versions of the game were used, there were three possible pairings: turbulence – duds, turbulence – standard, and duds – standard. 50% trials for each pairing was

presented in one order, and the other 50% presented in the opposite order, giving six total pairings, including order. Participants completed each pairing nine times for a total of 54 trials, across three blocks of 18 trials each. During the final block of 18 trials, participants provided JOAs and JOPs following each game.

Results

For analyses in this and all subsequent chapters, an alpha level equal to .05 was used as the threshold criterion for statistical significance. Results for all gameplay measures (i.e., all variables except choice) can be found in Table 1.

Judgments of agency. There was an effect of game type on JOA, $F(2, 46) = 169.69$, $p < .001$, $\eta^2 = .83$. There was a difference between mean JOAs for the standard game ($M = .88$, $SD = .08$) and turbulence game ($M = .21$, $SD = .11$), $d = 6.98$, $p < .001$, between the standard game and the duds game ($M = .69$, $SD = .18$), $d = 1.38$, p, $< .001$, and between the duds game and the turbulence game, $d = 3.24$, $p < .001$. Thus, the turbulence and duds manipulations performed as expected, producing games that varied in terms of feelings of agency (Figure 2).

Outcome achievement. There was an effect of game type on pop rate, $F(2, 46) = 676.72$, $p < .001$, $\eta^2 = .87$. There were differences between mean pop rates for the standard game ($M = .56$, $SD = .07$) and turbulence game ($M = .21$, $SD = .07$), $d = 4.92$, $p < .001$, between the standard game and the duds game ($M = .26$, $SD = .04$), $d = 5.22$, p, $< .001$, and between the turbulence game and the duds game, $d = 0.96$, $p = .01$, though this latter difference was much smaller than differences between the games in the other two pairs (Figure 3).

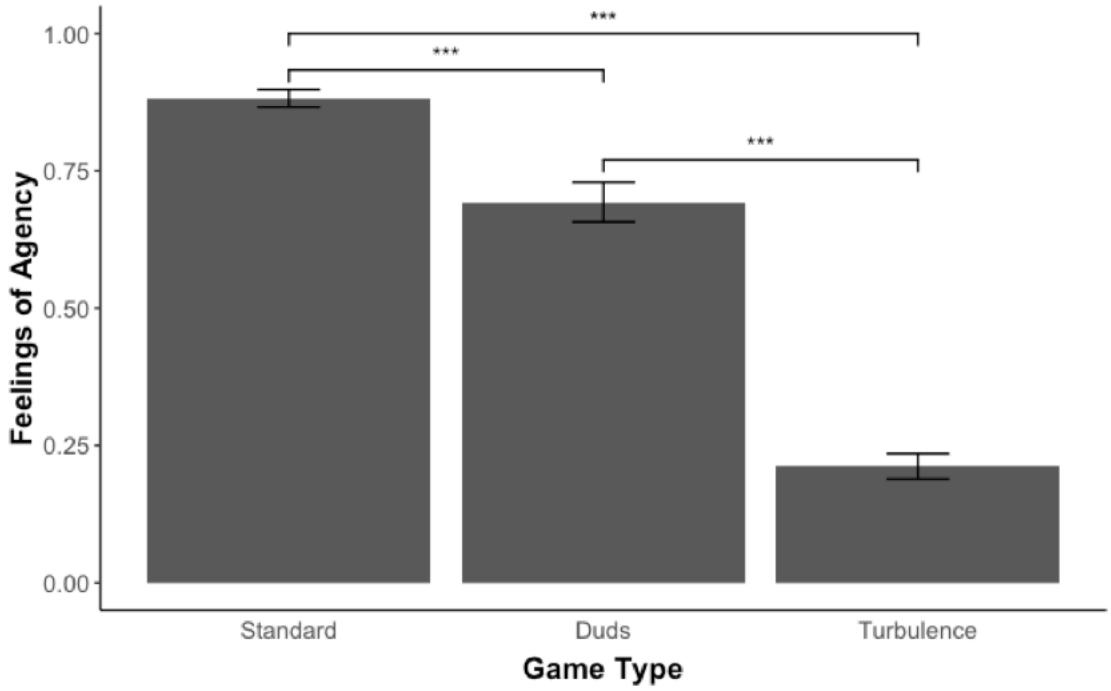

Figure 2. Feelings of agency as a function of game type

Feelings of agency for each game, as measured by mean JOAs, showing that the standard game produced the highest feelings of agency, followed by the duds game, then the turbulence game.

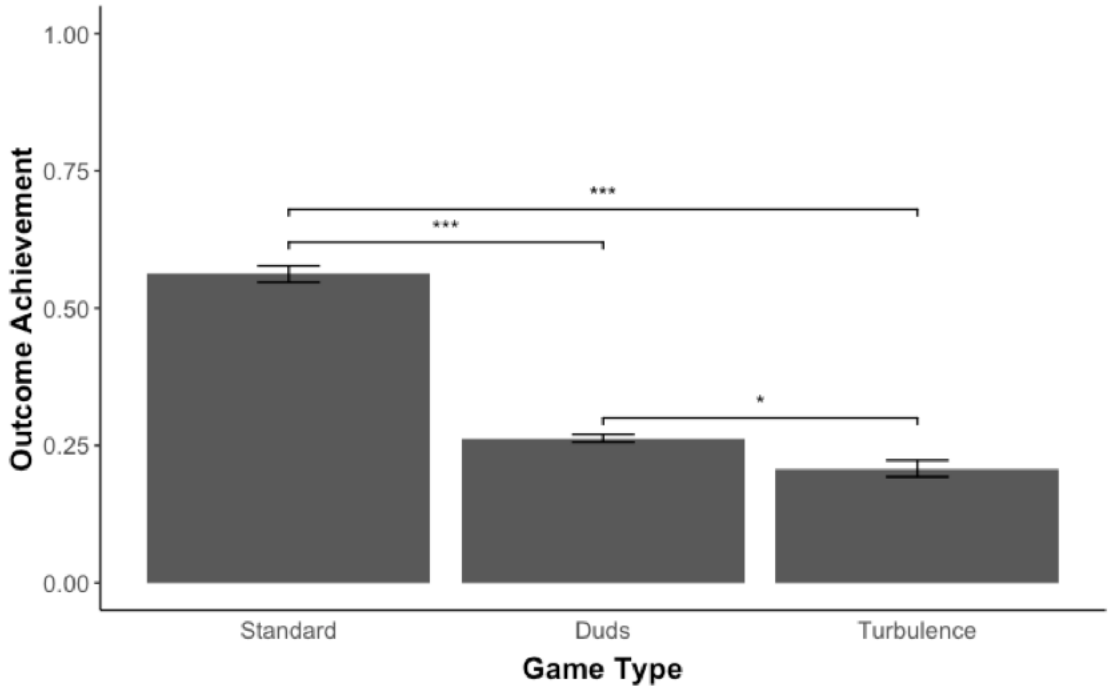

Figure 3. Outcome achievement as a function of game type

Outcome achievement for each game, as measured by mean pop rate, showing that the standard game led to the highest level of achieved outcome, followed by the duds game, then the turbulence game.

Table 1. Results for space pilot task measures

Measure	Standard		Turbulence		Duds		$F(2, 46)$	eta-squared
	M	*SD*	*M*	*SD*	*M*	*SD*		
JOA	0.88	0.08	0.21	0.11	0.69	0.18	169.69***	0.83
JOP	0.77	0.12	0.29	0.15	0.55	0.17	99.25***	0.67
Hit Rate	0.56	0.02	0.21	0.02	0.53	0.02	852.81***	0.83
Pop Rate	0.56	0.07	0.21	0.07	0.26	0.04	676.72***	0.87
False Alarm Rate	0.03	0.02	0.12	0.02	0.03	0.02	233.43***	0.81

Difference score analysis. Given that each trial comprised a pair of games, JOA difference scores were computed for each trial. The value from the second game was subtracted from the value from the first game. Thus, a positive difference score indicated a higher JOA in the first game. For each trial, the choice variable was coded with a 1 indicating the first game was chosen and 0 indicating the second game was chosen.

A mixed effects logistic regression analysis was run to predict choice from JOA difference score. Mean-centered difference scores were used in the analysis. Random effects for

participant were included. There was an effect of JOA on choice such that participants were more likely to choose games associated with higher JOAs, $b = 6.86$, $z = 5.38$, $p < .001$, 95% CI [4.77, 10.17]. Additional models controlling for all possible combinations of JOP, hit rate, and pop rate were run using a hierarchical approach. Difference scores were computed for those variables using the procedure described in the prior paragraph for JOAs. Random effects for participant were included for the JOA difference variable. The effect of JOA difference remained significant in all models (Table 2). Figure 4 illustrates the effect with all four predictor variables in the model

Table 2. Results of hierarchical regression analysis

Coefficients from mixed-effects logistic regression models for effects of difference scores on choice. Coefficients are unstandardized parameter estimates in units of log odds. Difference scores were computed by subtracting the rating (e.g., JOA) for the second game in each trial from that for the first game in each trial. The outcome variable was whether or not the first game in each trial was chosen (1 = chosen, 0 = not chosen). Positive coefficients mean that people were more likely to choose games with higher ratings for that measure. R^2 change equals the difference between the R^2 for the current model and model 1.
***$p < .001$; ** $p < .01$; *$p < .05$.

Predictor variables	*Model 1*	*Model 2*	*Model 3*	*Model 4*	*Model 5*	*Model 6*	*Model 7*	*Model 8*	*Model 9*	*Model 10*	*Model 11*	*Model 12*	*Model 13*	*Model 14*	*Model 15*
JOA difference	6.864***				4.761***	6.564***	5.857***	4.659***	4.646***	5.962***	4.713***				
JOP difference		7.389***			3.602***			3.574***	2.802**		2.797***	5.998***	6.472***		5.656***
Hit rate difference			7.474***			0.680		0.252		-0.273	-0.171	2.091**		5.680***	1.901**
Pop rate difference				7.154***			2.481***		1.308	2.538***	1.348		1.198	3.555***	0.591
R^2	0.853	0.766	0.661	0.646	0.859	0.853	0.853	0.858	0.855	0.853	0.855	0.747	0.751	0.712	0.740
R^2 change	0.000	-0.087	-0.192	-0.207	0.006	0.000	0.000	0.005	0.002	0.000	0.002	-0.106	-0.102	-0.141	-0.113

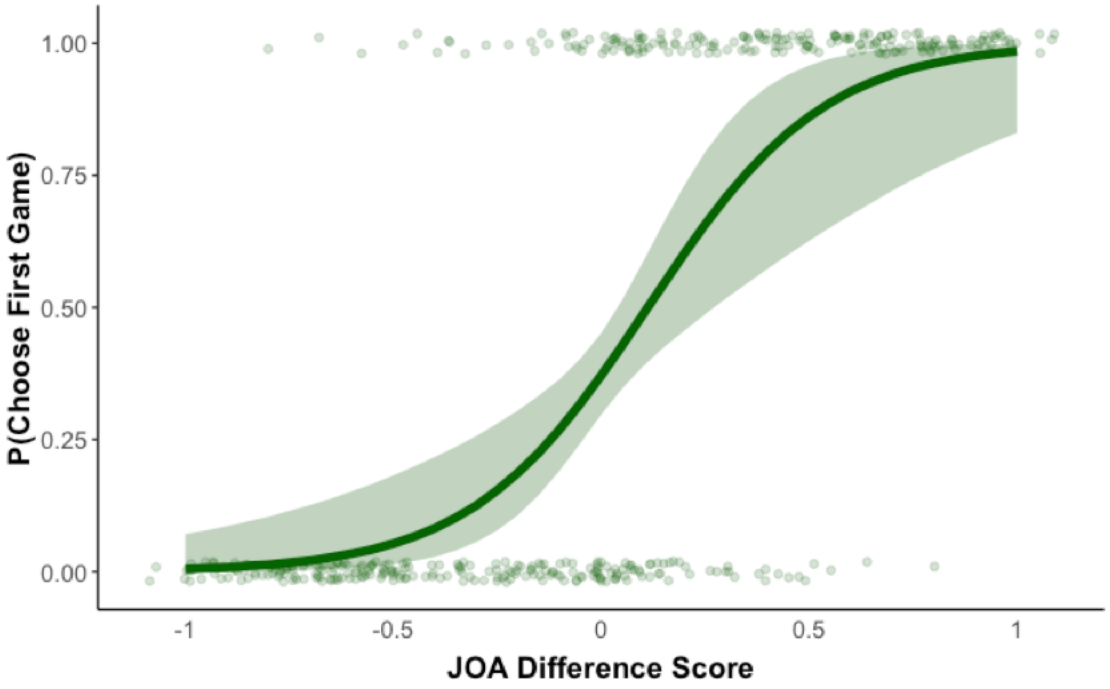

Figure 4. Effect of JOA difference score on probability of choice

JOA difference scores had a significantly positive effect on the probability of choosing the first game in each pairing. The model controlled for the effects of JOP, hit rate, and pop rate difference scores.

Choice. Mean choice proportions for each game are depicted in Figure 5. A one-way repeated measures ANOVA was performed to examine differences in overall mean choice proportions across the three individual game conditions – standard, turbulence, and duds. Interaction terms between game type and locomotion scores as well as between game type and assessment scores were included in the analysis. Order of game presentation was included as a covariate.

There was a significant effect of order, $F(1, 134) = 5.12$, $p = .03$, $\eta^2 = .04$. People showed a slight preference for the second game in each pair ($M = .53$, $SD = .37$) over the first game ($M = .47$, $SD = .32$), $d = 0.17$. There was an effect of game type on choice, $F(2, 134) = 263.45$, $p < .001$, $\eta^2 = .80$. Pairwise comparisons using Bonferroni's correction revealed significant differences in mean choice proportions among all three game types. People chose the standard game ($M = .87$, $SD = .14$) more frequently than they chose both the turbulence game (M

= .13, *SD* = .16), *d* = 4.20, *p* < .001 and the duds game (*M* = .50, *SD* = .07), *d* = 2.51, *p* < .001. The difference in mean choice proportions between the turbulence and duds game was also significant, *d* = 2.45, *p* < .001. The interaction terms with game type and locomotion as well as game type and assessment were not significant. These findings show that people's patterns of choice aligned with their JOAs.

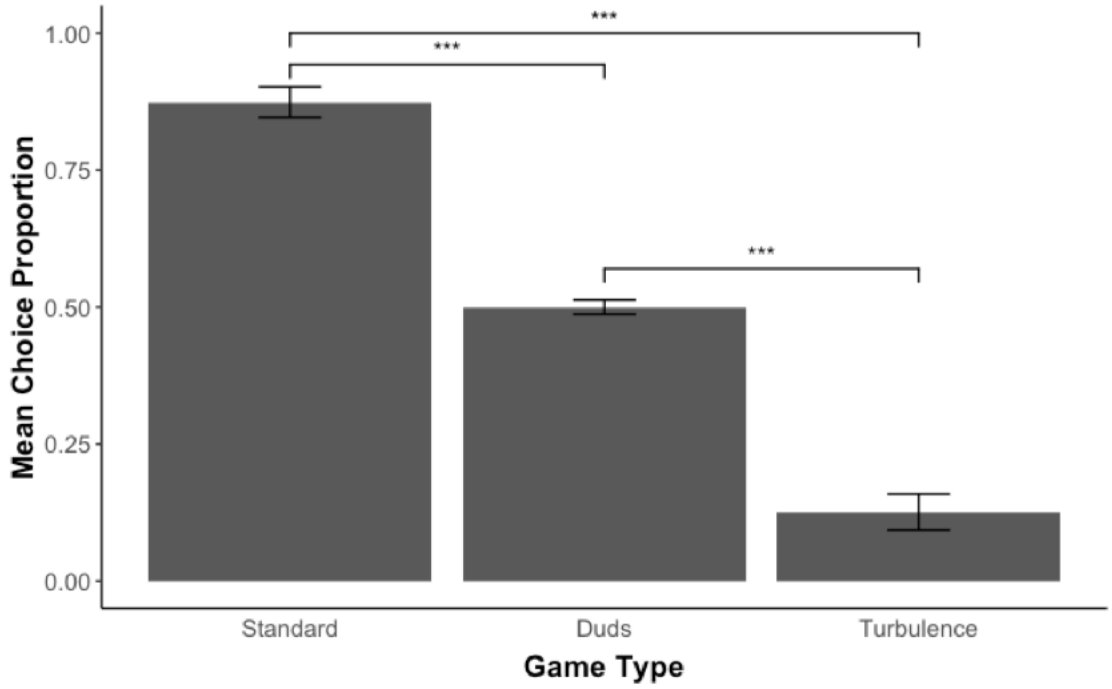

Figure 5. Mean choice proportions as a function of game type.

Overall mean choice proportions, showing that the standard game was the most commonly chosen game across all pairings, followed by the duds game, then the turbulence game.

Choice behavior for each of the three pairings – standard-turbulence, standard-duds, duds-turbulence – was examined. The probabilities of choosing each game in each pairing are depicted in Figure 6. Before analyzing the factors that influenced choices in each pairing, the effect of *the act of making judgments of agency and performance* on choice was examined. This was done to check whether the act of making such judgments after each trial altered a person's choices compared to the trials when no such judgments were made. Generalized linear models with mixed effects using logistic regression were run to examine the likelihood of choosing a

given game from each pairing. Random effects for participant were included in each model. All models were fit both using ordinary least squares (OLS) estimation with hypothesis tests and Bayesian estimation. This was done because the OLS encountered convergence issues due to the inclusion of the random effect term.

To assess whether the act of making a judgment had an effect on choice behavior, a dummy variable for judgment trials was included in the model (0 = no judgments given; 1 = judgments given). In all three pairings (standard – turbulence, standard – duds, duds – turbulence), neither the main effect of the judgment trial variable nor the interaction term were significant, indicating that the act of making judgments had no effect on choice behavior. The dummy variable was therefore removed from all subsequent analyses.

In all three pairings, there was an effect of game type on choice ($p < .001$). In the standard – turbulence paring, there was an effect of game type on choice such that people were more likely to select the standard game over the turbulence game, $b = 12.54$, 95% CI [8.22, 18.59]. In the standard – duds pairing, the likelihood of choosing the standard game was greater than the likelihood of choosing the duds game, $b = 6.85$, 95% CI [4.71, 10.34]. In the duds – turbulence pairing, there was an effect of game type on choice such that people were more likely to select the duds game over the turbulence game, $b = 5.10$, 95% CI [3.36, 7.24]. All parameter estimates and their 95% credible intervals are from the Bayesian models. The findings indicated that in each pairing participants chose the game associated with the higher JOA.

To test whether sensitivity to proximal interference differed from sensitivity to distal interference, a general linear model using logistic regression was run to predict choice from game types in the standard – turbulence pairing and the standard – duds pairing. The goal was to analyze whether the effect of game type was weaker in the latter case. A dummy variable was

used to create an interaction term that tested the difference between the parameter estimates for choosing the standard game in each pairing. The model showed an interaction such that the effect of game type was weaker in the standard – duds pairing than in the standard – turbulence pairing, b = -4.21 95% CI [-6.18, -2.60]. This finding suggested that people were more sensitive to proximal than to distal interference. In other words, they appeared more tolerant of games that reduced the reliability of expected outcome than games that impeded their ability to move the cursor smoothly.

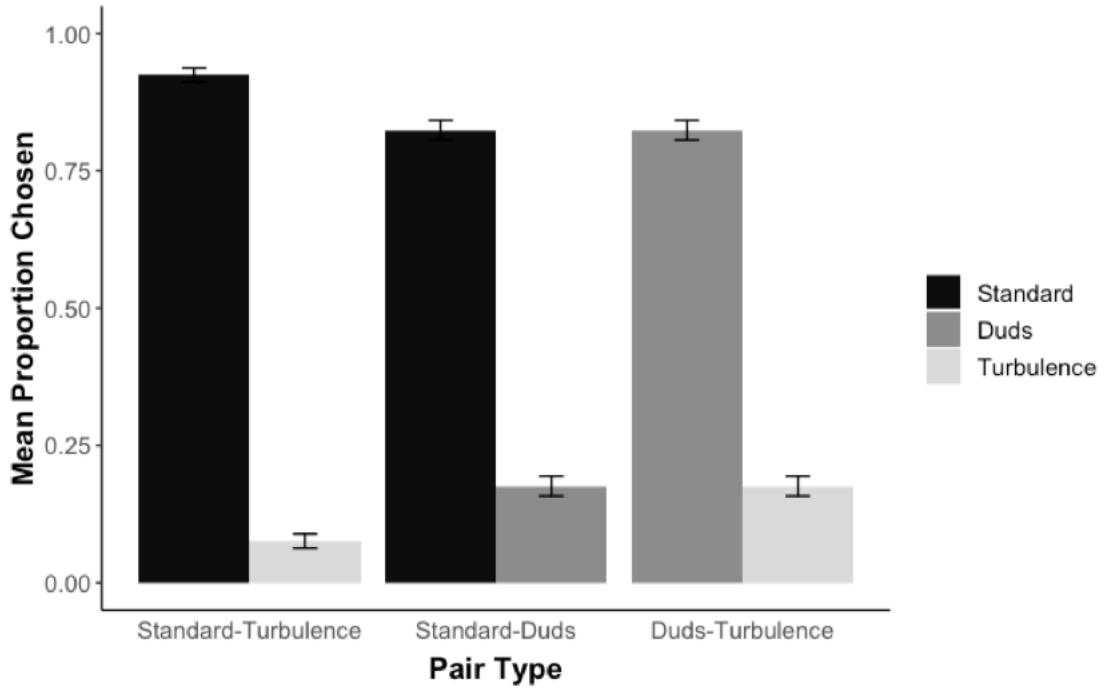

Figure 6. Mean proportion of each game chosen in each pairing

Discussion

The findings showed that people preferred games associated with higher feelings of agency. The results were consistent with prior research that has shown that people prefer circumstances that afford the opportunity to make choices and, thus, exert control (Bown, et al., 2003; Suzuki, 1997), as well as research highlighting the inherent value of feelings of agency (Leotti & Delgado, 2011; Leotti et al., 2010). However, the results went further than prior

research by showing that the effect is not limited to active – passive conditions, where people demonstrate a desire to be active. Instead, the findings showed a desire for high agency when forced to choose between two active states. Those results suggested that it is not merely the desire to make a choice or to be an active agent in determining the course of events. Rather, people appeared sensitive to variations in their experience of agency. When these variations occurred, people tended to opt for the experience that afforded the highest feelings of agency.

In addition, the findings suggested that people may be more sensitive to proximal action disturbances than they are to distal, outcome-oriented interference. Existing research has shown that people are indeed sensitive to desirable outcome differences and are more motivated by situations that afford a higher probability of desired outcomes and shorter lag between action and outcomes (Eitam, Kennedy, & Higgins, 2013; Karsh & Eitam, 2015; Karsh, Eitam, Mark, & Higgins, 2016). But the results from this experiment suggested that differences in the experience of executing an action may make a greater contribution to motivation than do distal outcome variables. While this pattern of results was not significantly moderated by regulatory mode (locomotion, assessment), the relatively small sample size may account for the lack of a significant interaction. Nonetheless, people appeared to be more sensitive overall to disturbances in action execution (e.g., turbulence) than they were to reduced outcome probability (e.g., duds).

As it pertains to the influence of the sense of agency itself, the most informative results emerged from the pairing that asked participants to choose between the duds and turbulence games. That decision required selecting between games that were similar in terms outcome achieved (i.e., proportion of Xs popped, as measured by pop rate) but different in terms judged agency. People reported feeling higher agency in the duds game than they did in the turbulence game. Their choice behavior showed a preference for duds in that pairing with a probability of

approximately .80, supporting the idea that people tend to gravitate toward experiences that afford higher feelings of agency.

While these findings provided evidence that people tend to choose experiences that provide higher feelings of agency, the results fell short of revealing whether people will, in fact, sacrifice desired outcome in favor of agency. To investigate that question, new variations of the task were necessary to further reduce pop rate without diminishing the experience of agency. Chapter III describes a study using the same space pilot paradigm but with new distal manipulations. The percentage of duds was increased in some games in order to further decrease performance. That resulted in a choice between an experience of high agency or achievement of a high outcome, forcing participants to navigate a tradeoff between a relatively agential experience and a relatively successful one.

III. Motivational Strength of Agential Experiences

Introduction

This experiment followed up on the findings discussed in chapter II. Those findings revealed that people tended to prefer experiences that conferred high feelings of agency and that people seemed more sensitive to proximal than to distal disturbances. The tendency to prefer the standard game was stronger when paired with the turbulence than with the duds game. In addition, people overwhelmingly preferred the duds game over the turbulence game when those two were in the same pairing. The results suggested the possibility that people might be willing to tolerate reductions in desired outcome achievement in exchange for smooth action execution, a suggestion that is explored in the present experiment.

In the prior experiment, choice behavior in the duds – turbulence pairing suggested that people may be more averse to proximal, action-oriented interference than distal, outcome-oriented disturbances. However, because outcome achievement, as measured by pop rate, was slightly higher in the duds condition relative to the turbulence condition, it is possible that the motivation to choose duds was driven in part by the desire to attain a higher level of outcome. Moreover, choosing the duds game in that pairing did not entail *sacrificing* outcomes in exchange for high feelings of agency and smooth action execution. Such a situation would occur only if choosing a high-agency game meant not choosing a game that resulted in a higher pop rate. If the appeal of agential experiences is sufficiently strong, people may persist in choosing the high-agency game, up to a point. This experiment investigated the motivational strength of agential experiences to examine whether it persists even at the expense of attaining desired outcomes.

There is some suggestion in the literature that people may, under some conditions, seek greater agency, even if it is at the expense of some desired end goal. When desired outcomes take the form of monetary gains, some evidence exists that people sometimes sacrifice financial reward in favor of retaining control. Bobadilla-Suarez et al. (2017) gave participants the chance to retain or delegate decision-making authority in a simple choice task. In part one, participants chose one of two shapes, and each shape was associated with a monetary gain or no gain. In part two, participants chose whether to retain or delegate decision-making authority in the shape-choosing task. To delegate authority meant to allow the computer to choose. The participants knew the computer's accuracy rate and cost prior to making the delegation decision and that sometimes the computer would be expected to perform better than would they themselves. Surprisingly, the researchers found that people failed to delegate when it was in their best interest (i.e., the expected value of the computer's performance exceeded their own) far more frequently than they failed to retain agency when that was optimal. Furthermore, the researchers found that the point of indifference – the expected value at which probability of delegation was 50% – was higher than it should have been for a rational actor (i.e., a person acting solely to maximize gains). Wang and Delgado (2019) conducted a similar experiment and found that the ability to exert control inflated the reward value of an expected monetary outcome by 30%. Furthermore, activity in ventromedial prefrontal cortex tracked the value inflation. These findings further suggest that retaining agency – at least in the form of the ability to make a choice – has inherent value, and that people will sacrifice monetary gains for it.

One source of value may be the affective consequences of feeling in control. It may feel good to make things happen, and that pleasurable state may motivate people to pursue high-agency experiences. Leotti and Delgado (2011) examined the affective experience of

anticipating the opportunity to exert control by making a choice. They used a simple choice task that involved either choosing one of two colored keys or responding to the location of a key that the computer chose. fMRI data showed increased activity in the ventral striatum – a part of the brain associated with reward processing – when participants anticipated the opportunity to choose. In addition, participants were asked which condition they liked better, and people preferred the choice condition. The findings suggest that when a person anticipates an agential experience, such as an opportunity to choose, the brain behaves as if a reward were imminent.

While existing research begins to build a case that feelings of agency may have inherent value, and people may, sometimes, be willing to give up a desired outcome in order to obtain a feeling of control, the evidence is limited to active-passive choice contexts. (NB: Choice, in this sense, refers to the independent variable of *ability to choose* (choice, no-choice) rather than choice as a dependent variable that assesses motivation.) It is clear that people like to be active agents and make choices for themselves. But the research on choice leaves unanswered the question of whether the object of value is simply *the ability to make a choice* or the relatively greater experience of agency itself. If people were forced to choose *among active circumstances* that varied in terms of degree of felt agency, would higher agential experiences always carry higher value? Or does the bulk of value lie in merely being the agent, leaving variability in terms of felt control within active states to be negligible? And is there a threshold level of outcome reduction whereby participants will eventually relinquish feelings of agency in order to secure *at least some portion* of their desired outcome?

The current experiment used the space pilot task to address those questions. In order to do so, it was necessary to create new variations of the task. These versions needed to create choice contexts that forced choices between high experiences of agency and a greater

achievement of the desired outcome. To achieve that aim, two new duds games were introduced – a 60% duds game, where each struck X had a 60% probability of falling through the cursor and a 40% probability of popping, and a 70% duds game, which gave each struck X a 70% probability of failing to pop and a 30% probability of popping. Because the 50% duds game brought pop rate down to a level to almost be equal to that of the turbulence game, these lower pop rates were implemented with the expectation that at least one, and possibly both, of the new duds conditions would further reduce that outcome. It was expected that pop rate in at least one of those games would end up being lower than that observed in the turbulence condition, forcing a tradeoff between agency and outcome. The experimental design paired each of the three duds games (50%, 60%, 70%) with the turbulence game. The standard game was not used in this experiment. The hypothesis was that individuals would choose the duds games in each pairing because those games were associated with the higher experience of agency, even in cases where the choice in favor of agency would occur at the expense of outcome.

Method

Participants. Participants were 20 Columbia University undergraduates enrolled in an introductory psychology class.

Materials. The same space pilot program used in the experiment described in chapter II was used in this experiment, with the modification in some game conditions that resulted in a higher percentages of duds. Two new duds games were introduced – 60% and 70% – that included higher probabilities of Xs failing to pop when struck.

Procedure. The basic procedure was identical to that used in the experiment described in chapter II. Participants played pairs of games and expressed a choice after each pair as to

which game they would like to play again. As in the prior experiment, peoples' choices had no bearing on the actual sequence of games and pairs presented.

Game pairs were presented randomly to each participant in two blocks of 30 trials each. In one block, participants gave JOAs and JOPs after each game. In the other block, judgments were not collected. Judgments were only collected during one block in order to check whether the act of making judgments influenced choice behavior.

After completing all trials, participants completed a brief demographics questionnaire.

Design. The experiment included three possible pairings, six considering order. Each pairing included one turbulence game and one of the three duds games – 50%, 60%, 70%. Participants completed each pairing 10 times for a total of 60 trials, divided into two blocks of 30 trials each. Participants provided JOAs and JOPs only during one of the blocks, with order of the blocks counterbalanced across participants. Other dependent measures were the same as those collected in the prior experiment.

Results

All analyses were conducted with order of presentation (i.e., first or second game in a pair) included as a factor. None of the analyses pertaining to measures of game play and experience revealed an effect of order; therefore, order was not included in the analyses presented below. All results can be found in Table 3.

Judgments of agency. There was an effect of game type on JOA, $F(3, 57) = 32.71$, $p < .001$, $\eta^2 = .45$. There was a significant difference in mean JOAs between the turbulence game ($M = .35$, $SD = .19$) and 50% duds game ($M = .73$, $SD = .19$), $d = 2.05$, $p < .001$, the 60% duds game ($M = .75$, $SD = .16$), $d = 2.23$, p, $< .001$, and the 70% duds game ($M = .67$, $SD = .19$), $d =$

1.92, $p < .001$. The differences in mean JOAs among the three duds game were not significant (Figure 7).

Outcome achievement. There was an effect of game type on pop rate, $F(3, 57) = 38.49$, $p < .001$, $\eta^2 = .37$. Differences between mean pop rates for the turbulence game ($M = .24$, $SD = .08$) and the 60% duds game ($M = .19$, $SD = .06$) were significant, $d = 0.83$, $p < .05$. Differences between mean pop rates for the turbulence game and 70% duds game ($M = .14$, $SD = .03$) were also significant, $d = 1.64$, $p < .001$. The mean pop rate for the 50% duds game ($M = .24$, $SD = .06$) was significantly different from the rate for the 60% duds game, $d = 1.07$, $p < .05$, and the 70% duds game, $d = 2.20$, $p < .001$ (Figure 8).

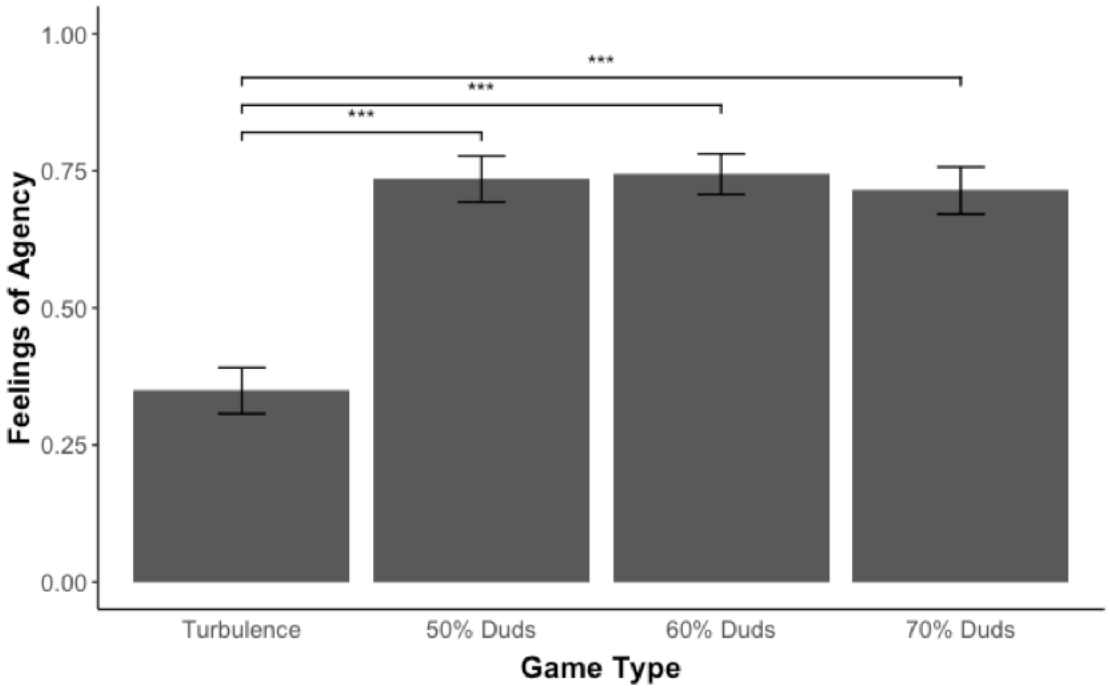

Figure 7. Feelings of agency as a function of game type

Feelings of agency for each game, as measured by mean JOAs, showing that each duds game produced higher feelings of agency than the turbulence game.

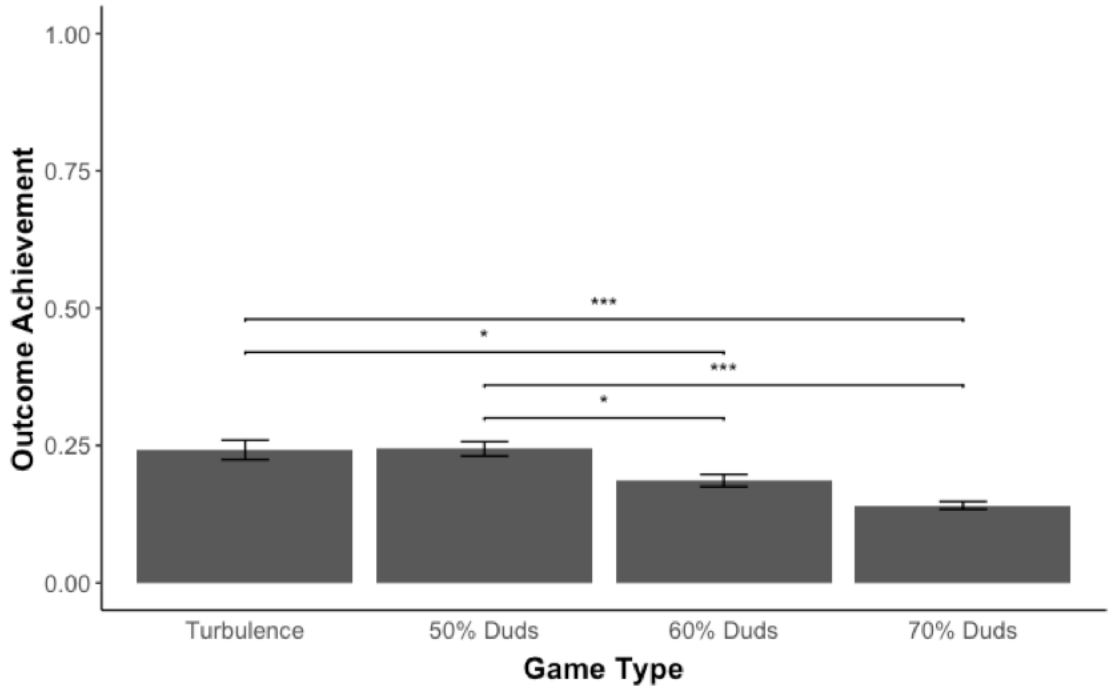

Figure 8. Outcome achievement as a function of game type

Outcome achievement for each game, as measured by mean pop rate, showing that the turbulence game led to greater outcome than both the 60% and 70% duds games.

Table 3. Results for space pilot task measures

Measure	Turbulence		50% Duds		60% Duds		70% Duds		$F(3, 57)$	eta-squared
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*		
JOA	0.35	0.19	0.73	0.19	0.75	0.16	0.67	0.19	32.71***	0.45
JOP	0.43	0.17	0.61	0.15	0.61	0.14	0.55	0.16	10.03***	0.19
Hit Rate	0.24	0.08	0.47	0.11	0.47	0.13	0.47	0.1	92.85***	0.49
Pop Rate	0.24	0.08	0.24	0.06	0.19	0.06	0.14	0.03	34.61***	0.35
False Alarm Rate	0.13	0.03	0.07	0.09	0.07	0.12	0.06	0.08	8.82**	0.10

Difference score analysis. JOA difference scores were computed for each trial. The value from the second game was subtracted from the value from the first game. There was an effect of JOA difference on choice such that participants were more likely to choose games associated with higher JOAs, $b = 4.50$, $z = 4.49$, $p < .001$, 95% CI [2.54, 6.47]. Additional models controlling for all possible combinations of JOP, hit rate, and pop rate were run using a hierarchical approach. Difference scores were computed for JOP, hit rate, and pop rate, and additional models were fit. The effect of JOA difference remained significant in all models

(Table 4). Figure 9 illustrates the effect of JOA difference with all four predictor variables in the model.

Table 4. Results of hierarchical regression analysis

Coefficients from mixed-effects logistic regression models for effects of difference scores on choice. Coefficients are unstandardized parameter estimates in units of log odds. Difference scores were computed by subtracting the rating (e.g., JOA) for the second game in each trial from that for the first game in each trial. The outcome variable was whether or not the first game in each trial was chosen (1 = chosen, 0 = not chosen). Positive coefficients mean that people were more likely to choose games with higher ratings for that measure. R^2 change equals the difference between the R^2 for the current model and model 1.
***$p < .001$; ** $p < .01$; *$p < .05$.

Predictor variables	*Model 1*	*Model 2*	*Model 3*	*Model 4*	*Model 5*	*Model 6*	*Model 7*	*Model 8*	*Model 9*	*Model 10*	*Model 11*	*Model 12*	*Model 13*	*Model 14*	*Model 15*
JOA difference	4.505***				3.826***	3.316***	4.424***	2.855**	3.560***	3.198***	2.555**				
JOP difference		4.935***			1.812***			1.482**	2.106***		1.801**	3.170**	5.454***		3.820***
Hit rate difference			7.191***			3.060***		2.844***		3.109***	2.892***	4.224***		5.593***	4.073***
Pop rate difference				-2.88			-1.282		-2.228***	-1.623	-2.436*		-4.700***	-4.297***	-4.713***
R^2	0.772	0.637	0.699	0.386	0.777	0.774	0.766	0.778	0.766	0.768	0.768	0.688	0.674	0.633	0.724
R^2 change	0.772	-0.135	-0.073	-0.386	0.005	0.002	-0.006	0.006	-0.006	-0.004	-0.004	-0.084	-0.098	-0.139	-0.048

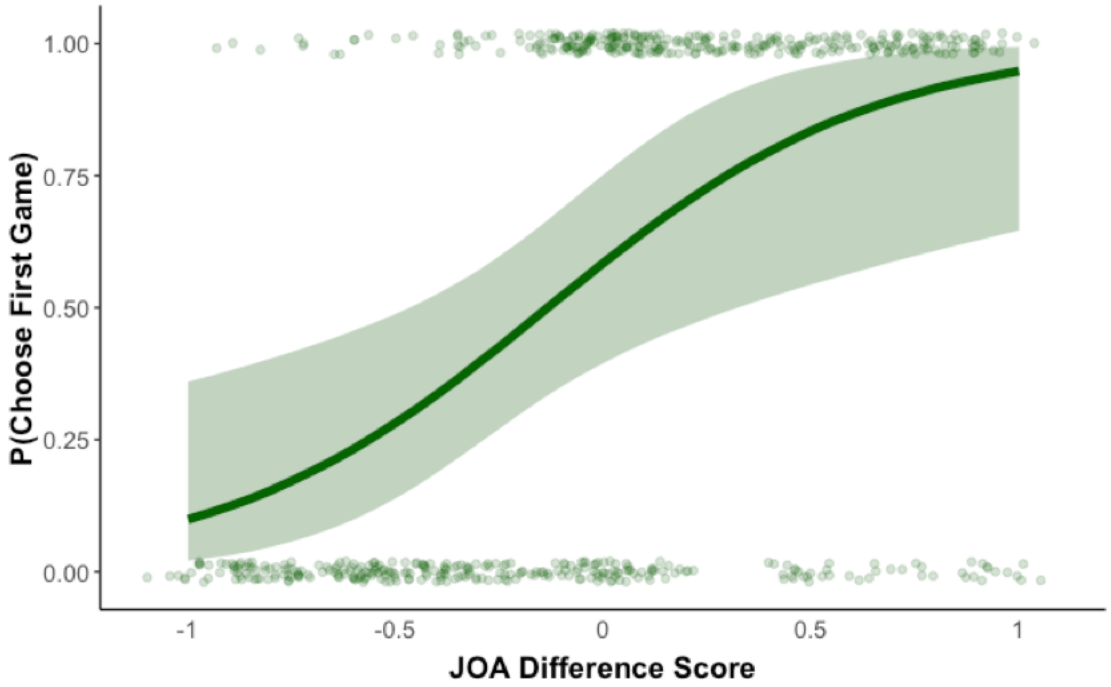

Figure 9. Effect of JOA difference score on probability of choice

JOA difference scores had a significantly positive effect on the probability of choosing the first game in each pairing. The model controlled for the effects of JOP, hit rate, and pop rate difference scores.

Choice. There was an effect of game type on choice, $F(3, 315) = 37.93$, $p < .001$, $\eta^2 = .27$. People chose the turbulence game ($M = .29$, $SD = .29$) significantly less frequently than any of the duds games: the 50% duds game ($M = .72$, $SD = .32$), $d = 1.40$, $p < .001$; 60% duds game ($M = .73$, $SD = .31$), $d = 1.46$, $p < .001$; and the 70% duds game ($M = .70$, $SD = .32$), $d = 1.34$, $p < .001$. There were no differences in mean choice proportions among the three duds games. These findings indicated that people's patterns of choice aligned with their JOAs, even in the turbulence – 60% and turbulence – 70% duds pairings, which entailed a sacrifice of desired outcome in exchange for high feelings of agency. Mean choice proportions can be found in Figure 10.

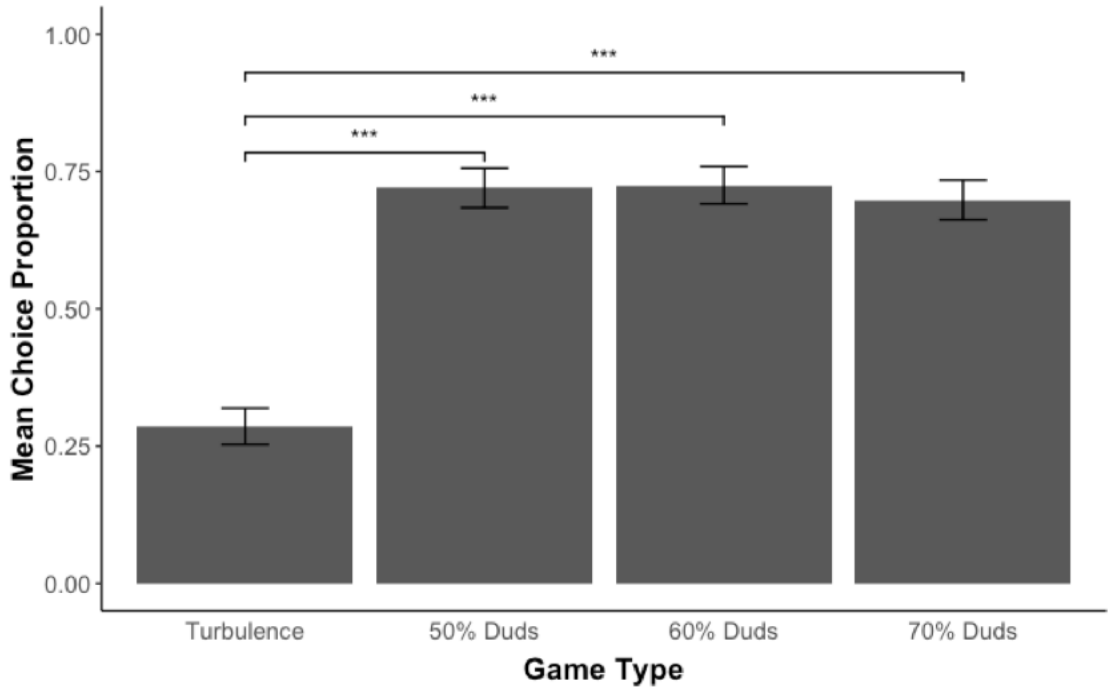

Figure 10. Mean choice proportions as a function of game type

Overall mean choice proportions, showing that the duds games were chosen significantly more often than the turbulence.

Probabilities of choosing each game in each pairing are shown in Figure 11. In the turbulence – 50% duds pairing, the likelihood of choosing the duds game was greater than the likelihood of choosing the turbulence game, b = 2.95, 95% CI [1.27, 5.03]. In the turbulence – 60% duds pairing, the likelihood of choosing the duds game was greater than the likelihood of choosing the turbulence game, b = 2.10, 95% CI [0.91, 3.52]. In the turbulence – 70% duds pairing, the likelihood of choosing the duds game was also greater than the likelihood of choosing the turbulence game, b = 1.90, 95% CI [0.56, 3.39]. These results suggested that people chose games associated with the higher experience of agency. Given that the 60% and 70% duds game reduced pop rate to a level below that of the turbulence game, the results for those pairings suggested that people were willing to sacrifice outcome to attain agency.

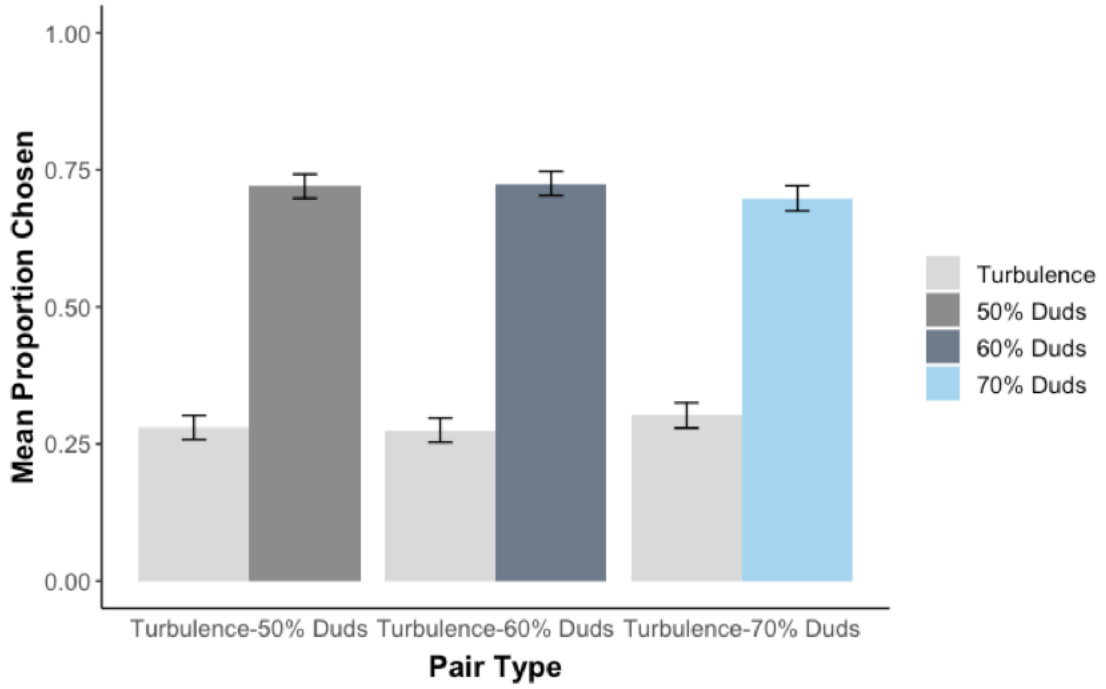

Figure 11. Mean proportion of each game chosen in each pairing

Discussion

This experiment extended the findings from chapter II; as in the prior experiment, people chose games associated with higher feelings of agency. The findings went further though, showing that preference for high feelings of agency persisted even when such a choice entailed sacrificing a desired outcome. Both the turbulence – 60% and turbulence – 70% duds pairings forced tradeoffs between agency and outcome. In those pairings, choosing the duds game meant reducing pop rate by approximately 20% and 40%. Such sacrifices were not enough to deter people from preferring the more highly agential experience, as the probability of choosing the duds game in each of those pairings, which was the game that fostered greater feelings of agency was approximately .70. This suggested that the motivational appeal of agential experiences is strong enough in this context to outweigh the achievement of a desired outcome.

One limitation from the findings from both this experiment and the experiment described previously is that the pattern of choices is such that people always show an aversion for the

turbulence condition. It is therefore possible that the results can be explained by a simple dislike for that particular game, or a particular aversion toward action interference more generally, rather than a tendency to seek highly agential experiences. In order to strengthen the claim pertaining to agential preference, a new game condition would be needed that reliably reduced feelings of agency without introducing turbulence or otherwise manipulating fluency. The following chapter describes an experiment that sought to solve that problem.

IV. Agency Preference in a Noncontingent Context

Introduction

Chapters II and III presented findings that supported the idea that agency is motivating; people tended to gravitate toward experiences that conferred high feelings of agency. In fact, as suggested by the results shared in chapter III, people were, in certain contexts, willing to sacrifice a desired outcome to attain or retain high feelings of agency. However, in those two experiments, a choice in favor of agency was always a choice against the turbulence condition of the space pilot game. It is unclear, then, whether people were exhibiting a preference for agency or a choice in opposition to the turbulence condition. To address that concern, this chapter describes a follow-up experiment that introduced an additional game condition that reduced feelings of agency without using turbulence.

In order to develop that game condition, pilot work was performed using noncontingent manipulations of space pilot that fixed the X pop rate at a particular probability, regardless of the player's action. Therefore, the likelihood of any given X popping was determined a priori and was not affected by the player's ability to strike the X. We ran five participants through eight versions of the space pilot game where performance was not at all contingent on the player's action. These games included four with turbulence and four without. The four games in each category used one of four levels of noncontingent performance: 25%, 50%, 75%, or 100%. In the 25% game, for instance, each X carried with it a 25% probability of popping, regardless of whether or not the player hit the X. Xs that popped without being struck popped at approximately the same location on the screen as they would have popped if they had in fact been struck. The pilot findings showed that the 75% noncontingent condition reduced feelings of agency relative to the standard game while preserving a high level of outcome attainment and,

based on self reports from pilot participants, maintained an illusion that the player had some control over the likelihood of the X popping. Therefore, the 75% noncontingent game was selected to pair with the standard game in this experiment to test whether people persisted in choosing agency when the noncontingent game rather than the turbulence game was the alternative. The player's effort had no impact whatsoever on the attainment of the desired outcome; each X had a 75% probability of popping regardless of the player's actions. In the final experimental design, the turbulence game was also included to allow for variety in the game playing experience. The hypothesis was that individuals would, indeed, continue to prefer the more highly agential experience and choose the standard game more often than they would choose the 75% noncontingent game.

Method

Participants. Participants were 26 male ($N = 9$) and female ($N = 16$) Columbia University undergraduates enrolled in an introductory psychology class. One student did not provide a gender identity. Participants ranged in age from 18 to 37 ($M = 20.76$, $SD = 4.32$).

Materials. We used the same space pilot program as described in chapter II, with the modification that in some games, the Xs popped non-contingently. Participants also completed a post-experiment demographics and reflection questionnaire via Google Forms.

Procedure. Participants followed the same procedure for each trial as in the experiments described in chapters II and III.

Design. As was the case in the prior experiments, participants played pairs of games and, after each pair, chose which game of the two they would like to play again. The three game conditions were (1) the standard game with no manipulations, (2) turbulence, and (3) 75% noncontingent. The comparison of primary interest in this experiment was the standard game

versus the 75% noncontingent game since our pilot work suggested that this pairing would force a choice between agency and outcome. JOAs were likely to be higher in the standard game than in the noncontingent game, but occurrence of the desired outcome was likely to be higher in the noncontingent game. We included a turbulence game in order to remain consistent with the first two experiments and vary the game playing experience for the participant. Since we used three different versions of the game, there were three possible pairings, six considering order. Participants completed 32 trials, 24 of which pitted the standard game against the 75% noncontingent game. The remaining 8 trials used the turbulence game, four against each of the other two games. We pitted the turbulence game against both the noncontingent and standard games in order to allow the participant to play three different game pairings, to be consistent with the first two experiments. JOAs and JOPs were solicited after every trial. Hit rate and pop rate were also measured.

Results

All analyses were conducted with order of presentation (i.e., first or second game in a pair) included as a factor. None of the analyses pertaining to measures of game play and experience revealed an effect of order; therefore, order is not included in the analyses presented below. All results can be found in Table 5.

Judgments of agency. There was an effect of game type on JOA, $F(2, 50) = 134.47$, $p < .001$, $\eta^2 = .80$. There was a difference between mean JOAs for the standard game ($M = .71$, $SD = .14$) and noncontingent game ($M = .45$, $SD = .14$), $d = 1.86$, $p < .001$, between the standard game and the turbulence game ($M = .12$, $SD = .07$), $d = 5.17$, $p < .001$, and between the noncontingent game and the turbulence game, $d = 2.98$, $p < .001$ (Figure 12).

Outcome achievement. There was an effect of game type on pop rate, $F(2, 50) = 1{,}081.42$, $p < .001$, $\eta^2 = .95$. There was a significant difference between the standard game ($M = .59$, $SD = .06$) and the noncontingent game ($M = .75$, $SD = .01$), $d = 4.05$, $p < .001$. The mean pop rate for the standard game was also significantly different from that for the turbulence game ($M = .17$, $SD = .08$), $d = 6.16$, $p < .001$. The pop rate for the noncontingent game was also significantly different from that for the turbulence game, $d = 10.57$, $p < .001$ (Figure 13).

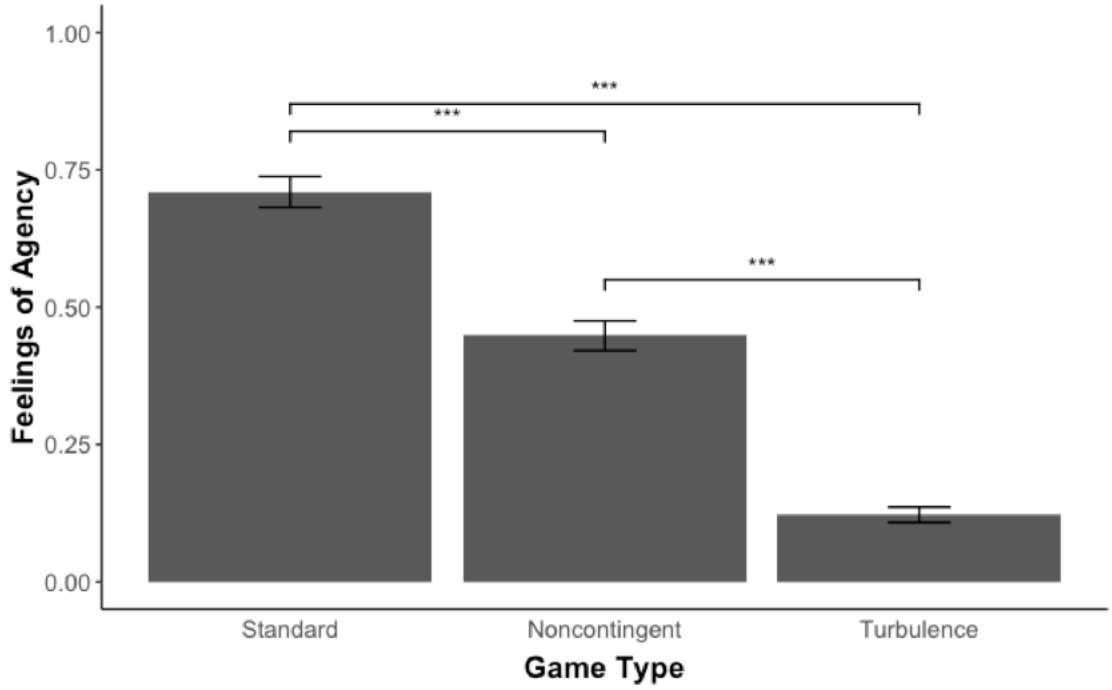

Figure 12. Feelings of agency as a function of game type

Feelings of agency for each game, as measured by mean JOAs, showing that each duds game produced higher feelings of agency than the turbulence game.

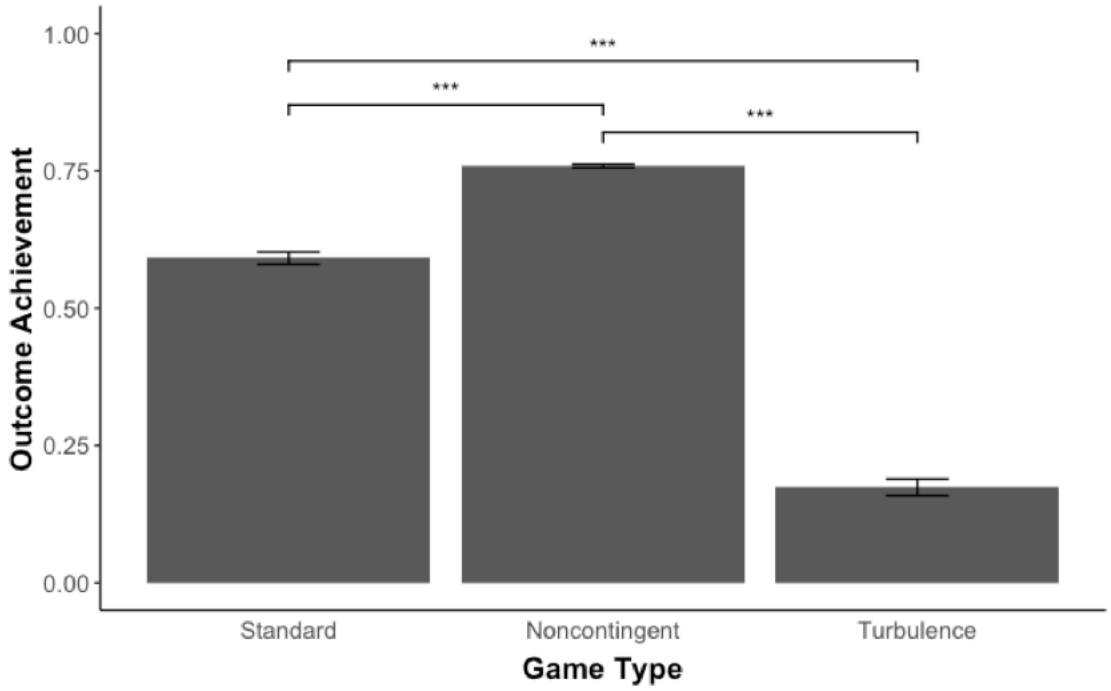

Figure 13. Outcome achievement as a function of game type

Outcome achievement for each game, as measured by mean pop rate, showing that the noncontingent game generated the greatest outcome.

Table 5. Results from space pilot task measures

Measure	Standard		Turbulence		Noncontingent		$F(2, 50)$	eta-squared
	M	*SD*	*M*	*SD*	*M*	*SD*		
JOA	0.71	0.14	0.12	0.07	0.45	0.14	134.47***	0.8
JOP	0.6	0.14	0.19	0.08	0.5	0.11	82.65***	0.71
Hit Rate	0.59	0.06	0.17	0.08	0.48	0.07	486.30***	0.88
Pop Rate	0.59	0.06	0.17	0.08	0.75	0.01	1,081.42***	0.95
False Alarm Rate	0.03	0.02	0.12	0.03	0.04	0.04	58.20***	0.56

Difference score analysis. JOA difference scores were computed for each trial. The value from the second game was subtracted from the value from the first game. There was an effect of JOA on choice such that participants were more likely to choose games associated with higher JOAs, $b = 7.50$, $z = 7.24$, $p < .001$, 95% CI [5.64, 9.85]. Additional models controlling for all possible combinations of JOP, hit rate, and pop rate were run using a hierarchical approach. Difference scores were computed for JOP, hit rate, and pop rate, and additional models were fit. The effect of JOA difference remained significant in all models (Table 6).

Figure 14 illustrates the fixed effect of JOA difference with all four predictor variables in the model.

Table 6. Results of hierarchical regression analysis

Coefficients from mixed-effects logistic regression models for effects of difference scores on choice. Coefficients are unstandardized parameter estimates in units of log odds. Difference scores were computed by subtracting the rating (e.g., JOA) for the second game in each trial from that for the first game in each trial. The outcome variable was whether or not the first game in each trial was chosen (1 = chosen, 0 = not chosen). Positive coefficients mean that people were more likely to choose games with higher ratings for that measure. R^2 change equals the difference between the R^2 for the current model and model 1.
***$p < .001$; ** $p < .01$; *$p < .05$.

Predictor variables	*Model 1*	*Model 2*	*Model 3*	*Model 4*	*Model 5*	*Model 6*	*Model 7*	*Model 8*	*Model 9*	*Model 10*	*Model 11*	*Model 12*	*Model 13*	*Model 14*	*Model 15*
JOA difference	7.504***				6.470***	5.928***	6.483***	5.422***	5.421***	5.763***	5.124***				
JOP difference		6.953***			2.086***			1.402*	2.140***		1.753**	4.648***	6.044***		4.691***
Hit rate difference			10.233***			3.483***		3.057***		2.394***	1.597	6.141***		8.232***	4.379***
Pop rate difference				-6.732***			-2.397***		-2.472***	-1.496*	-1.850**		-4.264***	-2.350***	-2.121**
R^2	0.810	0.725	0.720	0.554	0.810	0.809	0.800	0.809	0.802	0.802	0.802	0.772	0.743	0.707	0.760
R^2 change	0.810	-0.085	-0.090	-0.256	0.000	-0.001	-0.010	-0.001	-0.008	-0.008	-0.008	-0.038	-0.067	-0.103	-0.050

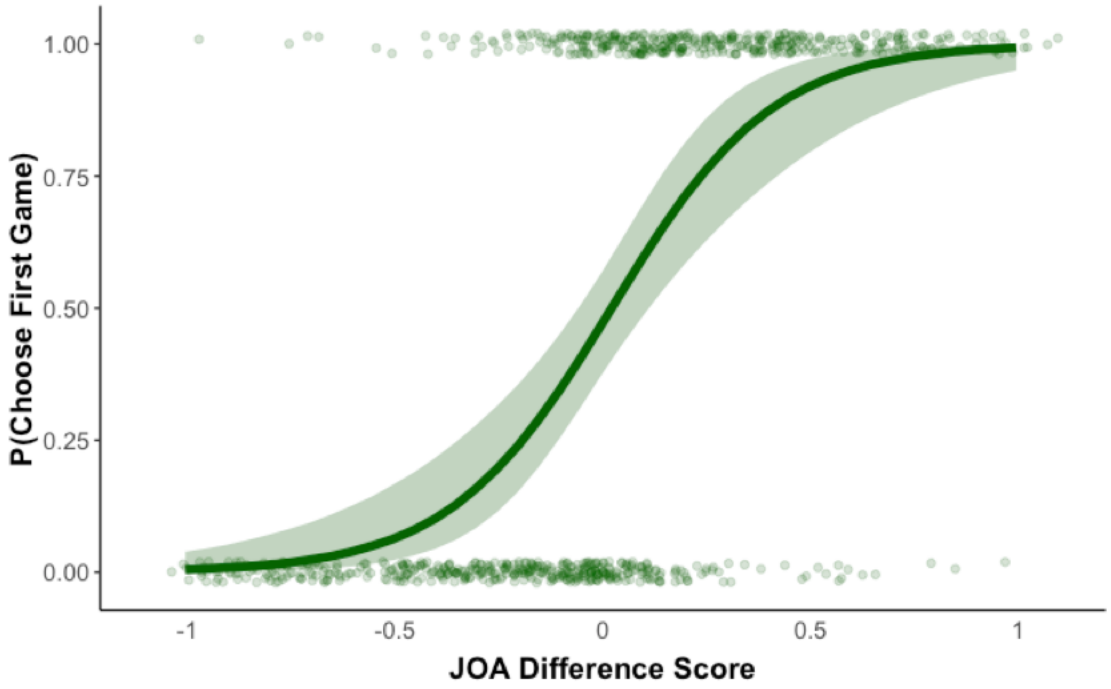

Figure 14. Effect of JOA difference score on probability of choice

JOA difference scores had a significantly positive effect on the probability of choosing the first game in each pairing. The model controlled for the effects of JOP, hit rate, and pop rate difference scores.

Choice. Mean choice proportions are shown in Figure 15. There was an effect of game type on choice, $F(2, 50) = 86.23$, $p < .001$, $\eta^2 = .76$. People chose the standard game ($M = .82$, $SD = .17$) more often than both the turbulence game ($M = .13$, $SD = .18$), $d = 3.12$, $p < .001$, and the noncontingent game ($M = .29$, $SD = .15$), $d = 2.48$, $p < .001$. People also chose the noncontingent game more often than the turbulence game, $d = 0.79$, $p < .01$. These findings indicated that people continued to choose based on their feelings of agency.

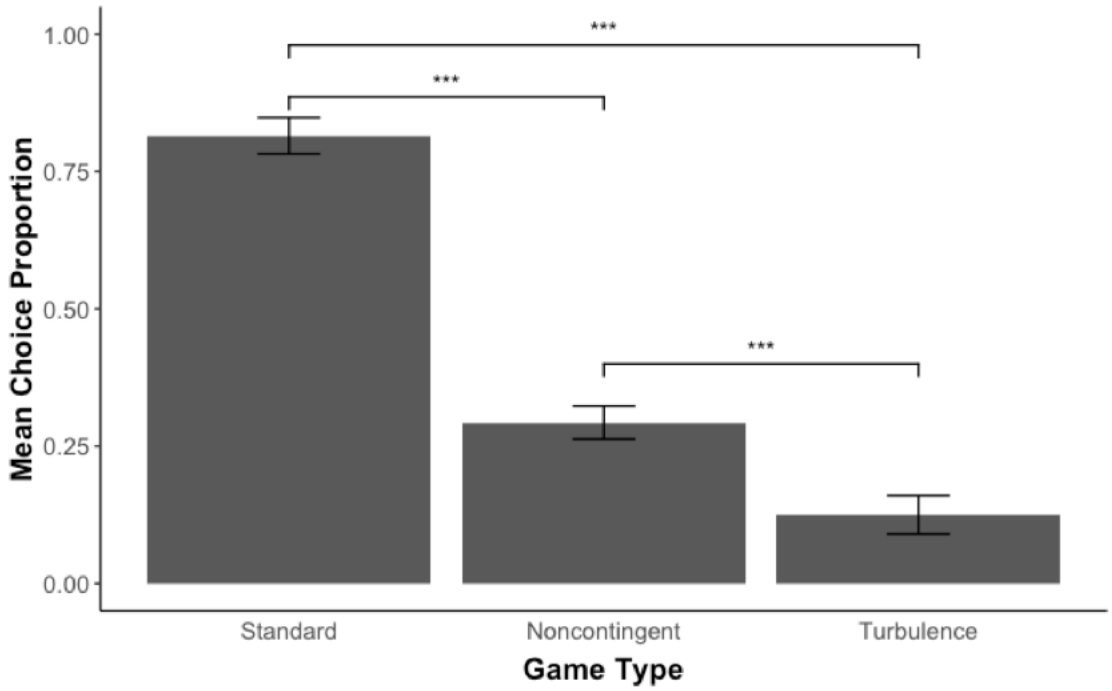

Figure 15. Mean choice proportions as a function of game type

Choice behavior for each of the three pairings – standard-noncontingent, standard-turbulence, noncontingent-turbulence – was examined. Choice probabilities are shown in Figure 16. In the standard – noncontingent pairing, the likelihood of choosing the standard game was significantly greater than the likelihood of choosing the noncontingent game, $b = 3.73$, $z = 5.98$, $p < .001$, 95% CI [2.50, 4.95]. In the standard – turbulence pairing, the likelihood of choosing the standard game was greater than the likelihood of choosing the turbulence game, $b = 17.29$, $z = 3.73$, $p < .001$, 95% CI [8.18, 26.34]. In the noncontingent – turbulence pairing, the likelihood of choosing the noncontingent game was significantly greater than the likelihood of choosing the turbulence game, $b = 5.88$, $z = 3.24$, $p < .01$, 95% CI [2.32, 9.43]. These results indicated that people chose games associated with the higher experience of agency.

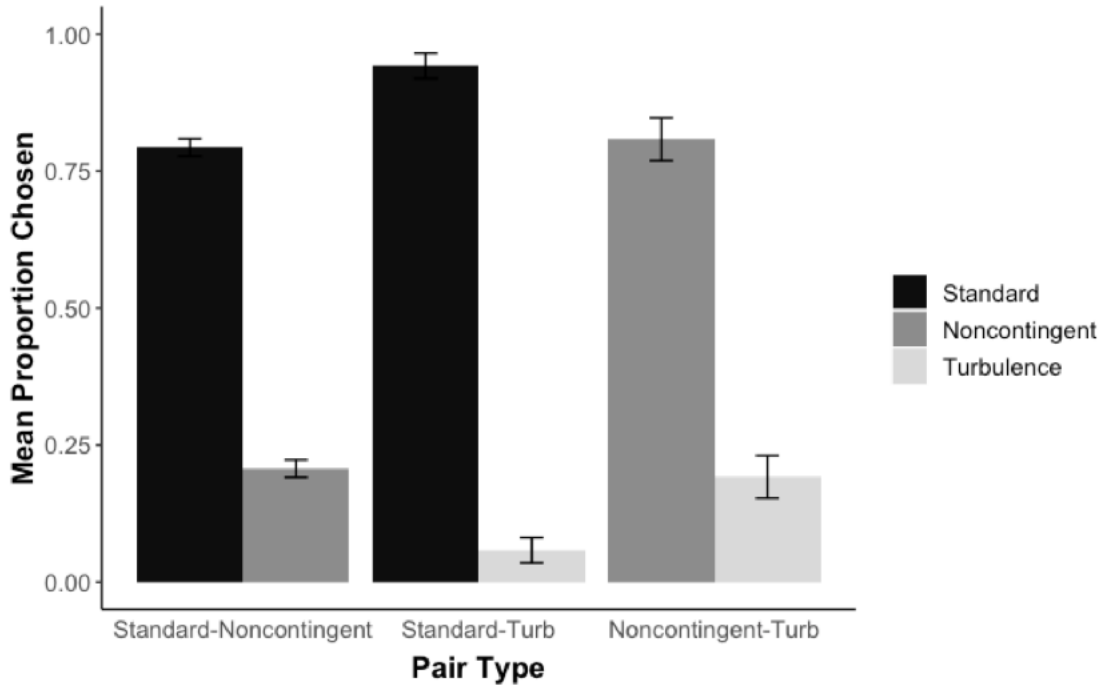

Figure 16. Mean proportion of each game chosen in each pairing

Discussion

The results of this experiment further supported the notion that people prefer tasks that generate higher feelings agency, even when those tasks are associated with diminished outcome. In addition, the findings showed that the effect generalizes to a condition where the low-agency condition was achieved via manipulating a distal, outcome-oriented cue rather than a proximal, action-oriented cue. That is, when altering the extent to which the action caused an effect, participants preferred the game that generated the higher experience of agency. The findings suggested that the aversion to low-agency states is not limited to circumstances where action is disrupted. People preferred experiences that generated high feelings of agency, both when those feelings were primarily caused by fluent action execution but also when that action reliably produced an effect.

The findings were consistent with prior research showing that people are more likely to choose responses associated with higher feelings of agency (Karsh & Eitam, 2015). They extend

the claim that agency motivates action to a dynamic, motor-control task where feelings of agency are measured explicitly using self-reported JOAs. Moreover, the space pilot task is meaningfully more complex than tasks used in prior work to investigate the motivating effects of agency. Actions in tasks used in existing research (e.g., Karsh & Eitam, 2015) require a single ballistic action that may produce a single effect. In contrast, this work incorporates a continuous and dynamic motor component – the movement of the mouse – along with having a perceptual effect – getting "Xs" to pop. Thus, the JOAs in the present research incorporated both a response to proximal motor control and the ability to have a distal effect.

More specifically, space pilot relies on a complex dynamic action (i.e., moving a mouse) rather than a single ballistic movement (i.e., pressing a button). Therefore, the JOA in response to playing space pilot likely carries more information than do the agency judgments gathered in other research to date. Not only does it factor in the participant's likelihood of having an effect, but it also considers the participant's experience of controlling the cursor. Thus, the JOA captures both fluency of motor action and success at achieving the desired outcome, while the participant exerts some degree of effort, and the task is more involved than simple button-pushing paradigms. The task and associated judgment, therefore, may more closely approximate agential experiences people may encounter in everyday life.

The nature of the space pilot task, with its action – primary effect – secondary effect structure, more closely aligns with the nature of agency-generating processes in the external world. For example, consider the chain of events that might lead a student to feel a sense of agency over his or her schoolwork. The student does the homework (action), receives feedback from the teacher (primary effect), and through that feedback learns something new and improves his or her work (secondary effect), and gets a good grade in the class (final effect). The student

then feels he or she has the capability to succeed in school (thus, has a sense of agency over his or her academic future). The circumstances in the world, then, that inform a person's sense of agency involve long causal chains with multiple effects. To more closely approach the investigation of that type of agency, lab studies that use tasks with longer causal chains and with multiple effects are necessary. Space pilot is a start in that direction.

The work presented in chapters II – IV has some limitations. First, the claims made regarding the relationship among feelings of agency, outcome, and preference are limited to behavior related to the space pilot task. That relationship may or may not hold in other venues of human activity. Additionally, the operational definition of outcome may not have been personally meaningful enough to the participants for performance to influence their choices. It is possible that sacrificing attained outcome may have a greater impact than experiences of agency and subsequent choices in circumstances where the person has more at stake in the outcome (e.g., financial reward). Further work is needed to address these limitations and to continue to advance our understanding of how agency influences our choices.

Despite its limitations, the work provided evidence that supports the motivating effects of feelings of agency driven by proximal action execution and distal outcome achievement. People tended to prefer experiences that garnered higher feelings of agency compared to situations that diminished that experience. In addition, people were willing to sacrifice a desired outcome for higher feelings of agency.

One question raised by this work is what potential may exist for other meaningful consequences of experiences of agency. The experiments described in chapters V – VIII explored the role of perceived agency on moral judgments of others' actions.

V. Feelings of Agency and Moral Judgments of Others' Actions

Introduction

While people appear motivated to seek high-agency states, it is possible that such states have consequences for other behaviors. Imagine you are having one of those days where everything seems to proceed as you intend. The kids wake up on their own, get ready for school in a calm, orderly fashion, and head out the door in plenty of time to catch the bus. At work, a project you've been focused on for months is nearing completion, and the final product aligns remarkably with your initial vision. The team you manage follows your instructions precisely and often completes tasks before you ask them to do so, as if they could read your mind and anticipate your next request. Everything is unfolding according to plan, and you feel firmly in control. Then, as you take a break to scroll through your newsfeed, you come across an article that breaks the news that your congressman was caught embezzling millions of dollars in public funds. How would you react to the congressman's behavior? Would you remember the story?

Now, imagine the opposite day. The kids don't get out of bed without multiple nudges from you, and they fight you every step of the way out the door. At work, a major deal you've been working on for months falls through. Your team doesn't listen to you and fails to follow through on even the simplest of tasks. It feels like everything is unraveling, and you feel you have no control. Once again, you take a much-needed break and notice that same article about the corrupt congressman. Would your feelings on this day change your judgment and memory of the congressman's behavior? How would it compare to your reaction in the previous paragraph?

Finally, imagine a third day. On this day, nothing seems exceptional. The kids give you a typical amount of resistance but ultimately acquiesce. Affairs at the office are mixed; you receive some good news about an upcoming deal but you also learn that a key team member is

leaving. You feel neither strongly in control nor completely lacking it. It is a typical day. How might these circumstances influence how you perceive the congressman's behavior?

Research suggests your own sense of agency may indeed make a difference in how you judge others (Cornwell & Higgins, 2019). On the day you felt everything proceeding according to plan, you might, for instance, judge the congressman more harshly than on the day when you lacked a sense of agency. If you did, one plausible explanation for that effect is the phenomenon of attributive projection.

Attributive projection refers to the notion that people tend to ascribe their own motivations, feelings, and other internal states to others (Murstein & Pryer, 1959). This idea is not the same as classical projection in the Freudian tradition, which viewed the attribution of traits or feelings to others (e.g., "He hates me.") as a defense mechanism to protect the ego from the overwhelming anxiety of confronting those feelings in oneself (e.g., "I hate him.") (Freud, 1936). In contrast, attributive projection requires no unconscious motivation and can be viewed as a cognitive heuristic. Research in social psychology has provided some evidence for attributive projection (Baumeister, Dale, & Sommer, 1998), including the false consensus effect, whereby people overestimate the extent to which others share their own traits, opinions, preferences, or motivations (Ross, Greene, & House, 1977). While no research has directly examined the link between one's own sense of agency and the inferred responsibility of another for their actions, the effect of the sense of agency on moral judgment intensity may imply such a link.

Cornwell and Higgins (2019) found evidence in support of the hypothesis that a person's sense of being in control positively relates to the intensity of their moral judgments of others' actions. In their experiment, participants gave self-reported control ratings in response to their

experience of making moral judgments. Participants were presented with vignettes that depicted either moral acts, immoral acts, or morally dilemmatic acts. They rated the behavior on a 9-point scale from 1 (completely morally wrong) to 9 (completely morally right). They computed moral judgment intensity by taking the absolute value of the difference between the raw judgment and the midpoint of the scale. After making the moral judgment, participants gave ratings related to their own experienced sense of control while doing the moral judgment task. The scale measured participants' "sense of willfulness and deliberateness of their actions in the experiment." The scale comprised six items: "How much control did you feel in this task?" "To what extent did you feel your actions to be deliberate?" "To what degree did you feel you were responsible in this task?" "To what extent did your judgments feel voluntary?" "To what extent did you feel willful?" These items were all rated on a 9-point scale, and each participant's sense of control rating was the average of these six items. In their experiments, Cornwell and Higgins (2019) found a positive relationship between moral judgment intensity and the magnitude of sense of control ratings: the more people felt in control, the more extreme were their ratings.

The experiments presented in this and subsequent chapters sought to extend and generalize Cornwell and Higgins' (2019) findings in several ways. First, their findings raised the question of the source of variability in the sense of control judgments they collected. Only one of their four studies included a manipulation of control. In that experiment, the researchers divided the participants into two groups, the random group and the choice group. In the random group, participants viewed the moral vignettes in random order. In the choice group, participants also viewed the vignettes in random order, but they made choices that gave them an illusion of control over presentation order. Participants in the choice group gave more intense moral

judgments than those in the random group. While that finding suggests that increasing the feeling of being in control may lead to more intense moral judgments, it is limited to a comparison between an active state (choice) and a passive state (random). As discussed in chapter I, factors beyond merely taking an action or making a choice can influence the sense of agency, including the relationship between one's intentions and the resulting outcome (Metcalfe, 2013). Therefore, to better assess the influence of the sense of agency on moral judgment intensity, comparison between two active states that vary in the degree of agency experienced is warranted.

A second limitation of Cornwell and Higgins (2019) is that the nature of their measure – control over reading vignettes and making moral judgments – leaves one wondering how a person might plausibly *not feel in control* of such a straightforward task. Assuming the individual's ability to read the vignette and provide a response was not impaired, it is difficult to imagine people reporting a low sense of control. Indeed, the mean control measure across the three studies in which it was measured was approximately 7.50 on a 9-point scale, and the mean standard deviation was approximately 1.40. The typical person, therefore, felt largely and consistently in control of executing the task. Because there was no condition where people truly felt they lacked control, the question remains how low-agency states (i.e., self-report judgments with a mean below midpoint) may influence moral judgment intensity. Furthermore, by linking the sense of control measure with the moral judgment task, it is difficult to draw inferences from Cornwell and Higgins (2019) about how a person's internal sense of agency that they may bring into a moral judgment task may influence their judgments.

The experiment that follows induced variable states of agency using the space pilot game and gathered moral judgments of behavior described in vignettes that were presented following

task performance. Participants played the game, made judgments about their experience, then read a vignette describing action that could be characterized as moral, immoral, or morally ambiguous. Participants then made judgments about the degree of moral rightness or wrongness of the behavior described. Following all trials, participants completed demographics and personality questionnaires, then were asked to recall as much information about the vignettes as possible. The hypothesis, based on Cornwell and Higgins (2019) and the notion of attributive projection, was that following games that induced high feelings of agency, participants would make more intense moral judgments. When they would feel they lacked agency, they would make less extreme moral judgments. Findings in support of that hypothesis would support the attributive projection account. Such results would suggest that an observer's feelings of agency influence their inferred judgment of an actor's sense of agency and responsibility, and that inference has consequences for attributions and moral judgments.

An alternative finding would be that people's *sensitivity* to whether they are in control or out of control is the operative factor. If that were the case, then trials on which people experience either extreme feelings of being in control or extreme feelings of being out of control would result in extreme moral judgments. While Cornwell and Higgins (2019) did not test this possibility in their study, perhaps because people likely always felt largely in control, in space pilot people often do report strong feelings of agency in the standard condition and a strong lack of agency when turbulence is introduced. Thus, this paradigm enables examination of the notion that when feelings of being either in or out of control are extreme, so too are judgments of morality. It also allows examination of whether individual people who are particularly sensitive to whether they are in control or not – that is, the dimension of agency is important to them – may also be more prone to making extreme moral judgments. The present study sought to shed

light on these open questions directed at whether and how feelings of agency have consequences for moral judgments.

To test the relation among feelings of agency, moral judgments, and motivational orientation, regulatory focus and regulatory mode questionnaires were included in this experiment. Regulatory focus theory distinguishes between self-regulatory orientations that motivate people to strive for gains and to fulfill aspirations (promotion focus) and those that motivate people to protect existing conditions and fulfill duties and responsibilities (prevention focus) (e.g., Higgins, 1997; Higgins, 2012). Chronic regulatory orientations can be measured using the regulatory focus questionnaire (RFQ) (Higgins et al., 2001). Prior research suggests a relationship between regulatory focus and a person's sense of control such that promotion orientation may inflate feelings of control (Langens, 2007) and may moderate the relation between felt control and the intensity of moral judgments of others' actions (Cornwell & Higgins, 2019). Including these questionnaires allowed for the testing of the relations among self-regulatory orientations, feelings of agency, and moral judgments of others' actions.

A recall task at the end of the experiment was also included to investigate whether there is a relationship between people's sense of agency and their memory. In a given context, merely being the agent – either by making a simple choice, generating information, or taking other productive action – can improve memory performance. Cloutier and Macrae (2008) found that selecting positive trait words "out of a hat" enhances memory and accessibility of those words relative to a condition where the same words were assigned to the participant. Pairs of participants went through the experiment simultaneously, and experimenters compared memory performance for words allotted to the primary participant and words allotted to the other. In addition, in one condition, allotted words were selected by the participant; in another, the words

were assigned to the participant by the experimenter. Both recall and recognition performance were better for words allotted to the primary participant. Intriguingly, an interaction showed that the effect held only for words selected by the participant, not those assigned to them. When both people in the room were assigned words, the researchers found no effect of self-allotment. The agential act and associated experience of trait word selection, therefore, boosted memory performance.

One limitation of that finding is the potential confounding effect of self-relevance. Because the to-be-remembered materials were trait adjectives, participants may have associated the words with themselves when they chose them, but not when words were assigned. Objectively, the words were not necessarily self-relevant because they were chosen randomly. But participants may have associated traits with themselves during the random selection procedure, and that self-relevance may explain the memory improvement. Murty, DuBrow, and Davachi (2015) used a different manipulation where it was unlikely that a link between the to-be-remembered information and the self played a role. Participants either chose locations on a screen where to-be-remembered images (unrelated to personality traits) would appear, or the locations were fixed. Crucially, the researchers used occluding symbols to mask the to-be-remembered images while the participants chose the location. That forced participants to make choices based solely on location, not image. They found that people performed better on a recognition task for items in the choice condition. The findings suggest that the simple agential act of choosing – even when the choice outcome is unrelated to the self – can improve memory.

Choice paradigms are not the only settings where agential actions have been shown to enhance memory. In the classic generation effect paradigm, for instance, researchers compare memory performance in a passive, read-only condition to an active, generate condition. During

the study phase of such experiments, participants in the generate condition complete trials that present a cue paired with a portion of a target (e.g., rapid – f___), and they attempt to generate the full target word. In the control condition, participants view both the cue and target simultaneously as a paired associate (e.g., rapid – fast). During test, participants view previously presented cues and try to recall the associated target. Memory for target words is better for items presented in the generate condition (Bertsch, Pesta, Wiscott, & McDaniel, 2007; Slamecka & Graf, 1978). Thus, the agential act of generation appears to play a role in enhancing memory.

Another firmly established finding that might rely on agential action is the testing effect. When people are tested on previously studied information, they perform better on a final test than if they had passively studied the material again (e.g., McDaniel, Roediger, & McDermott, 2007). In this case, the agential action is the act of generating responses to test questions or prompts. Test-takers produce responses through their own action whereas those in the restudy condition merely reread or review information without productive action. Furthermore, test type moderates the effect such that testing shows greater benefit in recall compared with recognition contexts and during short-answer rather than multiple choice exams (McDaniel et al., 2007). Recall and short-answer contexts require actions with higher agentiality; more effort is required in order to respond successfully. Therefore, the test-type interaction and, more broadly, the testing effect itself supports the notion that agential action may influence memory.

A third example of a well-established memory finding that might rely on agential action is the enactment effect. Memory for action events (e.g., "lift the pen," "put on the ring") is enhanced when a person acts out the event through gestures (Cohen, 1989; Nyberg, 1993). Cohen (1981) compared memory performance for action events among many study conditions. In one condition, people enacted events; in another, they listened to an experimenter read

descriptions of events. Recall was superior in the enactment condition. Like generation and testing, enactment requires an agential act. Enactors produce physical portrayals of the to-be-remembered action by making appropriate gestures. In contrast, those in the instruction condition listen passively to the events read aloud by the experimenter. The agential act of making physical gestures, therefore, enhances memory in these contexts.

The literature reviewed above suggests a link between agential action and memory performance. But it remains unknown whether the memory benefit arises from the action itself, and its relationship to the presentation of to-be-remembered stimuli, or the internal feeling state that comprises the agential experience. Including a recall test enabled this experiment to address that gap.

The experiment described in this chapter, then, tested two hypotheses about possible consequences of feelings of agency. The first hypothesis is related to consequences of feelings of agency for moral judgment. As described above, it might be the case that the more in-control a person feels during the task, the more intense their moral judgments will be. Alternatively, it is possible that the more extreme people's judgments of agency are, the more extreme will be their moral judgments, a possibility that has not been investigated previously. The experiment also tested the hypothesis that feelings of agency will have consequences for memory. States of high agency should be associated with greater memory performance. Due to the spillover effects of reward states on memory (Gruber & Ritchey, 2020), it was expected that people would show greater memory for vignettes encoded following games that fostered high, rather than low, feelings of agency. Such a finding would provide greater support that the internal feeling state germane to agency plays a role in enhancing memory, and that it is the state itself that drives memory enhancement.

Method

Participants. Participants were 77 Columbia University undergraduates enrolled in introductory psychology courses (N = 61) and volunteers from the local community (N = 16). Undergraduates received partial course credit and community volunteers cash compensation in exchange for participation. Participants were 38 females and 39 males, and ranged in age from 18 to 66 (M = 25.38, SD = 8.52).

13 participants were excluded from the analysis due to missing or incomplete data. The analyzable sample comprised 64 undergraduates (N = 54) and community volunteers (N = 10). This sample included 29 females and 35 males, and ranged in age from 18 to 63 (M = 24.55, SD = 7.07).

Materials. The space pilot task ran on the same basic program described in chapters II - IV. The set of morality vignettes included both original creations and vignettes adapted from those used in prior research (Cornwell & Higgins, 2019; Kohlberg, 1969; see Appendix A). The RFQ and RMQ were completed using Qualtrics, and the demographics questionnaire was completed as a Google form.

Procedure. Each trial included a 30s period of gameplay followed by judgments about the gameplay experience, presentation of a written morality vignette, and a judgment about the behavior described in the vignette. Participants completed twelve trials. After all trials, participants completed a brief demographics questionnaire, the Regulatory Focus Questionnaire (Higgins et al., 2001), and the Regulatory Mode Questionnaire (Kruglanski et al., 2000). Following the questionnaires, participants were asked to recall as much information about each vignette as they could. They were given 10 minutes to do so. Participants typed recall responses into a Microsoft Word document that the experimenter opened on the computer screen.

Design. The experiment was a 2 (turbulence) x 3 (vignette moral category) factorial design. Games either had turbulence or not, and morality vignettes presented one of three categories of behavior: moral acts, immoral acts, or ambiguous acts. Following each game, participants made judgments of agency (JoAs) and judgments of frustration (JoFs). JoAs were given in response to the question, "How much in control did you feel in this trial?" on a sliding scale from 0 to 1, with 0 meaning "No Control" and 1 meaning "Full Control." JoFs were given in response to the question, "How would you rate your level of frustration in this trial?" on a sliding scale from 0 to 1 with 0 meaning "Not at all Frustrated" and 1 meaning "Extremely Frustrated." Participants gave moral judgments following presentation of each morality vignette. Moral judgments were given in response to the question, "How morally right or wrong do you think the behavior was?" on a sliding scale from 0 to 1, with 0 meaning "Very morally wrong" and 1 meaning "Very morally right." The pairing of game types with vignettes was alternated such that half of the participants viewed one subset of the vignettes with the standard game. The other half viewed that same subset of vignettes with the turbulence game. The order of trial presentation was random. For the free recall portion at the end of the experiment, participants wrote recollections onto a blank Word document on the computer screen. (See Appendix B for the specific instructions given to each participant.)

Results

Judgments of agency and frustration. There was a significant difference in mean JOAs between the standard game (M = .80, SD = .23) and the turbulence game (M = .17, SD = .15), $t(63) = 22.46$, $p < .001$, 95% CI [.57, .68], $d = 4.30$. There was a significant difference in mean JOFs between the standard game (M = .19, SD = .21) and the turbulence game (M = .55, SD = .28), $t(63) = 11.57$, $p < .001$, 95% CI [.30, .43], $d = 1.65$, indicating that the experience of

lacking control was more frustrating. Insofar as the effect of JOFs was the reverse of the effect of JOAs but with a smaller magnitude, JOFs are not discussed in detail in subsequent experiments.

Self-regulatory orientations. Five participants failed to complete the RFQ and RMQ, leaving 59 participants in the sample who had successfully completed these questionnaires. There was a correlation between promotion orientation and feelings of agency in the standard game, $r = .28$, $p = .02$, suggesting that the greater a person's promotion orientation, the more strongly in-control they felt during space pilot in the absence of disruptions to their feelings of agency. There were no other significant relations among self-regulatory orientations and JOAs. A summary of these results can be found in Table 7.

Table 7. Regulatory focus and regulatory mode results

Results shown are descriptive statistics for each of the self-regulatory orientation measures and Pearson's r correlations between each measure and JOAs in each of the standard and turbulence games. Only the correlation between promotion orientation and JOAs in the standard game was significant (*$p < .05$).

			Standard	Turbulence
	M	*SD*	*r*	*r*
Promotion	3.55	0.55	.28*	-.08
Prevention	3.14	0.85	.04	-.09
Locomotion	4.35	0.66	.20	-.08
Assessment	4.20	0.79	.17	-.18

Morality judgments in relation to agency. There was an effect of a priori vignette group on moral judgment, $F(2, 126) = 439.85$, $p < .001$, $\eta^2 = .83$. Specifically, the mean morality judgment for the moral acts ($M = .71$, $SD = .27$) was significantly different from the mean morality judgment for immoral acts ($M = .12$, $SD = .16$), $d = 2.63$, $p < .001$, and for ambiguous acts ($M = .54$, $SD = .32$), $d = 0.58$, $p < .001$. The difference in means between the

judgments for the immoral and ambiguous acts was also significant, $d = 1.66$, $p < .001$. The results indicated that participants' judgments aligned with a priori groups.

Intensity ratings of the moral judgments were computed according to the procedure used by Cornwell and Higgins (2019). The absolute value of the difference between the raw morality judgment and the midpoint of the scale (.50) was calculated. That produced scores for each trial from 0 to .50 indicating the judgment's distance from the midpoint. A score of .50 meant that the participant's judgment was either a 0, meaning extremely morally wrong, or a 1, meaning extremely morally right. A score of 0 meant that the participant's judgment was exactly in the midpoint between those two extremes.

Regression analyses were performed to predict moral judgment intensity from JOA. There was a slight numerical trend suggesting that extreme moral evaluation might be associated with feeling more in control, but the effect was not statistically significant, $b = .02$, $t(712) = 1.49$, $p = .14$, 95% CI [-.01, .06]. The scatterplot showed clusters of data points at the upper extreme of moral judgment intensity at both ends of the JOA scale, which suggested a possible nonlinear relationship.

A second regression model that included a quadratic term (squared, mean-centered JOAs) was fit to the moral judgment intensity. The model was first fit using ordinary least squares estimation and showed a significant effect of squared JOAs on intensity, $b = .19$, $t(174) = 2.32$, $p = .02$. However, the model failed to converge with the random effect term included, so a follow-up model was fit using Bayesian estimation with the *brms* package for R (Bürkner, 2017). This model also showed an effect of squared JOAs on moral judgment intensity, $b = .15$, 95% [.00, .31], and although zero could not be excluded as a plausible value, the posterior probability distribution indicated a positive effect.

JOA intensity was also computed, using the same method used to compute moral judgment intensity. The absolute value of the difference between the raw JOA and .50 was first computed. That produced scores for each trial from 0 to .50 indicating the judgment's distance from the midpoint. A score of .50 meant that participant's judgment was either a 0, meaning not at all in control, or a 1, meaning completely in control. A score of 0 meant that the participant's judgment was exactly in the midpoint between those two extremes. A linear model was fit to predict moral judgment intensity from JOA intensity. There was a marginal effect, $b = .09$, $t(37) = 1.95$, $p = .058$, 95% CI [.00, .19], suggesting that the intensity of the agential experience was related to the intensity of moral judgment.

Between-subjects moral judgment intensity in relation to feelings of agency. Cornwell and Higgins (2019) found that a between-subjects variable – the amount of control an individual felt over a task – related to overall extremity of the individual's moral judgments. Accordingly, overall feeling of agency in relation to extremity of moral judgment was also investigated in this experiment. Following the analysis performed by Cornwell and Higgins (2019), we investigated whether people who, on average, felt more in control made more extreme moral judgments. The results of this analysis did not reveal a linear relationship between agency and moral judgment intensity, $b = -.04$, $t(62) = 0.44$, $p = .66$.

However, we also investigated whether people who were more *sensitive* along the agency dimension – that is people who made higher agency judgments when they were in control (i.e., in the standard condition) and lower agency judgments when they were out of control (i.e., in the turbulence condition) – made more extreme moral judgments. Mean agency judgment *intensity* was determined for each participant by computing each participant's mean JOA intensity. The higher the mean agency judgment intensity score, the more sensitive the person was to both

feelings of low and high agency. A linear model predicting mean moral judgment intensity from agency sensitivity was fit. There was a positive relation between moral judgment intensity and agency sensitivity, $b = .30$, $t(62) = 3.13$, $p = .003$, 95% CI [.11, .50], indicating that people who were most sensitive to factors that influence feelings of agency also made more intense moral judgments (Figure 17).

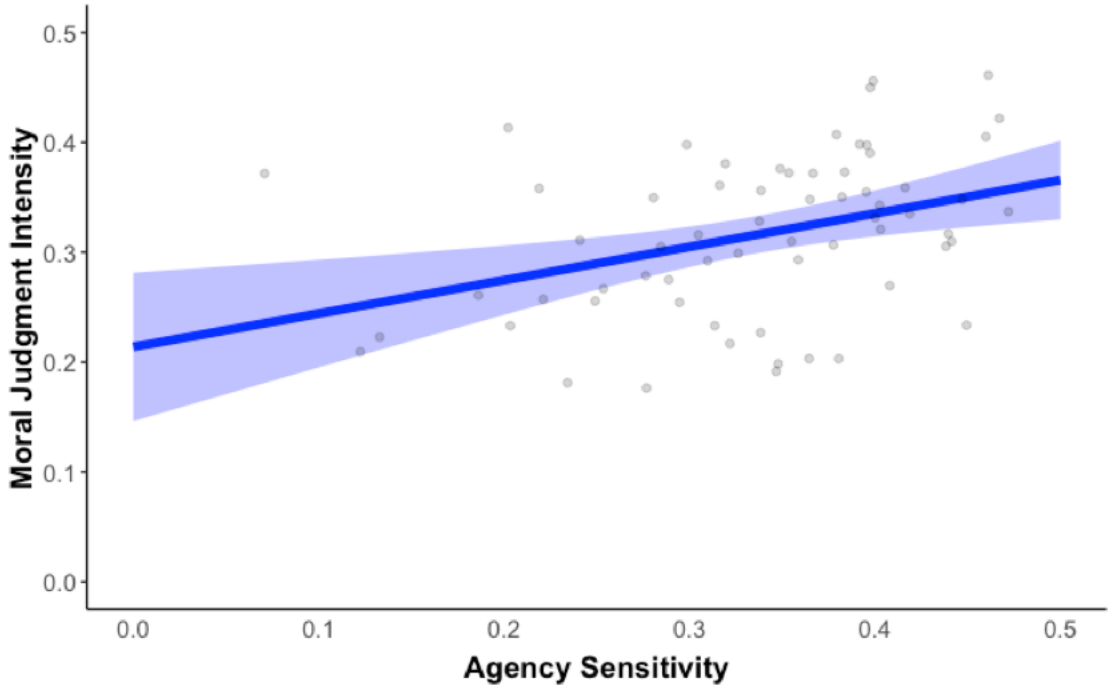

Figure 17. Effect of agency sensitivity on mean moral judgment intensity

Agency sensitivity significantly predicted mean moral judgment intensity. Shaded band represents 95% confidence interval of the regression line.

Recall scores. Two independent raters scored each vignette recall attempt on a scale from 0 to 5. A score of 0 indicated no information recalled while a score of 5 indicated near perfect recall. (For more details on the recall scale, see Appendix C.) A Pearson's r correlation revealed an extremely strong positive association between the two sets of independent scorers, $r = .96$, $t(766) = 91.19$, $p < .001$, 95% CI [.95, .96]. For all recall analyses described below, the mean of the two scores was used.

The main effect of vignette type was significant, $F(2, 126) = 31.13$, $p < .001$, $\eta^2 = .14$. Neither the main effect of game type, $F(1, 63) = 0.51$, $p = .48$, nor the interaction effect, $F(2, 126) = 2.01$, $p = .14$ were significant. Pairwise comparisons revealed significant differences in recall between the ambiguous ($M = 2.30$, $SD = 1.07$) and both the moral ($M = 1.21$, $SD = 1.27$), $d = 0.93$, $p < .001$, and immoral ($M = 1.56$, $SD = 1.13$) vignettes, $d = 0.68$, $p < .001$. The difference in recall score between the moral and immoral vignettes was not significant. The findings showed that the only factor in this analysis that impacted recall was the nature of the morality vignette, with memory performance being highest for ambiguous vignettes (Figure 18).

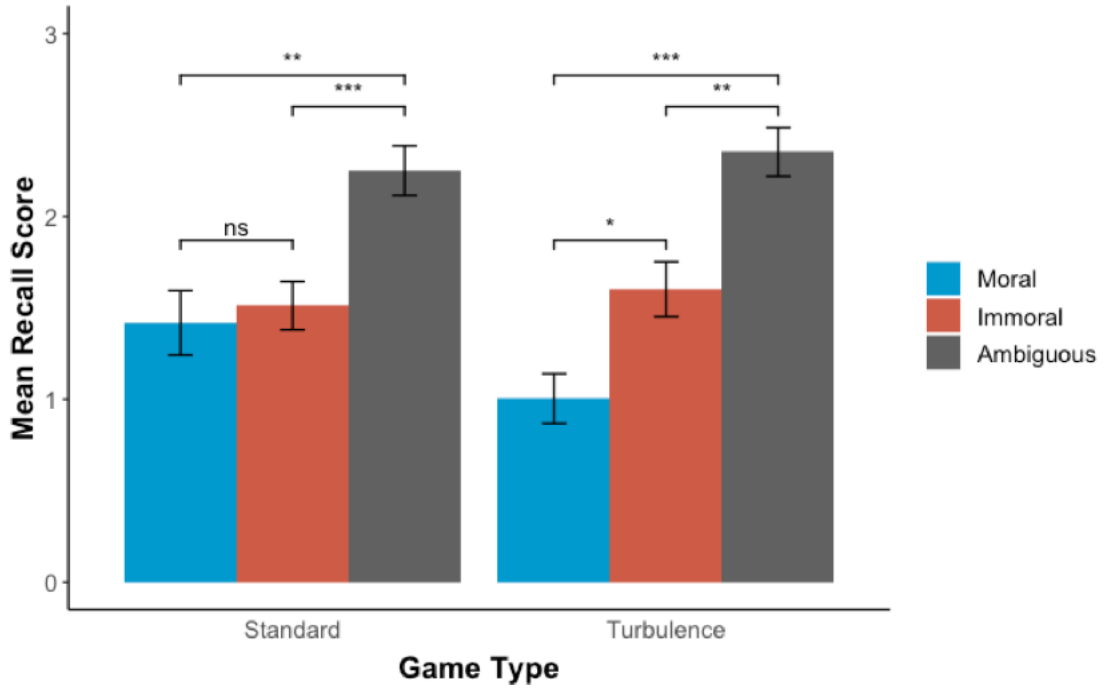

Figure 18. Mean recall scores as a function of game type and vignette type

Results of 2 (game type) x 3 (vignette type) repeated measures ANOVA revealed that people remembered the ambiguous vignettes better than the moral and immoral vignettes.

Discussion

While the hypothesis was that the magnitude of the JOAs and moral judgment intensity would be positively related, we instead found a nonlinear relationship. As JOAs approached both extremes of the scale, intensity of moral judgments increased: the *intensity* of JOAs was

related to the *intensity* of the moral judgments. These findings indicated that moment-to-moment changes in experienced agency, within subjects, appeared to translate into changes in moral judgment intensity. Furthermore, individuals who tended to be more sensitive to factors that influenced their own feelings of agency also tended to make more extreme judgments of the morality vignettes. This between-subjects analysis showed a significant positive relationship between agency sensitivity and moral judgment intensity, indicating that individuals who were high in sensitivity along the agency dimension judged the morally right actions of others more favorably and the morally wrong actions of others with more disapproval than do people with less agency sensitivity.

The memory findings did not support the hypothesis that recall would be highest following experiences of high agency. The only significant memory finding was that people remembered the ambiguous vignettes better than both the moral and immoral ones, which can likely be explained by greater rehearsal of the ambiguous vignettes due to more time and effort spent considering the relative rightness and wrongness of the depicted behavior.

These findings extended and qualified previous work by suggesting that it is not simply the state of feeling a high sense of agency that positively relates to moral judgment intensity. Rather, extreme experiences of agency – either high or low – enhance judgment intensity. This finding runs counter to the prevailing understanding of the relationship between the sense of agency and attributions of social behavior. Because these results showed that low-agency states can also lead to greater intensity of moral judgments, the attributive projection (Murstein & Pryer, 1959) account cannot fully explain the findings. If people used their own internal sense of agency as a model for the actor's sense of agency, ratings following the low-agency version of the game would have been *less* intense, not more so. People would have inferred that the actors

in the vignettes felt less control over their actions and, thus, were less praiseworthy or culpable. However, low-agency states also resulted in intense moral judgments.

To return to the illustration in the introduction about the corrupt congressman, the findings suggest that his behavior would be judged harshly in *both* the smooth, everything-going-according-to-plan day *and* the chaotic, no-sense-of-control day. It would be the typical day, where feelings of control are not extraordinarily strong or weak, that would lead to a more lenient appraisal of the congressman's misdeeds. Moreover, if you are someone who tends to be highly sensitive to variations in your own sense of agency, you might be more likely to let that internal sense influence your moral judgment. The person who experiences relative equanimity in response to stimuli that tend to alter feelings of agency would likely make a lenient judgment regardless.

Although, like Cornwell and Higgins (2019), we found that when people experienced very high feelings of agency they made more extreme moral judgments than when they had only moderately high feelings of agency, the findings in this experiment, which also included conditions in which people experienced low feelings of agency, went further than those advanced by Cornwell and Higgins (2019). These results indicated that both high- and low-agency experiences led to more intense morality judgments, and that individuals who appear more sensitive along the agency dimension judge others' behavior more intensely. A replication experiment was run to solidify the findings. That experiment is described in chapter VI.

VI. Replication of the Effects of Agency Intensity and Sensitivity on Moral Judgment Intensity

Introduction

The experiment described in chapter V introduced two novel findings to the study of agency and moral judgment. First, internal states of both high agency *and* low agency that vary within individuals were associated with more intense moral judgments. Second, individuals who were more sensitive to changes to their own feelings of agency tended to judge the behavior of others more harshly. The experiment described in this chapter provides a replication of those findings.

By and large, the materials and procedure remained the same, though a few changes were made. First, the ambiguous vignettes were removed because they fell in the middle of the moral judgment scale. Their presence in the prior experiment likely pulled mean moral judgment intensity toward zero, possibly obscuring a stronger effect between JOA intensity and moral judgment intensity. By removing them, this experiment focused on the types of vignettes most likely to generate intense judgments. Second, vignettes were revised to maximize the distance between the moral and immoral vignettes. Some were rewritten and others added to create patterns of behavior most likely to generate clear judgments of right and wrong. The vignettes were also standardized based on word count and name mentions. Each vignette had between 100 and 110 words, and each included two named individuals with each name mentioned exactly three times. Third, the number of trials per participants was increased from 12 to 20. Finally, the amount of time participants had for the recall portion of the experiment was increased from 10 to 15 minutes.

The main hypothesis was that within-subjects JOAs and moral judgment intensity would demonstrate a positive quadratic relationship such that intensity would be heightened during both high and low agency states. We also predicted a between-subjects effect such that agency sensitivity would positively predict moral judgment intensity. In addition, with the absence of the ambiguous vignettes, we predicted an effect on memory recall such that memory would be enhanced for vignettes presented following high-agency states.

Method

Participants. Participants were 57 Columbia University undergraduates enrolled in introductory psychology courses. Undergraduates received partial course credit in exchange for participation. Participants were 28 females and 29 males, and ranged in age from 18 to 57 (M = 22.28, SD = 6.52). Two participants were excluded from analysis due to missing or incomplete data. Analyzable sample comprised 55 undergraduates. This sample included 27 females and 29 males, and ranged in age from 18 to 57 (M = 22.44, SD = 6.59).

Materials. The space pilot task ran on the same basic program described in chapters II - V. The set of morality vignettes included both original creations and vignettes adapted from those used in prior research (Cornwell & Higgins, 2019; Kohlberg, 1969; see Appendix A). The RFQ and RMQ were completed using Qualtrics, and the demographics questionnaire was completed as a Google form.

Procedure. The procedure was identical to that described in chapter V except each participant competed 20 trials. Each trial included a 30s period of gameplay, judgments about the gameplay experience, presentation of a written morality vignette, and a judgment about the behavior described in the vignette.

After all trials, participants completed a brief demographics questionnaire, the RFQ and the RMQ. Following the questionnaires, participants were asked to recall as much information about each vignette as they could. They were given 15 minutes to do so. Participants typed recall responses into a Microsoft Word document that the experimenter opened on the computer screen.

Design. The experiment was a 2 (turbulence) x 2 (vignette moral category) factorial design. Games either had turbulence or not, and morality vignettes presented one of two categories of behavior: moral acts or immoral acts. Following each game, participants made JOAs and JOFs. Participants gave moral judgments following presentation of each morality vignette. The pairing of game types and vignettes, as well as trial order, was randomized for each participant. For the free recall portion at the end of the experiment, participants wrote recollections onto a blank Word document on the computer screen.

Results

Judgments of agency. There was a significant difference in mean JOAs between the standard game (M = .85, SD = .15) and the turbulence game (M = .18, SD = .10), $t(54) = 28.94$, $p < .001$, 95% CI [.62, .71], $d = 5.35$.

Self-regulatory orientations. There was a significant association between promotion focus and JOAs in the standard game, $r = .30$, $p = .02$, suggesting that the greater a person's promotion orientation, the more strongly in control they felt during space pilot in the absence of disruptions to their feelings of control. There were no other relationships among self-regulatory orientations and JOAs. A summary of these results can be found in Table 8.

Table 8. Regulatory focus and regulatory mode results

Results shown are descriptive statistics for each of the self-regulatory orientation measures and Pearson's r correlations between each measure and JOAs in each of the standard and turbulence games. Only the correlation between promotion orientation and JOAs in the standard game was significant (*$p < .05$).

			Standard	Turbulence
	M	*SD*	*r*	*r*
Promotion	3.68	0.55	.30*	-.13
Prevention	3.19	0.89	.06	-.20
Locomotion	4.28	0.69	.24	-.13
Assessment	4.30	0.65	-.01	-.01

Moral judgments and intensity ratings. There was a significant difference in mean morality judgments between the moral acts ($M = .86$, $SD = .09$) and the immoral acts ($M = .17$, $SD = .08$), $t(54) = 36.91$, $p < .001$, 95% CI [.65, .73], $d = 8.23$, showing that participants' judgments aligned with the a priori grouping. Intensity ratings of the moral judgments were computed according to the procedure used by Cornwell and Higgins (2019). The absolute value of the difference between the raw morality judgment and the midpoint of the scale (.50) was calculated. The effect of JOA on intensity was slightly positive though not significant, $b = .01$, $t(468) = 1.32$, $p = .19$, 95% CI [-.01, .04]. The quadratic model fit using Bayesian estimation, though, again showed a quadratic effect of JOAs on moral judgment intensity, $b = .13$, 95% CI [.01, .25] (Figure 19a).

Moral judgment intensity in relation to judgment of agency intensity. JOA intensity was computed by taking the absolute value of the difference between the raw JOA and the midpoint of the scale (.50). There was a positive relation between agency intensity and moral judgment intensity, $b = .08$, $t(1,043) = 2.26$, $p = .02$, 95% CI [.01, .15] (Figure 19b).

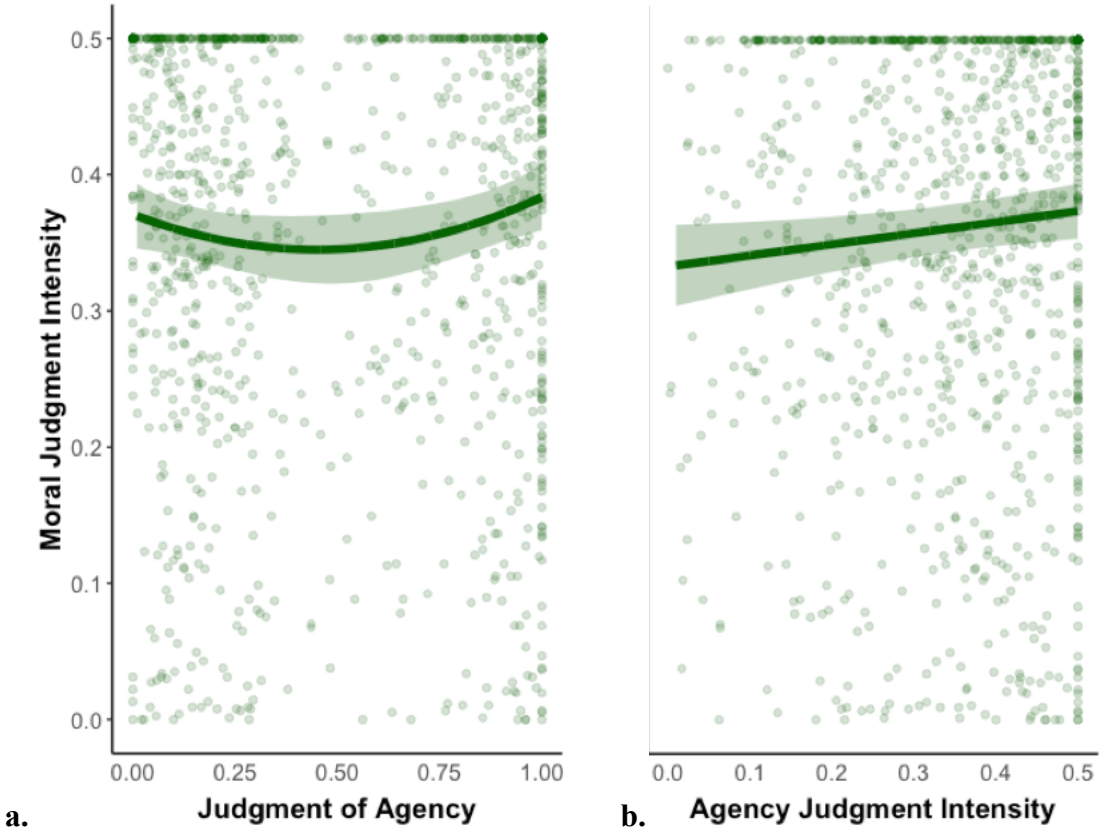

Figure 19. Effects of JOAs and JOA intensity on moral judgment intensity

Agency judgment intensity was computed by taking the absolute value of the difference between the raw agency judgment (rating from zero to one) and the midpoint of that scale, 0.5. The intensity judgments, therefore, ranged from zero, meaning the participant gave a JOA exactly in the midpoint of the scale, to one, meaning the participant registered a JOA at one of the extreme ends of the scale.

Between-subjects agency sensitivity. Mean moral judgment intensity and agency sensitivity ratings were computed for each participant. The relationship was positive but not quite significant, $b = .21$, $t(53) = 1.62$, $p = .11$, 95% CI [-.05, .48] (Figure 20).

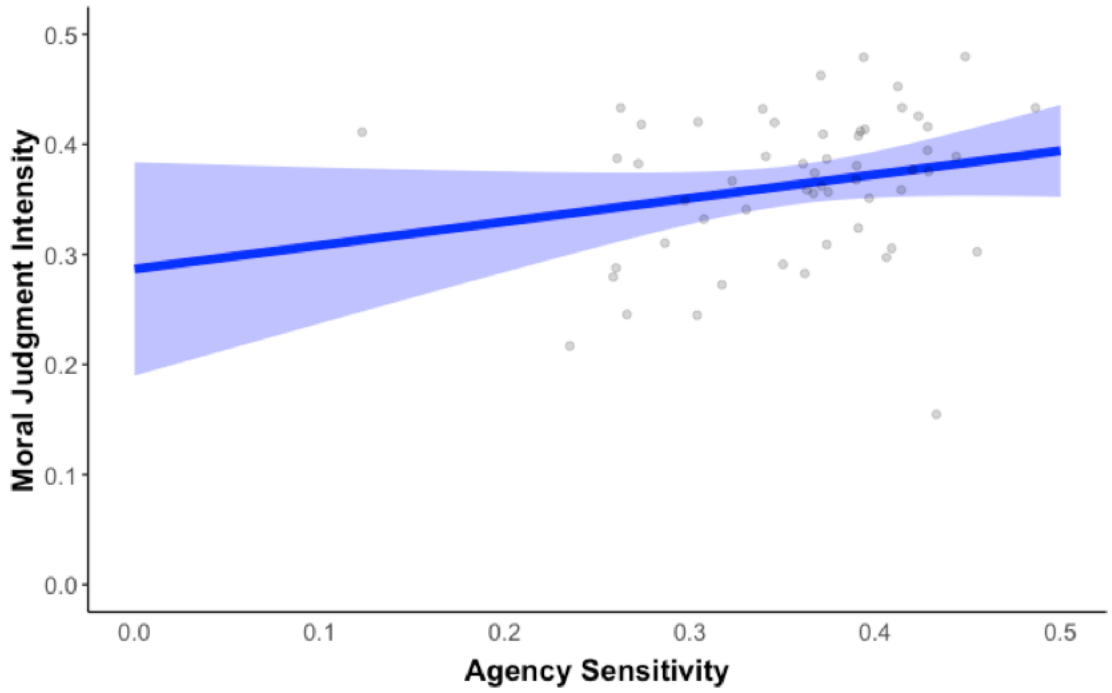

Figure 20. Effect of agency sensitivity on mean moral judgment intensity

Recall. Each vignette recall attempt was scored on a scale from 0 to 5. A score of 0 indicated no information recalled while a score of 5 indicated near perfect recall. (For more details on the recall scale, see Appendix C.) The main effect of vignette type was marginally significant, $F(1, 54) = 2.91$, $p = .09$, $\eta^2 = .02$, such that there was a trend toward recall for the immoral vignettes ($M = 1.44$, $SD = 0.77$) to be greater than recall for the moral vignettes ($M = 1.25$, $SD = 0.68$). Neither the main effect of game type, $F(1, 54) = 0.87$, $p = .36$, nor the interaction effect, $F(1, 54) = 0.07$, $p = .80$ were significant. At the trial level, the effect of moral judgment intensity on recall was significant, $b = .78$, $t(115) = 2.29$, $p = .02$: the more intense a moral judgment for a given vignette, the better was the recall of that vignette.

Discussion

The findings from this experiment substantiated the results from chapter V. A nonlinear relationship between within-subject agency judgment intensity and moral judgment intensity was found such that extreme agency judgments were associated with extreme moral judgments. That

effect replicated what was found in chapter V, though the effect did not quite make the cutoff for significance in the prior experiment. The between-subjects relationship between agency sensitivity and mean moral judgment intensity, which was statistically significant in the prior experiment, was also in the expected direction in this experiment such that people who showed greater sensitivity along the agency dimension tended to give more intense moral judgments. Once again, there was no relationship between feelings of agency and memory.

The dynamic of the within-subjects, moment-to-moment effect of feelings of agency on judgment intensity was such that the agential experience from playing the game *carried over* to influence processing and judgment of the morality vignette. Participants viewed the morality vignette *just after* experiencing a high or low agency state. Given that agency intensity was influencing moral judgment intensity in such a carry-over context, it is possible that simultaneous experience of high or low feelings of agency with exposure to a morality vignette may enhance the effect. The experiment described in chapter VII tested that hypothesis.

VII. Agency Sensitivity and Moral Judgment Intensity During Concurrent Audio Stimulus Presentation

Introduction

The previous two chapters introduced evidence in support of the notion that feelings of extremely high and low agency amplify moral judgment intensity. When people experienced extreme feelings of agency, either feeling strongly in control or distinctly lacking control, they gave more intense moral judgments. In both prior experiments, the results suggested a carry-over effect: when a person finds themselves in a feeling state of high or low agency, the consequences carry over to influence processing of subsequent stimuli. In this case, extreme feelings of agency are associated with the intensity of the moral judgments of others' actions.

Given that carry-over effects might well decay over time, it is possible that the effect would be strengthened when the agential experiences occurred concurrently with the presentation of the to-be-judged stimulus. The experiment described in this chapter used audio recordings of the morality vignettes read aloud and presented concurrently with space pilot gameplay to test this prediction.

The vignettes used in this experiment were the same as those used in chapter VI. Trial length was increased from 30s to 40s to accommodate the full audio presentation of each vignette. In addition, the method for scoring recall data was changed, to overcoming a possible shortcoming in the recall scoring scale. The scoring process that was used in this experiment relied on detail checklists. Each vignette had its own checklist containing all of the details in that vignette, and raters judged recall by assigning a detail score to each recollection equal to the proportion of details recalled accurately. In addition, each recollection was given a gist score

indicating whether or not the participant recalled the gist from that vignette. Complete checklists can be in found in Appendix E.

The experiment proceeded in a similar fashion to those described in the previous two chapters. Participants played versions of space pilot that induced variable agential experiences. While people played the game, they listened through headphones to a recording of the experimenter reading a morality vignette aloud. People gave judgments about their gameplay experience and a morality judgment about the vignette at the end of each trial. After all trials and a filler task, participants were asked to freely recall as much information from the vignettes as possible. The same hypotheses held from the prior experiments: within-subjects effects of JOA intensity on moral judgment intensity, and between-subjects effects of agency sensitivity on moral judgment intensity.

Method

Participants. Participants were 39 Columbia University undergraduates enrolled in introductory psychology courses. They received partial course credit in exchange for participation. Participants were 27 females and 12 males, and ranged in age from 18 to 32 (M = 20.38, SD = 3.01).

Materials. The space pilot task was the same version used in the experiment described in the prior chapter. The updated set of morality vignettes included both original vignettes and ones adapted from those used in prior research (Cornwell & Higgins, 2019; Kohlberg, 1969; see Appendix A). Like the prior experiment, the RFQ and RMQ were completed using Qualtrics, and the demographics questionnaire was completed as a Google form.

Procedure. The experiment began with two practice trials. Participants indicated their understanding of the task before moving on to the experimental trials. Each trial included a 40s

period of gameplay, judgments about the gameplay experience, audio presentation of a morality vignette, and a judgment about the behavior described in the vignette. Participants wore headphones during the experiment and listened to the vignette read aloud on a recording. Participants completed twenty trials. After all trials, participants completed a brief demographics questionnaire, the RFQ, and the RMQ. Following the questionnaires, participants were asked to recall as much information about each vignette as they could. They were given 15 minutes to do so. Participants typed recall responses into a Microsoft Word document that the experimenter opened on the computer screen.

Design. The experiment was a 2 (turbulence) x 2 (vignette category) factorial design. Games either had turbulence or not, and morality vignettes depicted either moral acts or immoral acts. Following each game, participants made JOAs and JOFs in response to the gameplay experience, and morality judgments in response to the vignettes. The scales used for each judgment were identical to those used in the prior experiment. For the free recall portion at the end of the experiment, participants wrote recollections onto a blank Word document on the computer screen.

The pairing between game types and vignettes was randomized, and every pair of participants was yoked such that the even-numbered participant saw the flipped version of the stimuli set presented to the prior odd-numbered participant. Randomization of pairings between game types and vignettes occurred for every odd-numbered participant. The following even-numbered participant saw the flipped pairing such that the subset of vignettes paired with the standard game for the prior participant was paired with the turbulence game for the current participant, and so forth. This randomization scheme was used in order to prevent certain vignettes from being disproportionately paired with the same game type and to prevent the same

vignettes from always being clustered together with the same game type. The order of trial presentation was also randomized.

Results

Judgments of agency. There was a significant difference in mean JOAs between the standard game (M = .82, SD = .19) and the turbulence game (M = .21, SD = .16), $t(38) = 20.87$, $p < .001$, 95% CI [.56, .67], $d = 5.23$.

Self-regulatory orientations. There were no other significant relationships among self-regulatory orientations and JOAs. A summary of the results can be found in Table 9.

Table 9. Regulatory focus and regulatory mode results

Results shown are descriptive statistics for each of the self-regulatory orientation measures and Pearson's r correlations between each measure and JOAs in each of the standard and turbulence games. None of the correlations were statistically significant.

			Standard	Turbulence
	M	*SD*	*r*	*r*
Promotion	3.40	1.14	.02	.00
Prevention	3.19	1.22	.07	-.09
Locomotion	4.18	0.99	.16	.03
Assessment	4.05	0.98	-.02	.12

Moral judgments and intensity ratings. There was a significant difference in mean morality judgments between the moral acts (M = .79, SD = .23) and the immoral acts (M = .19, SD = .20), $t(38) = 20.47$, $p < .001$, 95% CI [.53, .65], $d = 5.72$. Intensity ratings of the moral judgments were computed according to the procedure used by Cornwell and Higgins (2019). The absolute value of the difference between the raw morality judgment and the midpoint of the scale (.50) was calculated. The effect of JOA on intensity was positive though not statistically significant, b = .03, $t(35) = 1.34$, p = .19, 95% CI [-.01, .06]. The quadratic model fit using

Bayesian estimation showed an effect of squared JOAs on moral judgment intensity, b = .23, 95% CI [.05, .41] (Figure 21a).

Moral judgment intensity in relation judgment of agency intensity. JOA intensity was computed by taking the absolute value of the difference between the raw JOA and the midpoint of the scale (.50). There was a positive effect of JOA intensity on moral judgment intensity, b = .15, $t(38)$ = 2.72, p = .01, 95% CI [.04, .25] (Figure 21b).

Figure 21. Effects of JOAs and JOA intensity on moral judgment intensity

Agency judgment intensity was computed by taking the absolute value of the difference between the raw agency judgment (rating from zero to one) and the midpoint of that scale, 0.5. The intensity judgments, therefore, ranged from zero, meaning the participant gave a JOA exactly in the midpoint of the scale, to one, meaning the participant registered a JOA at one of the extreme ends of the scale.

Between-subjects agency sensitivity. There was a significant effect of agency sensitivity on mean moral judgment intensity such that sensitivity positively predicted intensity, $b = .37$, $t(37) = 2.84$, $p = .007$, 95% CI [.11, .63] (Figure 22).

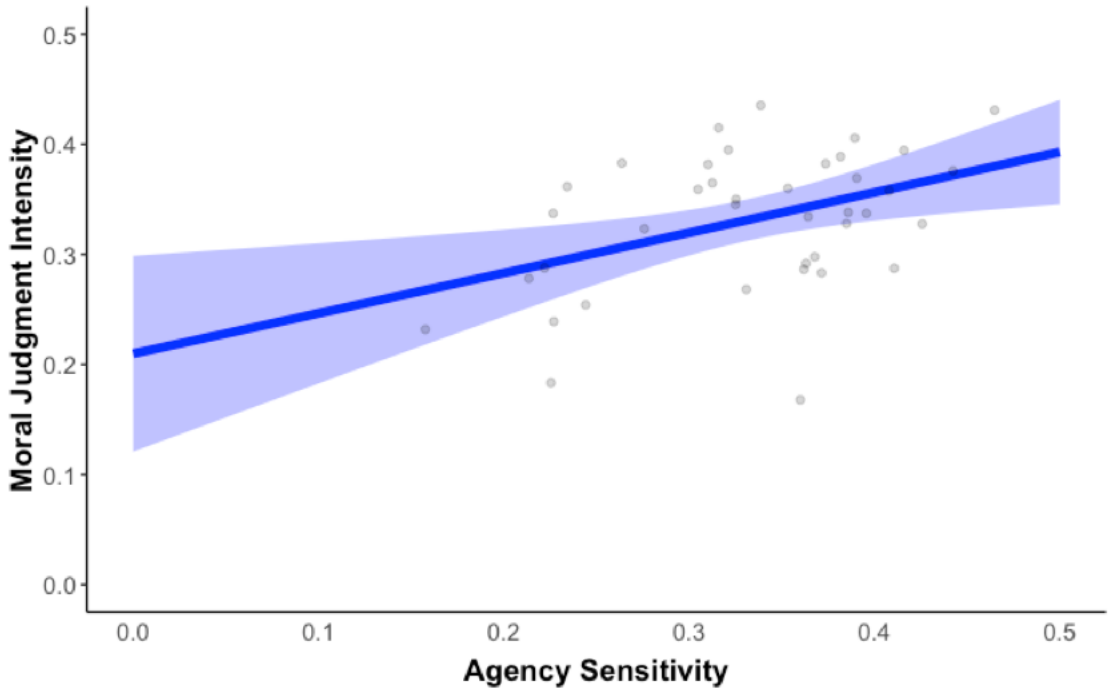

Figure 22. Effect of agency sensitivity on mean moral judgment intensity

Agency sensitivity significantly predicted mean moral judgment intensity. Shaded region represents the 95% confidence interval of the regression line.

Recall. Detail scores were computed using proportions derived from the scoring checklists (Appendix E). Each trial received a score from 0, meaning no details recalled, to 1, meaning all details recalled. The main effect of vignette type was significant, $F(1, 38) = 5.06$, $p = .03$, $\eta^2 = .02$, such that detail recall was greater for immoral vignettes ($M = .18$, $SD = .12$) than for moral vignettes ($M = .15$, $SD = .10$). The main effect of game type was also significant, $F(1, 38) = 5.73$, $p = .02$, $\eta^2 = .04$, such that recall was greater in the standard game ($M = .19$, $SD = .12$) than in the turbulence game ($M = .14$, $SD = .10$). The interaction term was not significant, $F(1, 38) = 0.59$, $p = .45$ (Figure 23).

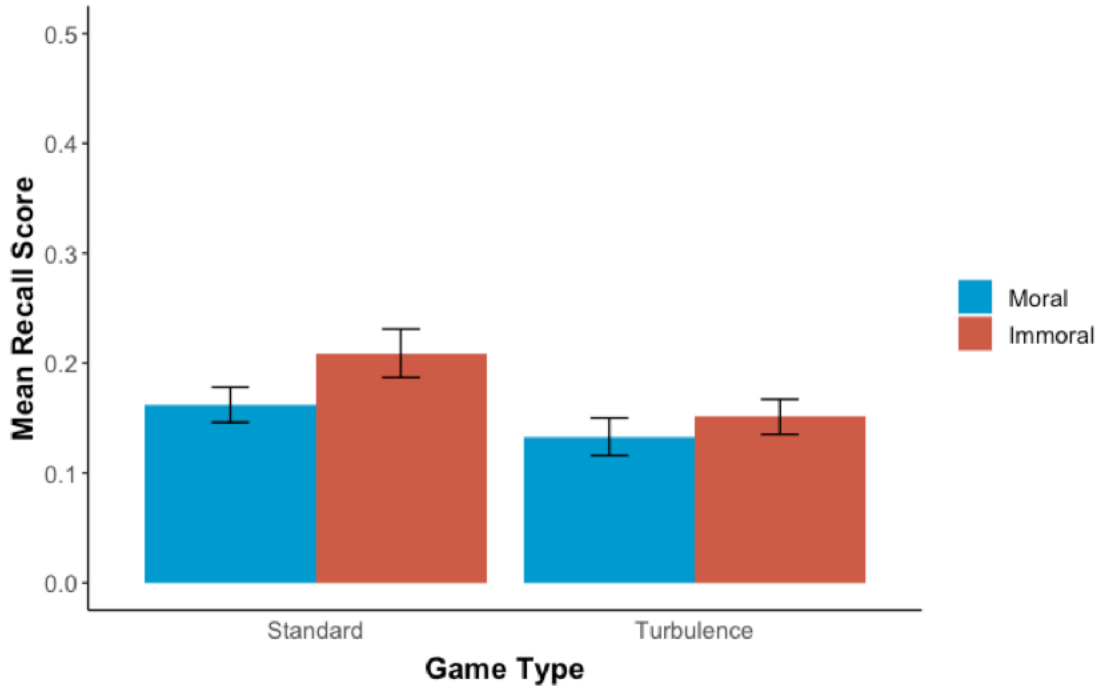

Figure 23. Effects of game type and vignette type on mean recall score

People showed better recall for the immoral vignettes and for vignettes presented during the standard game.

At the trial level, the effect of moral judgment intensity on recall was significant, $b = .28$, $t(142) = 5.23$, $p < .001$, which suggested that the more intense a moral judgment for a given vignette, the better was the recall of that vignette. At the subject level, the relationship between mean moral judgment intensity and mean recall was also significant, $b = 0.39$, $t(37) = 2.74$, $p = .01$, suggesting that people who tended to make intense moral judgments were also more likely to perform better overall on the recall task.

Discussion

A quadratic relationship between within-subject JOAs and moral judgment intensity was found in this experiment. Both extreme high- and low-agency states led to more intense moral judgments. In fact, the effect was stronger in this experiment, in which vignette presentation occurred simultaneously with the experience of agency, than in the experiments described in chapters V and VI, in which the vignettes were presented separately, at a delay. This suggests

that decay due to lag between gameplay and presentation of the morality vignette attenuated the effect in the prior experiments. We also found a significantly positive relationship agency sensitivity and mean moral judgment intensity. Finally, a main effect of game type was identified, suggesting that recall was impaired for information encoded during the turbulence game as compared to information encoded during the standard game.

One unanswered question following these three experiments is whether other manifestations of feelings of agency would show similar effects to those generated from playing the space pilot game. Agency is a broad construct, and many human experiences far beyond a simple motor control task can influence our feelings of control. In the final experiment, we aimed to manipulate agential experiences using episodic simulations and autobiographical recollections and examine how those experiences relate to moral judgment intensity and memory.

VIII. Autobiographical Recall and Episodic Simulation as Agency Manipulations

Introduction

The prior three experiments showed consistent results for effects of extreme agential experiences on moral judgment intensity. Both feelings of extremely high and low agency intensified moral judgments of others' action. The experiment described in this chapter tested that hypothesis by using different techniques for manipulating felt agency. Instead of using a motor task, the present study used episodic simulation and autobiographical recollections to induce feelings of high and low agency. Episodic simulation refers to the act of imagining oneself experiencing a future event. Autobiographical recollection refers to the active process of bringing to mind memories from long-term episodic memory and experiencing emotions associated with the retrieved event. These techniques were selected due to their self-relevant nature and stark contrast to the motor control experience of the space pilot game. They differed substantially from space pilot yet can produce experiences that vary in felt control (Whitson & Galinsky, 2008).

An example of episodic simulation would be imagining oneself at some future or hypothetical event. For instance, one could imagine oneself delivering a lecture, standing in a lecture hall in front of a group of eager students on the first day of the semester. During the imagination exercise, the participant is encouraged to vividly imagine what it might feel like to experience this situation in real life. Research in cognitive neuroscience indicates that imagining future events activates neural circuitry similar to that which is active during the experience itself (Schacter, Addis, & Buckner, 2008). That suggests the technique may be suitable for inducing internal states. In the present study, episodic simulation prompts were used in some trials that

asked people to imagine situations where they were likely to feel either a high or low degree of personal control.

In other trials, autobiographical recollections were used to prompt similar feelings of low and high agency. Participants were asked to recall time in their lives when they felt either firmly in control or distinctly lacking control. This technique has been used in the compensatory control literature (e.g., Whitson & Galinsky, 2008) to generate states of low and high personal control. In these trials, participants were asked to write about an experience in their own life when they either felt firmly in control or felt they lacked control.

The same vignette stimuli set used in chapters VI and VII was used in this experiment, while the procedure reverted back to that described in chapter VI, where experiences of agency were induced *prior* to vignette presentation. In each trial, participants proceeded with the agency manipulation and made judgments about their experience, read a vignette that depicted either a moral or an immoral act, then made a judgment about the morality of the behavior depicted. The prediction was that extreme agency states, both within- and between-subjects would lead to more intense moral judgments. In addition, we predicted an effect of agency on memory such that memory for the vignettes would be greatest following high feelings of agency.

Method

Participants. Participants were 57 Columbia University undergraduates (35 females, 19 males, 2 non-binary, and 1 who did not report a gender). They ranged in age from 18 to 29 (M = 19.79, SD = 2.32). 7 participants were excluded from analysis due to missing or incomplete data. Analyzable sample comprised 50 undergraduates (31 females, 18 males, 1 nonbinary). The sample ranged in age from 18 to 29 (M = 19.94, SD = 2.42).

Materials. Prompts for the episodic simulations were developed for this experiment (Appendix F). They consisted of eight baseline situations that were then altered to generate feelings of either high agency or low agency. Morality vignettes were the same ones used in the experiment described in chapter VI.

Procedure. Each trial included either an episodic simulation or autobiographical recollection simulation, judgments about that experience, presentation of a written morality vignette, and a judgment about the behavior described in the vignette. Participants completed twenty trials in total, with the first sixteen using episodic simulation and the final four using autobiographical recall. In the episodic trials, participants viewed a short paragraph that prompted them to imagine themselves in a particular situation. They were instructed to vividly imagine themselves in the situation and were given 30 seconds to do so. Following the simulation, participants made judgments about their experience. They were then presented with a morality vignette and asked to make a judgment about the morality of the behavior described. Episodic simulation and autobiographical recollection prompts can be found in Appendix F.

For the trials that used autobiographical recollection, participants were asked to handwrite recollections of their own experiences. They were asked to bring to mind experiences in their own life where they felt either firmly in control or did not feel in control. They were given three minutes to complete that exercise, followed by a prompt asking them to make judgments about their experience. After all trials, participants completed a brief demographics questionnaire, the RFQ, and the RMQ. Following the questionnaires, participants were asked to recall as much information about each vignette as they could. They were given 15 minutes to do so. Participants typed recall responses into a Microsoft Word document that the experimenter opened on the computer screen.

Design. The experiment was a 2 (prompt type) x 2 (vignette moral category) factorial design. The simulations and recollections used either a situation that was likely to generate high or low feelings of agency. Morality vignettes depict either moral or immoral acts. Following each simulation and recollection, participants made JOAs and judgments of vividness (JOVs). JOAs were given in response to the question, "How much in control did this situation make you feel?" on a sliding scale from 0 to 1, with 0 meaning "No Control" and 1 meaning "Full Control." JOVs were given in response to the question, "How vividly were you able to imagine this situation?" on a sliding scale from 0 to 1 with 0 meaning "Not At All" and 1 meaning "As If I Experienced It." Participants gave moral judgments following presentation of each morality vignette. Moral judgments were given in response to the question, "How morally right or wrong do you think the behavior was?" on a sliding scale from 0 to 1, with 0 meaning "Very morally wrong" and 1 meaning "Very morally right." For the free recall portion at the end of the experiment, participants wrote recollections onto a blank Word document on the computer screen. (See Appendix F for the specific instructions given to each participant.)

The pairing between simulation/recollection prompt types and vignettes was randomized, and every pair of participants was yoked such that the even-numbered participant saw the flipped version of the stimuli set presented to the prior odd-numbered participant. Randomization of pairings between prompt types and vignettes occurred for every odd-numbered participant. The following even-numbered participant saw the flipped pairing such that the subset of vignettes paired with the in-control prompt for the prior participant was paired with the not-in-control prompt for the current participant, and so forth. This randomization scheme was used in order to prevent certain vignettes from being disproportionately paired with the same prompt type and to

prevent the same vignettes from always being clustered together with the same prompt type. The order of trial presentation was also randomized.

Results

Judgments of agency. There was a main effect of prompt type, $F(1, 49) = 607.09$, $p < .001$, $\eta^2 = .87$, such that mean JOAs were significantly larger for the control prompts ($M = .84$, $SD = .11$) than the not-in-control prompts ($M = .19$, $SD = .11$). There was also a main effect of prompt quality, $F(1, 49), = 6.95$, $p = .01$, $\eta^2 = .01$, such that mean JOAs were significantly larger for episodic simulations ($M = .52$, $SD = .05$) than for the autobiographical recollections ($M = .50$, $SD = .04$), indicating that the simulations generated slightly higher feelings of agency across both prompt conditions than the recollections. There was also a significant interaction, $F(1, 49) = 13.76$, $p < .001$, $\eta^2 = .09$, such that the effect of the prompt type manipulation (control/not-in-control) was more pronounced for the autobiographical recollections, suggesting that when people used their own memories to achieve an internal state of feeling relatively in control or out of control, the experience generated more intense feelings (Figure 24).

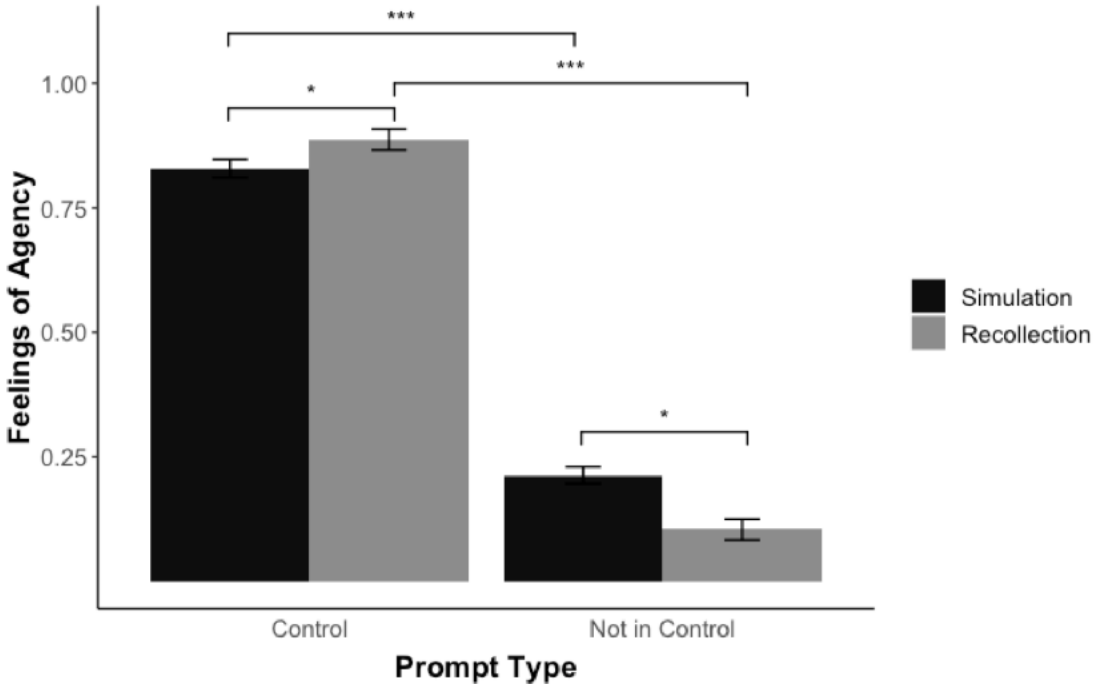

Figure 24. Effects of simulations and recollections on feelings of agency

The analysis functioned as a manipulation check, showing that the different prompt types generated feelings of high and low agency. Simulations generated higher feelings of agency than recollections, and people report more extreme feelings during recollections than simulations.

Judgments of vividness. There was a main effect of prompt quality, $F(1, 49) = 113.18$, $p < .001$, $\eta^2 = .38$, such that mean JOVs were significantly larger for the autobiographical recollections ($M = .94$, $SD = .10$) than the episodic simulations ($M = .74$, $SD = .14$). This effect showed that participants' personal recollections of feeling in control and not in control were experienced more vividly than the simulations. There was no main effect of prompt type, $F(1, 49) < .001$, $p = .99$, and no interaction, $F(1, 49) = .003$, $p = .95$.

Self-regulatory orientations. There were no significant associations among self-regulatory orientations and JOAs. A summary of these results can be found in Table 10.

Table 10. Regulatory focus and regulatory mode results

Results shown are descriptive statistics for each of the self-regulatory orientation measures and Pearson's r correlations between each measure and JOAs for each of the in-control and not-in-control prompts. None of the correlations were statistically significant.

			In-Control	Not-in-Control
	M	*SD*	*r*	*r*
Promotion	3.73	0.60	.02	-.37
Prevention	3.23	0.78	.11	.06
Locomotion	4.31	0.73	.05	-.09
Assessment	4.25	0.69	.09	.08

Moral judgments and intensity ratings. There was a significant difference in mean morality judgments between the moral acts (M = .82, SD = .12) and the immoral acts (M = .15, SD = .11), $t(49) = 22.94$, $p < .001$, 95% CI [.60, .72], d = 5.78, showing that participants' judgments aligned with the a priori grouping and were consistent with prior experiments. The linear effect of JOA on moral judgment intensity was not statistically significant, b = .004, $t(42) = 0.34$, p = .73, 95% CI [-.02, .03]. The quadratic model showed a significant effect of squared JOAs on moral judgment intensity, b = .16, $t(47) = 2.50$, p = .02, 95% CI [.03, .30] (Figure 25a).

Moral judgment intensity in relation to judgment of agency intensity. There was a significant effect such that agency judgment intensity positively predicted moral judgment intensity, b = .09, $t(45) = 2.11$, p = .04, 95% CI [.004, .18] (Figure 25b).

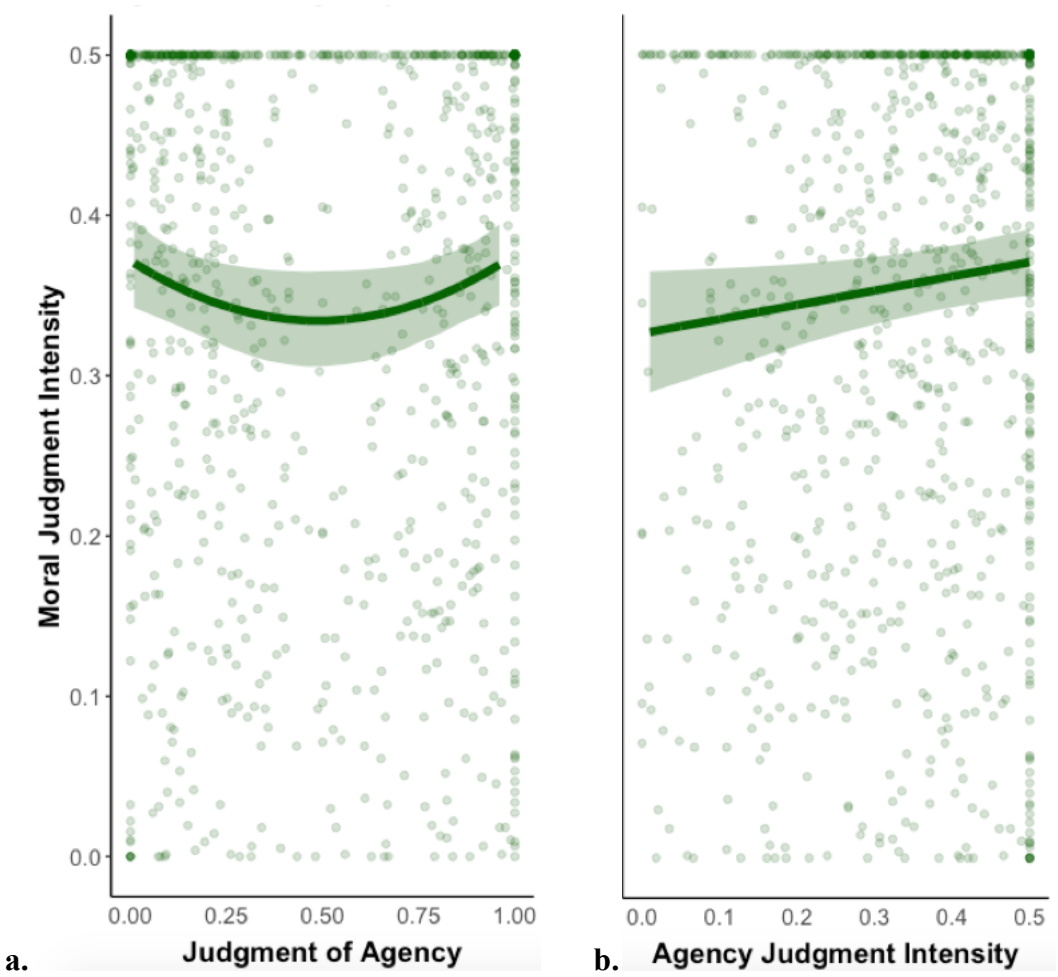

Figure 25. Effects of JOAs and JOA intensity on moral judgment intensity

Agency judgment intensity was computed by taking the absolute value of the difference between the raw agency judgment (rating from zero to one) and the midpoint of that scale, 0.5. The intensity judgments, therefore, ranged from zero, meaning the participant gave a JOA exactly in the midpoint of the scale, to one, meaning the participant registered a JOA at one of the extreme ends of the scale.

Between-subjects agency sensitivity. There was an effect of agency sensitivity on mean moral judgment intensity such that sensitivity positively predicted intensity, $b = .84$, $t(48) = 9.04$, $p < .001$, 95% CI [.66, 1.03] (Figure 26).

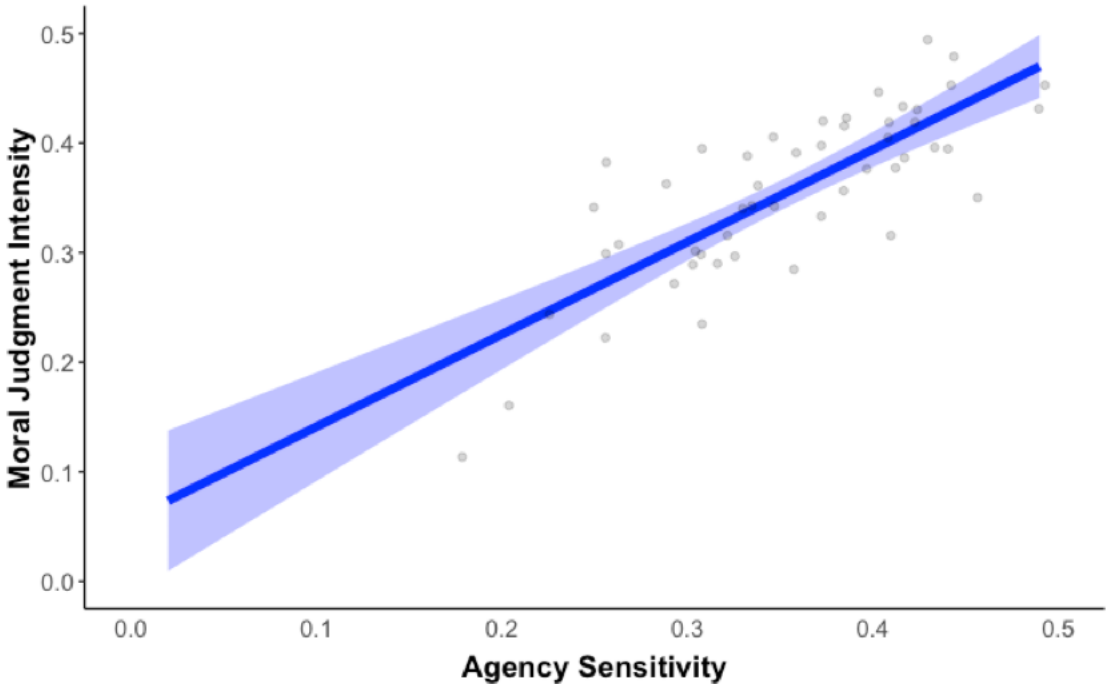

Figure 26. Effect of agency sensitivity on moral judgment intensity

Agency sensitivity significantly predicted mean moral judgment intensity. Shaded region represents the 95% confidence interval of the regression line.

Recall. There were no significant differences in recall as a function of prompt type and vignette type nor were there any significant effects of moral judgment intensity and agency judgment intensity on recall.

Discussion

The findings supported the hypothesis that the within-subjects relationship between the moment-to-moment sense of agency and moral judgment intensity is quadratic such that both extremely low and high feelings of agency lead to more intense moral judgments. These results are consistent with the findings from the experiments described in chapter V – VII. Moreover, because episodic simulations and autobiographical recollections rather than the space pilot game were used to manipulate felt agency in this study, these results suggest that the effect generalizes to self-relevant, non-motor control manipulations. The results also supported the hypothesis of a

between-subjects relationship showing that people who exhibit the highest degree of agency sensitivity give the harshest moral judgments. That effect in this experiment appeared to be stronger than that effect in the prior three, suggesting that self-relevant feelings of agency, in contrast to those generated during a motor control task, may relate more strongly to moral judgment intensity. There were no significant effects on memory recall, suggesting that feelings of agency, induced in the manner set forth in this experiment, do not impact recall for morality vignettes.

The memory findings from this and prior experiments do not support the notion that the sense of agency, when generated unrelated to the learning or memory task, enhances memory. Only in chapter VII did the data reveal a significant effect of agency on memory. But given the dual-task nature of that experiment, it is possible that the diminished memory when stimuli were encoded during the turbulence game may have been due to dual-task interference (Pashler, 1994) and not memory enhancement from feeling in control during the standard game. It is possible that effects of being in control on memory require that the action that generates the feelings of agency be linked, in some way, to the memory task, whether by making a choice about to-be-remembered information or generating information from one's own knowledge store in response to a prompt.

IX. General Discussion of the Effect of Agency on Moral Judgment

Across four experiments (chapters V – VIII), findings indicated that the intensity of agential experiences relates to the intensity of moral judgments of others' actions. A person who feels either intensely in-control of their actions or deeply lacking control is likely to make harsher moral judgments of another's behavior. Moreover, individual differences in agency sensitivity – the magnitude of the change in feelings of control in response to influencing factors – was related to individual differences in moral judgment intensity. People who were more sensitive to changes to their own felt agency tended to be harsher moral judges of others' behavior.

Support for these claims came from four experiments that tested the effects of feelings of agency on moral judgment. In three of the four experiments, feelings of agency were manipulated using a dynamic motor task that resembled a videogame. The intensity of feelings of agency derived via that task related to the intensity of moral judgments made in response to behavior described in morality vignettes. These vignettes depicted either generally moral behavior (e.g., helping others, self-sacrifice) or immoral behavior (e.g., theft, deceit, harming others). The effects were found in contexts when the agential experience occurred both *prior to* and *concurrent with* presentation of the to-be-judged behavior. The fourth experiment introduced episodic simulations and autobiographical recollections as agency manipulations. That experiment revealed similar results to the prior three, indicating that the previous findings were not specific to feelings of agency experienced during a motor manipulation. In fact, the agency sensitivity effect was strongest in this final experiment, suggesting that self-relevant feelings of agency may have a larger impact on moral judgment intensity than those generated in a neutral motor control paradigm.

Prior experimental research (Cornwell & Higgins, 2019) had shown that people who feel more in control express more extreme moral judgment; people who reported higher feelings of control also gave harsher moral judgments. Those findings were replicated here, at the high end of the control scale, but the presents results suggest there is more to the story. It is likely that those findings did not extend to the full range of the control scale. In that work, the object of the sense of control measure (i.e., the task about which people reported feelings of control) was the act of making moral judgments, a relatively easy task. In the experiments presented in chapters V – VIII, the object of JOAs was the experience of performing the space pilot task, which was sometimes easy and sometimes not. It is possible that the positive linear relationship observed in Cornwell and Higgins (2019) may pertain to feelings of control over the moral judgment task itself. The mean control measure across their three studies in which it was measured was approximately 7.50 on a 9-point scale, and the mean standard deviation was approximately 1.40. People, in general, then, felt largely in-control of performing the task. That raises the possibility that the lack of truly low-control experiences in their sample was the reason why that work did not reveal the phenomenon observed in the present work whereby low-control states also lead to moral intense moral judgments.

Despite that relationship between the two sets of empirical results, the prevailing explanation for the prior research – the notion of attributive projection – cannot fully explain the present findings. To recap, attributive projection refers to the general idea that people use their own internal states – emotions, sensations, motivations – as models or anchors that influence their judgments of others (Murstein & Pryer, 1959). According to that account, the reason there is a positive relationship between feelings of control and moral judgment of others' action is that one's own high sense of control causes a person to infer that the actor feels a comparable degree

of agency. People who have a strong sense of control for their own actions are typically viewed as more responsible (Weiner, 1995). And the more responsible a person is for his own actions, the more deserving of condemnation or praise in the context of immoral or moral behavior.

While plausible in many ways, the attributive projection account cannot explain the data presented in chapters V – VIII. If it indeed were the case that people used their own feelings of agency to infer those of others, then the data would have shown a positive monotonic relation between the magnitude agency judgments and intensity of moral judgments. In low-agency states, people should have judged the behavior of others *less* harshly, if they believed that the actors depicted in the vignettes also were experiencing low-agency states. Instead, the data from these four experiments showed that low-agency states, as well as high-agency states, led to more extreme moral judgments, indicating that a different explanation of the relation between feelings of agency and moral judgments is needed.

One possible explanation relates to the action of two distinct sets of cognitive processes. It may be possible that on the positive side of the JOA scale, when people reported feeling generally in control, attributive projection processes may have been responsible for the relationship. When people feel some baseline level of control, they may start to use their own experience as a proxy for the actor. But below that threshold, attributive projection may be overwhelmed by a second set of processes related to compensatory control (Friesen, Kay, Eibach, & Galinsky, 2014; Kay, Whitson, Gaucher, & Galinsky, 2009). That framework argues that when a person lacks a sense of control, cognition becomes biased toward imbuing a greater sense of order in the world around them. One means of doing this may be by increasing endorsement of objective standards and moral structure, which may manifest in harsher moral judgments of others' behavior. The motivation to view the world as orderly and structured may

represent a deeper psychological need than any tendency to view others as experiencing a similar internal state as oneself. Therefore, during low-agency states, the need to restore order and structure supersedes attributive projection processes. Only when a baseline sense of agency returns to the individual can attributive projection begin to influence judgments of others.

Another possible explanation pertains to the relation between extreme agency states and the sense of self. When people feel either firmly in control or distinctly lacking control, the sense of self may become more cognitively accessible, leading people to lend more weight to the notion of an autonomous self when judging the behavior of others. In the former case, when people feel in control, the metacognitive system that underlies metacognition of agency is producing the output that the self is in control. The actor receives information that they, *themselves*, are performing the act. In the latter case, when people lack control, the system reports a discrepancy, signaling the actor to course correct if they wish to continue an action in line with their original intentions. In both cases, the signal from the metacognition of agency system is strong and may amplify the sense of self. In contrast, if a person's sense of agency is neither extremely high or low, the signal from the system is less clear. Such a mechanism may explain the nonlinear relationship between intensity in agency judgments and morality judgments.

The between-subjects finding across all four experiments in chapters V – VIII suggests that individuals differ in their sensitivity to factors that influence their sense of agency. This difference relates meaningfully to their judgments of others' actions. People who are most sensitive along the agency dimension tend to also make the most intense judgments of others' behavior. This effect appeared to be strongest in chapter VIII, when self-relevant stimuli were used to manipulate feelings of agency, suggesting that sensitivity to factors that influence a

person's sense of agency in their own lives may be particularly strongly related to their judgments of the behavior of others. The notion of agency sensitivity is supported by some research on the relationship between methamphetamine and feelings of agency (Kirkpatrick, Metcalfe, Greene, & Hart, 2008). In that experiment, a 12-mg dose of methamphetamine caused people to report higher feelings of agency than placebo in the standard version of the space pilot game and at the same time lower feelings of agency in the turbulence condition. Thus, the drug made people more sensitive along the agency dimension and made their control states feel more extreme. The data from the experiments presented here supported the idea that such extremity has implications for judgments of others' behavior. When a person is sensitive to their own level of agency, they seem to project that sensitivity on to their judgments of others. In that sense, the attribution that gets projected is not the internal state itself, but the sensitivity along the agency dimension.

Further work is necessary to better understand the relationship among control states, agency sensitivity, and judgments. These experiments are limited in that the moral judgments are made about others' behavior, which raises the question as to how one's sense of agency impacts a person's judgments of their *own* behavior. Some evidence suggests that being the agent who makes a decision (as contrasted with taking an action ordered by someone else) may, under some circumstances, attenuate judgments of moral culpability and of regret (Malter, Kim, & Metcalfe, 2020). This attenuation does not occur when they judge another who either makes the decision or obeys orders. It is possible, therefore, that different processes are at play when people judge others than when they judge themselves.

Overall, chapters V – VIII extend our understanding of the relationship between agency and moral judgment. Experiences of extremely high or low control tend to produce more intense

moral judgments, and people who exhibit the highest degree of agency sensitivity seem to also make more intense judgments of others' actions. In that sense, one consequence of agential experiences is that they appear to tune one's moral lens. When we assert agency, whether we succeed and feel firmly in control, or fail mightily and feel like we've lost our grip, the act of taking an action and making use of the innate human capacity to act as an agent, may augment our use of moral structures when we judge the world around us.

X. Conclusions

The experience of taking action in pursuit of desired ends has meaningful psychological consequences. Feelings of agency that arise from actively engaging with the environment influence motivation and moral judgment. People tend to choose experiences that confer high feelings of agency, even at the expense of desired outcomes. People are more sensitive to action execution than effect contingency such that they will accept reduced contingency in exchange for smooth execution. In the realm of moral judgment of others' behavior, extreme feelings of agency, whether they entail strong feelings of control or intense feelings of lacking control, lead to more extreme moral judgments. In addition, people who tend to be highly sensitive to disturbances to their own sense of agency tend to make more intense judgments of others' actions.

Each insight gleaned from this work contributes to its respective field. Motivation science gains understanding of the relative motivational weights of means versus ends, and how feelings of agency influence preferences. The work advances moral psychology by adding intensity of the sense of agency to the list of elements of the observer's internal milieu that influence moral judgments. And personality research benefits from the glimmer of a new individual difference attribute – agency sensitivity – to better explain heterogeneity in psychological processes.

From the perspective of motivation science, the findings bolster and extend the literature that suggests that feelings of control experienced during task performance are inherently valuable (e.g., Bobadilla-Suarez et al., 2017; Leotti et al., 2010; Wang & Delgado, 2019). Not only are people motivated to seek the opportunity to make choices (Bown, et al., 2003; Suzuki, 1997) or simply take actions that generate reliable and immediate effects (Eitam et al., 2013; Karsh &

Eitam, 2015; Karsh et al., 2016) but they discriminate between actions that vary in terms of the feelings of control induced. People prefer tasks that generate higher feelings of agency. These tend to correlate with tasks that promise smooth action execution. That preference is strong enough to persist across circumstances where choosing high feelings of agency translates into reduced receipt of a desired outcome. People would rather control the action fully, even it means sacrificing outcome. These contributions lay the groundwork for follow-up research to more deeply probe the precise dynamics and boundary conditions of the motivational consequences of feelings of agency, including the tension between means and ends, and how people navigate tradeoffs between the two.

Such research has implications for other fields of psychological study, such as learning and memory. The distinguished memory scholar Robert A. Bjork has argued for the notion of desirable difficulties in the realm of learning. Experiences that challenge people or make them uncomfortable, such as changing the conditions of learning, interleaving target information, and repeated testing, often help with long-term learning (Bjork & Bjork, 2011). But people can be reluctant to engage in such practices due to the additional effort often required (hence "difficulty), even though their efforts would likely promote long-term learning (hence "desirable"). The difficult but desirable practices can be seen as a kind of turbulence condition, as they may interfere, at least initially, with existing, more seamless study habits, such as massed practice or rereading material. Indeed, in chapter III, if people were focused exclusively on desired ends, they should have chosen the turbulence condition at the expense of the 70% duds condition. But instead, they sacrificed desired outcome in exchange for an easier experience. When students take the same approach in learning contexts, they may miss opportunities to enhance their own learning. Understanding how people balance desired ends with the experience

of undertaking the means can help to devise strategies that motivate people to engage in more difficult, but ultimately more rewarding, pro-learning strategies.

Another area in motivation research ripe for further study pertains to the relative weights of means and ends. Presumably, if an end were sufficiently valuable (e.g., $100 per X popped in the space pilot game), most people would be willing to tolerate substantial disturbances to their sense of control in order to attain such an end goal. Indeed, the classic film *It's a Mad, Mad, Mad, Mad World* (Kramer, 1963) brought to life the unfortunate yet occasionally hilarious human tendency to willingly endure absurd means in pursuit of a hefty monetary sum. But if everyone has their price, everyone also has their red lines that they pledge never to cross. Meat Loaf, the popular recording artist of the 1980s and 1990s, told us, "I would do anything for love…but I won't do that" (Steinman, 1993), which suggests that people have their boundaries, even when it comes to that which we desire most. It is clear from the experiments in chapters II – IV that people were not willing to tolerate disturbances in the movement of the on-screen cursor in order to pop more Xs. Participants' feelings of agency experienced during the means of goal pursuit, therefore, represented a meaningful component of the means experience that influenced subsequent choice behavior. Future research can extend this and other work (e.g., Wang & Delgado, 2019) by identifying the precise value of perceived control across a range of contexts. Other factors of the experience of the means, such as liking, confidence, and feelings of being in the zone, can be studied in this frame as well.

The work discussed in chapters V – VIII adds to the growing subfield in moral psychology that studies how states and traits of the observer influence their judgments of others (e.g., Graham et al., 2009; Miller & Cushman, 2013; Schnall et al., 2008). That course of inquiry relates to a larger movement within psychology to emphasize the variability or heterogeneity of

processes that govern human behavior (Bolger, Zee, Rossignac-Milon, & Hassin, 2019). While there may be universal rules of moral judgment based solely on the circumstances surrounding the actor, complexities and inconsistencies may best be understood by investigating why judgments differ among individuals. Existing research suggests that the observer's motivational orientation (Cornwell & Higgins, 2013), political ideology (Janoff-Bulman et al., 2008), and physical sensations (Eskine et al., 2011) play a role. The findings described in chapters V – VIII suggest that another driver of individual differences in moral judgment is the intensity of the observer's feelings of control.

One crucial area of follow-up is the question of why feelings of *both* high and low agency lead to more intense moral judgments. Chapter VIII presented two possible accounts: the dual-process account and the self-amplifying account. The dual-process account says that two processes are at play – attributive projection, when people feel largely in control, and compensatory control, operating when people report a distinct lack of control. According to that explanation, the need to believe that the world has structure and order takes over the mind's tendency to use the self's internal state as a model for the actor's inner world. Such a process can only occur once the self has attained a comfortable baseline sense of order. Compensatory processes, therefore, operate at low levels of control, whereas attributive projection processes occur at higher levels. In contrast, the self-amplifying account argues that both strong feelings of lacking control and strong feelings of being in control increase the salience of the concept of the individual self in the observer's mind. In turn, that promotes greater attribution of the behavior to the individual committing the act rather than external circumstances, which would manifest as more extreme moral judgments.

There are likely many ways to begin to identify which account best explains the phenomenon. One path would involve directly testing elements of each account. For example, researchers could test whether low feelings of agency lead to increased endorsement of objective standards and moral structure, which is an underlying assumption of the dual-process account. That account would predict that people feeling a lack of agency would be more likely to see the world in black and white rather than shades of gray. Such a distinction could be tested by asking for people's level of agreement with statements such as, "People should live their lives according to strict rules." That way, the role of lacking control on moral outlook could be tested without asking for explicit judgments of the moral rightness and wrongness of others' behavior. In addition, researchers could devise ways to study schema accessibility related to the concept of the individual self to see whether extreme agency states show similar activation patterns. Regardless of the precise methods, the path to understanding why extreme agency states enhance moral judgment intensity is an important avenue to pursue.

Lastly, the between-subjects findings introduced in chapters V – VIII suggest that agency sensitivity is a meaningful individual difference measure. When performing a task, two people may report two different judgments of control, and that difference has consequences for moral judgment and possibly other domains. That raises the question of whether that difference is distinct from other measures of individual differences in sensitivity. One possibility is that agency sensitivity is simply one manifestation of broader sensitive tendencies (Aron, 1996; Benham, 2006). Individual differences in sensitivity have historically relied on self-report measures (Aron & Aron, 1997). To the extent that agency sensitivity relates to sensitivity more broadly construed, findings discussed in chapters V – VIII may suggest the opportunity for a task to more directly identify individual differences along that dimension. Follow up research that

examines that relationship between feelings of agency reported during task performance and self-report responses to sensitivity questionnaires would shed light on the nature of that connection.

The existence of human agency implies that all researchers get to choose what to study. They may be nudged in certain directions by interests, hunches, or the winds of the zeitgeist. But, as human beings, we decide which actions to take and which directions to pursue. Those directions may confer different feelings of agency. The untrodden by-way may make for an uncertain journey, full of precarious steps and blind corners, but promise an enlightening vista at its end. Whereas the well-worn route may secure easy passage yet deliver nothing more than a potpourri of commonplace flora. Regardless of the route, it is hoped that researchers will choose to venture down an avenue that promises answers to the questions laid forth by this work, and continue the scientific study of human agency and its psychological consequences.

In that sense, human agency is not only the bedrock of history, but of science, too. Insight, understanding, technological advancements, treatments, vaccines, and other scientific breakthroughs happen because people intentionally take action in pursuit of some goal. The benefits of the *ends* of scientific inquiry can hardly be overstated. But, as this work suggests, the *means* affect us, too. The means of all human action represent agential experiences that may significantly influence how we think, act, and view the world around us. The better we understand those consequences, the more insight we gain into the human condition and the lens through which we see each other.

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Appendix A: Morality Vignettes

Chapter V

Morally Right

A. Adherence to personal beliefs

A woman finds herself under scrutiny for her outspoken support of religious beliefs that her co-workers find offensive. Her boss tells her that if she publicly recants her beliefs and writes a letter of apology to her fellow employees, then she can keep her job. But if she insists on holding them, she will be fired without severance. The woman refuses the offer and loses her job instead of giving up her beliefs.

B. Sticking to plans with needy friend

A young man has made dinner plans with an acquaintance who doesn't have many friends and who is going through hard times and needs to talk to someone. He then receives an invitation from his best friend to a party that same evening. Upon telling his friend that he already has plans, he learns that the girl he's been really interested in asking out will also be at this same party. Even so, he tells his friend thank you for the invitation, but that he's sticking to the plans he has already made. He does say that he will try to come to the party afterwards.

C. Volunteer tutor

A scholarship student at an urban college sacrifices her time on Tuesday evenings to tutor at-risk teenagers who are doing poorly in school and who live in a dangerous neighborhood where the student grew up. For doing so, the student feels deeply satisfied and feels as if she's making a positive contribution to the community. However, her own college grades suffer because she devotes less time to studying in order to make time for tutoring.

D. Adoption

A married couple that has just discovered that they are infertile decides to adopt a child. Rather than adopting a newborn baby, they adopt a handicapped young girl who has been in foster care for several years. For doing so, they receive a tax break from the federal government.

Morally Wrong

E. Cheating on exam

A student is taking an exam for which he did not study much. He occasionally copies the answers of the girl sitting next to him, whom he knows studied for the exam thoroughly. He doesn't score as well as she does, but no one discovers what he did, and he gets a fairly good score.

F. Showing favoritism in promoting decisions

An executive decides to give one of his employees a raise. Rather than assess job performance, he decides loyalty is more important and gives the raise to one of his friends whom he hired a few months ago. In doing so he passes over a number of other more competent employees that have been with the company much longer than his friend.

G. Deception and stealing

A man named Bill loses his job and feels he needs money. Bill goes to a retired old man who is known to help people in town. He explains that he is very sick and that he needs a thousand dollars to pay for an operation. Although the old man doesn't know Bill very well, he lends him the money. Bill skips town with a thousand dollars and never returns.

H. Unprovoked physical assault

A man named Jim goes drinking at a bar with friends after learning his wife wants a divorce. Initially, Jim's friends do their best to cheer him up. However, without provocation, begins to shout insults at another group of men at the bar. The exchange quickly escalates, and Jim gets up from his table, goes over to the other group, and starts punching one of the other men in the face. Jim's friends quickly break up the altercation but not before Jim breaks the nose of his target.

Ambiguous

I. Heinz dilemma

A man's wife is very ill with a rare cancer. Doctors think only one particular drug can save her. The drug is a form of radium developed by a biochemist in the same town. The drug is very expensive to make, and the biochemist only has enough for one person, so he is charging a premium for it. The husband works as hard as he can to collect money from friends in the area but is not able to raise enough to afford the drug. So he becomes desperate and breaks into the biochemist's laboratory to steal the drug and save his wife.

J. Diagnosis reveal

A doctor diagnoses a man with a rare and deadly disease. Though he won't experience any pain or suffering, the man will die in 6 to 8 weeks. Somehow, the girlfriend of this man hears the diagnosis before him and begs the doctor not to tell him. She explains that her boyfriend has always wanted to visit Africa and they're planning to leave on that trip together, and that this news would completely ruin his experience. Since he is going to die anyway, she asks the doctor to wait until after the trip. However, hospital rules and regulations dictate that the doctor must report every diagnosis to patients as soon as they're able to, and so the doctor tells the man despite his girlfriend's objections.

K. Hitting at school

A young teacher works at a private elementary school. The school has one zero-tolerance rule for students: no hitting. At recess, one student, Elliot, approaches her claiming that another student, Sarah, has hit him. Upon being confronted by the teacher asking why she hit Elliot, Sarah simply replies, "I don't know." The teacher then says, "Now you know what happens when you hit another student, right?" Upon hearing this, Sarah turns to Elliot and says, "I'm sorry, Elliot." Though she finds this apology touching and doesn't herself agree with the school's policy, she decides to follow the school's rules, "No. There is a zero-tolerance rule for hitting, so you need to be sent home." She sends Sarah home in accordance with the school's policy.

L. Medical dilemma

A doctor is the principal investigator on a clinical trial examining the efficacy of a new autism drug. Preliminary findings suggest it may be effective, but it has yet to be licensed or approved by the FDA. The doctor's nephew has autism, and the family has yet to find adequate treatment. Going against medical ethics – and in direct violation of the internal review board's human subjects protection protocol – the doctor gives the drug to his sister for his nephew to try.

Chapter VI – VII

Morally Right

1. Sticking to plans with needy friend

Sam makes dinner plans with an acquaintance who doesn't have many friends and who is going through hard times and needs to talk to someone. He then receives an invitation from his best friend James to a party that same evening. Upon telling James that he already has plans, Sam learns that the girl he's been really interested in asking out will also be at this same party. Even so, Sam says thank you for the invitation but that he's sticking to his dinner plans. He does let James know that he will try to come to the party afterwards.

2. Taking a bullet for a fellow soldier

Two soldiers are in a warzone in the midst of combat. John is 29-years-old, single with no children. He graduated at the top of his class from West Point and plans to attend law school and become a public defender once he leaves military service. Frank is 27, happily married, father of three, and plans to spend his entire career in the army. While in the trenches, John sees an enemy assailant stand up and fire at Frank. It's too late for John to warn Frank to duck, so he leaps in front of him and takes the bullet for him.

3. Help crossing the street

An elderly man named Matthew approaches a busy intersection struggling to carry two large bags of groceries. He spills the groceries while crossing the road and bends down to try to pick

them up. The first car in line at the intersection does not see Matthew and starts to move forward. Jessica, a young woman who has been waiting 30 minutes for her bus at a nearby stop, notices what's happening. Even though she finally sees her bus approaching, Jessica runs to the intersection to stop the car and help Matthew. Jessica misses her bus and must wait for the next one.

4. Adoption

Betsy and Christopher are married and have been trying unsuccessfully for months to have a child. They visit a fertility specialist and learn that Betsy has a hormone imbalance making it impossible for them to conceive. Christopher initially wishes for them to adopt a newborn. However, they choose to conduct a thorough search and consider children of all ages. After researching the lives of foster children, they are overcome with compassion for the needy children who have been in foster care for several years. So Betsy and Christopher decide to adopt a young girl with many health complications whom many sets of eligible parents had passed over.

5. Concert tickets

Amanda and Roberta are known around the office for being the world's biggest Lady Gaga fans. Lady Gaga is performing a special one-night-only live concert in their town. Amanda is the only one of the two who has a ticket, and she has been looking forward to the concert for months and is extremely excited to attend. The day before the concert, she learns that Roberta got fired and tomorrow is her last day. Amanda tries to buy a ticket for her as a farewell gift, but the concert is sold out. So she insists Roberta take her ticket and see the concert in her place.

6. Helping person in need

Sarah is homeless. She had been staying with a friend named Hannah but was caught stealing and forced to leave. Now, she depends on shelters and handouts to survive. A charity arranges a job interview for Sarah. However, the charity cannot provide funds for appropriate clothes and transportation, so she resigns to miss the interview. Hours before she would have to catch the train to the interview, Hannah passes her in the street. Hannah gives Sarah enough money to buy a new outfit and a roundtrip train ticket so she can attend the interview, which results in a job offer.

7. Scholarship student

Michelle is a scholarship student at an urban college near where she grew up, and she works part-time on weekday evenings as a waitress to help pay for school. She gives up her shift on Tuesdays to volunteer as a tutor for Sandra, an at-risk high-school student who is doing poorly in school and lives in a dangerous neighborhood where Michelle grew up. She sees a younger version of herself in Sandra – unfocused, lost, and questioning the point of academic pursuits. While Sandra is often a struggle to teach, Michelle perseveres and devotes her time and effort to help improve her chances for success.

8. Standing up to terrorism

Martin grew up and lives in a community that supports terrorism. He learns that his good friend Gregory has helped plan an imminent attack on a major city subway system that would kill hundreds of people. Martin passionately disagrees with Gregory's plan, and the aims and tactics of terrorists in general, but he recalls a rumor that the last member of the community to speak out against terrorism disappeared mysteriously. Nevertheless, he chooses to sound the alarm and reports the plot to international authorities. They foil the plot and the attack never takes place. However, Martin worries that Gregory suspects that he betrayed them and decides to flee the community.

9. Stopping a fight

Jeffrey watches his friend Michael get into a political argument with a stranger at a bar. At first, the two engage in a friendly back-and-forth. However, within minutes, the two start shouting over each other. The tension reaches such a height that the stranger suddenly spits in Michael's face. Overcome with anger, Michael rolls up his sleeves and gets ready to punch the stranger in retaliation. Before he can follow through with the strike, Jeffrey intervenes. He steps between them but gets knocked down by accident. When they see that they may have hurt Jeffrey, they immediately stop fighting and feel remorse for letting the argument get out of hand.

10. Whistleblowers

Maria and Robin work at a bank in a group that creates and markets complicated financial instruments. They work on a product that has generated millions of dollars in revenue. However, Maria and Robin's analyses indicate that the underlying mechanism behind the product is fraudulent. Investments in the product, including pension funds, will likely lose nearly all of their value in the near future. The financial wellbeing of ordinary people will be in jeopardy while the bank will profit handsomely. Maria and Robin try to sound the alarm to their superiors, but no one listens. So they gather evidence on a flash drive and report their concerns to financial regulators.

Morally Wrong

11. Cheating on exam

Patricia is taking a calculus final for which she did not study. She needs to pass the class in order to graduate. Patricia is generally hard-working and is the first in her family to attend college. She feels pressure to do well. During the exam, she sits next to Nicole and copies many of her answers since she knows Nicole is the top student in the class and studied thoroughly. She doesn't score as well as Nicole does, but she gets a fairly good score. Patricia passes the class and graduates on time, making her family very proud. No one discovers what she did.

12. Showing favoritism in promoting decisions

A small tech company enjoyed a record-setting year. Rebecca, an executive, decides to give one employee a raise. Jennifer is a mid-level employee who has been with the company since its founding. Jennifer is the hardest worker at the firm, and her innovations contributed to much of the company's success. But rather than award the raise on the basis of performance, Rebecca decides that loyalty is more important. Rebecca gives the raise to a friend whom she hired a few months ago. In doing so, she passes over Jennifer and many other more competent employees who have been with the company much longer.

13. Deception and stealing

Bill loses his job and needs money. He goes to his former mentor, Peter, who volunteered as his Big Brother in high school, helping him to succeed in school and set his life on a better course. Peter is now a retired old man who is known to help people in town. When the two meet, Bill fabricates a story, explaining that he is very sick and needs a thousand dollars to pay for an operation. Although Peter lives on a modest fixed income, he lends him the money. Bill skips town with the thousand dollars and never returns.

14. Medical dilemma

Dr. Samuelson is the principal investigator on a clinical trial of a new autism drug. Preliminary findings suggest it may control symptoms, but several participants have reported life threatening adverse effects. The drug is not approved by the FDA, so physicians cannot prescribe it. Because of the safety issues, the study may soon end. Dr. Samuelson's nephew, William, has autism, and the family has yet to find adequate treatment. Their family is in tatters from dealing with William, and they are desperate for a solution. Going against medical ethics and in violation of the internal review board's human subjects protection protocol, Dr. Samuelson gives the drug to William.

15. Police officer bribery

Officer Johnson, a state trooper, pulls over a car for speeding on the highway. Edward, the driver, had been traveling at a rate 30 mph over the speed limit, and he was driving recklessly. When the officer asks the driver for his license and registration, he sees that he is wearing a very expensive watch. Edward begs Johnson not to write a ticket because one more ticket will cause his license to be suspended. Even though his driving was endangering other drivers, Johnson tells Edward that if he gives him his watch, he'll tear up the ticket and pretend it never happened. He complies.

16. Damaging tweet

Jane is a college student volunteering for a congressional candidate. One day she overhears fellow volunteers wondering whether the opponent might have had an affair with a girl named Emily whom Jane knew in prep school. She knew Emily to be straight-laced and upright, so she is sure the rumors are false. Nevertheless, she tweets an innocent question about the opponent and Emily to her prep school friends, suspecting they might believe it, and possibly retweet it.

They not only confirm her suspicions but send suggestive pictures from years past. Jane tweets the images to a friend from the campaign. The rumor and images go viral.

17. Theft for $$ and entertainment

Lee robs homes for the thrill of it as well as the money he earns from selling stolen goods. He has robbed many homes in a wealthy Boston neighborhood and has not been caught. Lee wears the stolen jewelry in order to flaunt his spoils. His friend Henry tells him to stop, but he doesn't listen. During a recent job, he took $50,000 worth of jewelry, a diamond ring, a Rolex watch, and a TV. The diamond ring had been in the family for two generations. Because Lee suspected that the ring might be recognized, he sold it to his friend Henry. He neglected to tell Henry it was stolen.

18. Workplace bully/bullying boss (adapted from Newman, Bloom, and Knobe, 2014)

Rachel was an excellent mid-level manager at a marketing firm. She treated her co-workers and her superiors very well. She never yelled or embarrassed them. In fact, she went out of her way to help everyone. After her promotion to senior manager, she began disparaging the people she used to work with and publicly embarrassing them for minor infractions. At a recent meeting, Joe, one of her former co-workers, cited a statistic that Rachel knew to be incorrect. Instead of letting it pass, Rachel chastised Joe for five minutes in front of his co-workers, calling him stupid and incompetent and threatening to fire Joe if he didn't improve.

19. Adultery

Lizzie and Brian have been married for eight years. Things started out well, but recently Lizzie began feeling bored and craving excitement. She started having an affair with a co-worker. Two nights a week, she said she was going to yoga, but she secretly met her lover instead. A few months into the affair, Brian began to suspect that something was wrong. One evening when the two were at home, he gently broached the topic with Lizzie. She immediately denied everything and implied that he was being unfairly accusatory. She blamed Brian vociferously, making him feel defensive and guilty that he ever doubted her integrity.

20. TA spite

Valerie is a TA for a challenging biology course. Annie is an exceptionally smart and ambitious student in the class. She gets perfect scores on nearly every exam, is insensitive to others' feelings, and likes to show off. Annie is so confident that she points out every tiny mistake that the TA makes in class, humiliating her in front of the other students. Valerie has the last laugh on the final exam, though. True to form, Annie earns a 99 on the final. But Valerie "mistakenly" records an 89, causing her final grade to drop. The finals are never returned to students, so no one discovers the "error."

Vignettes for Training Phase

1. Rhonda is an administrative assistant at a major healthcare company. She has worked for the same company her entire career. She finds herself under scrutiny for her outspoken support of religious beliefs that her co-workers find offensive. The offended co-workers take their complaints to her boss Danielle. Danielle tells Rhonda that if she publicly recants her beliefs and writes a letter of apology to her fellow employees, then she can keep her job. But if she insists on holding them, Danielle will fire her immediately without severance. Rhonda refuses the offer and decides to lose her job instead of giving up her beliefs.

2. David's wife is very ill with a rare cancer. Doctors think only one particular drug can save her. The drug is a form of radium developed by Dr. Peterson, a biochemist in the same town. The drug is very expensive to make, and Dr. Peterson only has enough for one person, so he is charging a premium for it. David works as hard as he can to collect money from friends in the area but is not able to raise enough to afford the drug. So David becomes desperate and breaks into Dr. Peterson's laboratory to steal the drug and save his wife.

Appendix B: Space Pilot Game Instructions (Chapters V and VI)

Participants completed the experiment in the laboratory after giving informed consent. They were given instructions then completed the first phase of the experiment. The instructions were:

> *Welcome to the experiment. In this experiment, you are going to play a game in which you will use the mouse to move a cursor horizontally across the screen. Xs and Os will scroll down the screen, and your task is to pop as many Xs as possible and avoid as many Os as possible.*
>
> *After each game, you will be asked to provide a judgment of control for the game that just occurred. You will then be asked to make a judgment concerning your level of frustration during that game. Use the mouse to indicate your judgments along a sliding scale. When you are satisfied with each judgment, click the mouse to submit your judgment and continue.*
>
> *In addition, after each game you will read a short scenario and make a judgment regarding the morality of the behavior described. After all trials have completed, you may be asked to answer a few additional questions.*

Appendix C: Space Pilot Game Instructions (Chapter VII)

Participants completed the experiment in the laboratory after giving informed consent. They were given instructions then completed the first phase of the experiment. The instructions were:

Welcome to the experiment. In this experiment, you are going to play a game in which you will use the mouse to move a cursor horizontally across the screen. Xs and Os will scroll down the screen, and your task is to pop as many Xs as possible and avoid as many Os as possible. Press the spacebar to continue."

In addition, during each game you will hear a short scenario. Please listen as carefully as you can to the scenario while doing your best to play the game. Press the spacebar to continue."

After each game, you will be asked to provide a judgment of control for the game that just occurred. You will then be asked to make a judgment concerning your level of frustration during that game. Finally, you will be asked to make a judgment regarding the morality of the behavior described in the scenario. Use the mouse to indicate your judgments along a sliding scale. When you are satisfied with each judgment, click the mouse to submit your judgment and continue. After all trials have completed, you may be asked to answer a few additional questions. Press the spacebar to continue."

We will start with two practice trials. Press the spacebar to continue.

Appendix D: Morality Vignette Recall Scoring Scale (Chapter V)

For the recall data from the experiment described in chapter V, each vignette was given a recall score according to the following scale:

0 = no information recalled

1 = up to a few words related to the primary topic of the vignette

2 = a sentence or two with some details and a preliminary sense of the gist

3 = a few sentences accurately summarizing the gist of the scenario, with a few specific details

4 = accurate summary of the gist and most of the details

5 = accurate summary of the gist and nearly all details; near perfect recall

Appendix E: Morality Vignette Detail Checklists (Chapters VI – VIII)

The following checklists were used to score recall data from the experiments described in chapters VI – VIII. Each checklist contains details from the vignette. Recall scores were calculated as a proportion of details recalled. The numerator of the proportion was the number of details successfully recalled. The denominator was the total number of details that could have been recalled in a given vignette.

1. **Sticking to plans with needy friend**

- Person who makes plans is named Sam
- Sam is male
- Sam's friend is named James
- James is Sam's friend
- They are best friends
- Sam makes plans
- Plans are dinner plans
- Plans are with an acquaintance
- Acquaintance doesn't have many friends
- Acquaintance is going through hard times
- Acquaintance needs to talk to someone
- Sam receives invitation to party
- Invitation is from James
- Party is happening that same evening
- Sam tells James that he already has plans
- Sam is really interested in asking a girl out

- Girl will be at the party
- Sam learns about girl's anticipated attendance after his initial response
- Sam says thank you for the invitation
- Sam says he's sticking to his dinner plans
- Sam lets James know that he will try to come to the party afterwards

2. Taking a bullet for a fellow soldier

- Name of one soldier is John
- Name of other soldier is Frank
- John is a man
- Frank is a man
- Both men are soldiers
- Both are in a warzone
- Both are in the midst of combat
- John is 29-years-old
- John is single
- John has no children
- John graduated at the top of his class
- John graduated from West Point
- John plans to leave military service
- John plans to attend law school
- John plans to become a public defender
- Frank is 27
- Frank is happily married

- Frank is a father
- Frank has three kids
- Frank plans to spend his entire career in the army
- John sees an enemy assailant stand up
- John sees an enemy assailant fire at Frank
- John will not be able to warn Frank
- John will not be able to warn Frank because it is too late
- John leaps in front of Frank
- John takes the bullet for him

3. Help crossing the street

- Name is Matthew
- Matthew is a man
- M is elderly
- M approaches an intersection
- Intersection is busy
- M is carrying groceries
- M is carrying 2 bags
- Bags of groceries are large
- M struggles to carry the groceries
- M spills the groceries
- M spills the groceries while crossing the road
- M bends down
- M tries to pick them up

- Car at intersection
- Car is first car
- Driver of car does not see M
- Car moves forward
- Name is Jessica
- J is a woman
- J is young
- J has been waiting for her bus
- J has been waiting for 30 minutes
- Bus stop is nearby
- J sees what's happening
- J sees her bus approaching
- J runs to intersection
- J stops the car
- J helps M
- J misses her bus
- J must wait for next bus

4. Adoption

- Couple is a man and a woman
- Name of woman is Betsy
- Name of man is Christopher
- B and C are married
- B and C have been trying to have a child

- B and C have been unsuccessful
- They have been trying for months
- They see a doctor
- Doctor is a fertility specialist
- B has fertility issue
- Fertility issue is hormone imbalance
- Fertility issue makes it impossible to conceive
- Initial idea is to adopt newborn
- C is person who initially wants to adopt newborn
- They conduct a thorough search
- They consider children of all ages in this search
- They are overcome with compassion for children
- Characterizes these children as needy
- Characterizes these children as being in foster care
- These children have been in foster care for several years
- B and C decide to adopt a girl
- Adopted girl is not a newborn
- The girl is young
- The girl has many health complications
- Many sets of eligible parents had passed over the young girl

5. Concert Tickets

- Name is Amanda
- Name is Roberta

- A & R are Lady Gaga fans
- A & R are the world's biggest Lady Gaga fans
- A & R are known in the office for this
- Lady Gaga is performing a concert
- Concert is in their town
- Concert is special
- Concert is one night only
- Concert is a live concert
- A has a ticket
- R does not have a ticket
- A is looking forward to the concert
- A has been looking forward to the concert for months
- A is extremely excited to attend the concert
- R got fired
- R got fired day before concert
- R's last day is tomorrow
- A tries to buy ticket for R
- A intended ticket as farewell gift
- Concert is sold out
- A could not buy ticket
- A insists R take her ticket

6. Helping person in need

- Name is Sarah

- Name is Hannah
- S is a woman
- S & H are friends
- S is homeless
- S had been staying with a H
- S was caught stealing
- S was forced to leave
- S depends on shelters
- S depends on handouts
- S has a job interview
- Job interview arranged by a charity
- S does not have adequate clothes
- S cannot afford transportation cost to go to interview
- Charity cannot provide funds for clothing
- Charity cannot provide funds for transportation
- S resigns to miss interview
- H passes S in the street
- This happens hours before S would have to catch train to interview
- H gives S money
- It is enough money to buy a new outfit
- It is enough money to buy a roundtrip train ticket
- H gives money to S so she can attend the interview
- S receives a job offer

7. Scholarship student

- Name is Michelle
- Name is Sandra
- M is female
- S is female
- M is a college student
- M is on scholarship
- College is urban
- College is near where M grew up
- M works part- time
- M works weeknights
- M works as a waitress
- M works to help pay for college
- M sacrifices work shift to volunteer
- M sacrifices Tuesday shift
- M volunteers as a tutor
- M tutors S
- S is a student
- S is a high-school student
- S is at-risk
- S is doing poorly in school
- S lives in a dangerous neighborhood
- Neighborhood is where M grew up

- M sees a younger version of herself in S
- S is unfocused
- S is lost
- S questions the point of academic pursuits
- S is often a struggle to teach
- M perseveres
- M devotes her time
- M devotes her effort
- M does so in order to help improve Sandra's chances for success

8. Standing up to terrorism

- Name is Martin
- Name is Gregory
- M is a man
- G is a man
- M is the person who stands up to terrorism
- G is the person who helped plan the attack
- M grew up in a community that supports terrorism
- M lives in this community (that supports terrorism)
- M & G are friends
- M & G are good friends
- M learns about terrorist plot
- Attack is on a subway system
- Subway system is in major city

- Attack is imminent
- G helped plan attack
- Attack would kill people
- Attack would kill hundreds of people
- M disagrees with G's plan
- M disagrees passionately
- M disagrees with aims of terrorists in general
- M disagrees with tactics of terrorists in general
- M recalls rumor
- Rumor is that last member of community to speak out against terrorism disappeared
- Disappeared mysteriously
- M chooses to sound alarm
- M reports plot to authorities
- Authorities are international
- Authorities foil the plot
- Attack never happens
- M worries that G suspects that he betrayed them
- M flees the community

9. Stopping a fight

- Name is Jeffrey
- Name is Michael
- J is a man
- M is a man

- J is the name of man who attempts to stop fight
- M is the name of man gets into fight
- J & M are friends
- M gets into argument
- J watches M get into argument
- Argument is political
- Argument is with stranger
- Argument happens at a bar
- Back-and-forth
- Back-and-forth is friendly
- Two start shouting
- Two shout over each other
- Change happens within minutes
- Stranger spits in M’s face
- M is overcome with anger
- M rolls up his sleeves
- M gets ready to punch stranger
- J intervenes
- J intervenes before M can follow through with strike
- J intervenes by stepping between them
- J gets knocked down by accident
- M & stranger see they may have hurt Jeffrey
- They stop fighting

- They feel remorse for letting argument get out of hand

10. Whistleblowers

- Name is Maria
- Name is Robin
- M & R work together
- M & R work at a bank
- They work in a group that creates financial instruments
- They work in a group that markets financial instruments
- Financial instruments are complicated
- Recent product they've worked on was successful
- Product generated millions of dollars of revenue
- M & R conduct analyses related to the underlying mechanism of the product
- Analyses reveal that product is fraudulent
- Investments in product will likely lose value
- Investments will likely use ALL value
- Value loss will likey happen in near future
- Investments include pension funds
- Financial wellbeing of people will be in jeopardy
- People are ordinary
- Bank will profit
- Bank will profit handsomely
- M & R try to sound the alarm
- They try to sound the alarm to their superiors

- Superiors do not listen
- M & R gather evidence
- Gather evidence on a flash drive
- M & R report their concerns
- Report concerns to financial regulators

11. Cheating on Exam

- Name is Patricia
- Name is Nicole
- P is female
- N is female
- P is taking an exam
- Exam is a final
- Final is for calculus
- P did not study
- P must pass the class
- P must pass the class in order to graduate
- P is generally hard-working
- P is first in her family to attend college
- P feels pressure to do well
- P sits next to N during the final
- P copies many of N's answers
- N is the top student in the class
- N studied thoroughly for the final

- P gets a fairly good score
- P does not score as well as N
- P passes the class
- P graduates
- P graduates on time
- P makes her family very proud
- No one discovers what P did

12. Showing favoritism in promoting decisions

- Name is Rebecca
- Name is Jennifer
- R is female
- J is female
- R & J work for tech company
- Company is small
- Company is successful
- Company enjoyed record-setting year
- R is an executive
- R decides to give one employee a raise
- J is an employee at the company
- J is a mid-level employee
- J has been with the company since its founding
- J is dedicated to the firm
- J is the hardest worker at the firm

- J's innovations contributed to much of the company’s success
- R decides that loyalty is more important than performance
- R makes her decision on basis of personal loyalty
- R does not award the raise on basis of performance
- R gives raise to a friend
- R hired friend a few months ago
- R passed over J for the raise
- R passed over many other more competent employees for the raise
- Many other more competent employees have been with the company for longer

13. Deception and Stealing

- Name is Bill
- Name is Peter
- B is male
- P is male
- B loses his job
- B needs money
- B goes to P
- P is B’s former mentor
- P volunteered as B’s Big Brother
- P was B’s Big Brother in high school
- P helped B succeed in school
- P helped B set his life on a better course
- P is retired

- P is an old man
- P is known to help people in town
- B intends to ask P for help finding a new job
- B and P meet
- B fabricates a story
- B tells P that he is very sick
- B tells P he needs a thousand dollars
- B tells P he needs to pay for an operation
- P lives on a modest fixed income
- P lends B the money
- B skips town
- B brings the thousand dollars with him
- B never returns

14. Medical dilemma

- Name is Dr. Samuelson
- Name is William
- W is male
- W is part of Dr. S' family
- W is Dr. S' nephew
- Dr. S is a principal investigator
- Dr. is a PI on clinical drug trial
- Drug is for autism
- Findings are positive

- Findings are preliminary
- Findings suggest drug may control symptoms
- Several participants reported adverse effects
- Adverse effects are life threatening
- Drug is not approved by the FDA/is not legalized
- Physicians cannot prescribe the drug
- Study may soon end
- Study may soon end due to safety issues
- W has autism
- W's family has yet to find adequate treatment
- W's family is in tatters
- W's family is desperate for a solution
- Dr. S goes against medical ethics
- Dr. S violates the internal review board's human subjects protection protocol
- Dr. S gives the drug to William

15. Police officer bribery

- Name is Officer Johnson
- Name is Edward
- OJ is male
- E is male
- OJ is a police officer
- OJ is a state trooper
- OJ pulls over a car

- Car is speeding
- Car is on highway
- E is the driver of the car
- E was traveling at a rate 30mph over the speed limit
- E was driving recklessly
- OJ asks E for his license
- OJ asks E for his registration
- E is wearing a watch
- Watch is very expensive
- Edward is rich
- OJ sees that E is wearing the watch
- E begs OJ not to write a ticket
- E's license is in risk of being suspended
- One more ticket will cause E's license to be suspended
- E's driving was endangering other drivers
- OJ asks E for his watch
- OJ tells E if he gives him his watch he'll tear up the ticket
- OJ tells E if he gives him his watch he'll pretend the situation didn't happen
- E gives OJ his watch

16. Damaging tweet

- Name is Jane
- Name is Emily
- J is female

- E is female
- J is a college student
- J is volunteering for a candidate
- Candidate is running for Congress
- J overhears fellow volunteers
- Volunteers wonder whether opponent might have had an affair
- Opponent might have had an affair with E
- J knew E from prep school
- J knew E to be straight-laced
- J knew E to be upright
- J thinks rumors are false
- J sends tweet to her prep school/high school friends
- Tweet is an innocent question
- Question is about the opponent and E
- J suspects her prep school friends may believe the rumor
- J suspects her friends may retweet her tweet
- J's prep school friends confirm her suspicions
- There are suggestive pictures of E from years past
- The pictures are of E and the opponent
- J's prep school friends send the pictures
- J tweets the pictures
- J has a friend from the campaign
- J tweets the pictures to this friend

- The rumor goes viral
- The pictures go viral

17. Theft for $$ and Entertainment

- Name is Lee
- Name is Henry
- L is male
- H is male
- L robs homes
- L robs homes because it's thrilling
- L robs homes to make money
- L has robbed many homes
- L has robbed many homes in a Boston neighborhood
- Boston neighborhood is wealthy
- L has not been caught
- L wears stolen jewelry
- L wears stolen jewelry to flaunt his spoils
- L and H are friends
- H tells Lee to stop
- L ignores H
- L stole $50,000 worth of jewelry
- L stole a ring
- Ring was a diamond ring
- L stole a watch

- Watch was a Rolex
- L stole a TV
- Ring belonged to family for generations
- L suspected ring might be recognized
- L sold ring to Henry
- L did not tell Henry the ring was stolen

18. Workplace bully/bullying boss

- Name is Rachel
- Name is Joe
- R is female
- J is male
- R was a manager
- R was a mid-level manager
- R was an excellent manager
- R was a successful manager
- R worked at a marketing firm
- R treated her co-workers very well
- R treated her superiors very well
- R never yelled at her co-workers
- R never embarrassed her co-workers
- R never yelled at her superiors
- R never embarrassed her superiors
- R went out of her way to help everyone

- R was promoted
- R was promoted to senior manager
- R began disparaging the people she used to work with
- R began publicly embarrassing the people she used to work with
- R publicly embarrassed people for minor infractions
- J is one of R's former co-workers
- J is one of R's inferiors
- There was a meeting recently
- J cited a statistic at the meeting
- R knew the statistic J cited to be incorrect
- R did not let the incorrect statistic pass
- R chastised J
- R chastised J for five minutes
- R chastised J in front of his co-workers
- R embarrassed J
- R called J stupid
- R called J incompetent
- R threatened to fire J
- R told J he needed to improve

19. Adultery

- Name is Lizzie
- Name is Brian
- L is female

- B is male
- L and B are married
- L and B have been married for eight years
- L and B have been married for a long time
- L and B’s marriage started out well
- L has been feeling bored
- L has been craving excitement
- L started having an affair
- L’s affair is with her co-worker
- L would meet her lover in secret
- L would meet her lover two nights a week
- L said she was going to yoga when she would go to meet her lover
- B began to suspect something was wrong
- B began to have suspicions a few months into the affair
- B broached the topic with L
- B broached the topic gently
- B broached the topic when B and L were at home
- B broached the topic one evening
- L lied
- L immediately denied everything
- L implied he was being unfairly accusatory
- L blamed Brian
- L blamed Brian vociferously

- L made Brian feel defensive
- L made Brian feel guilty
- B felt guilty that he ever doubted L's integrity

20. TA Spite

- Name is Valerie
- Name is Annie
- V is female
- A is female
- V is a TA
- V TAs a biology course
- Biology course is challenging
- A is a student
- A is smart
- A is ambitious
- A is EXCEPTIONALLY smart and ambitious
- A is in the biology course that V TAs
- A gets perfect scores on nearly every exam
- A is insensitive to others' feelings
- A likes to show off
- A is very confident
- A points out every tiny mistake that V makes in class
- This happens in front of the other students
- A humiliates V

- V has the last laugh on the final exam
- A earns a 99 on the final
- A’s grade on her final is true to form
- V records that A got an 89 on the final
- V records this score “mistakenly”
- V’s recording causes A’s final grade to drop
- The finals are never returned to the students
- No one discovers the “error”

Appendix F: Experiment Materials (Chapter VIII)

Participants completed the experiment in the laboratory after giving informed consent. They were given instructions then completed the first phase of the experiment. The instructions were:

Welcome to the experiment. In this experiment, you will see a series of prompts. Please read each prompt carefully and imagine vividly the situation described. Take a deep breath, and do your best to put yourself in the shoes of the person described. Feel what it would be like to actually experience the situation.

After each imagination exercise, you will be asked to make judgments about your experience. Use the mouse to indicate your judgments along a sliding scale. When you are satisfied with each judgment, click the mouse to submit your judgment and continue.

In addition, after each exercise you will read a short vignette and make a judgment regarding the morality of the behavior described. After all trials have completed, you may be asked to answer a few additional questions.

In-Control Episodic Simulation Prompts

1. You have a great idea for a group research project in your favorite class. You lead a group of collaborative classmates whose ideas align with your own, so the team experience is free from major conflict. Your group completes an outstanding project, and you earn an A+.

2. You decide to cook dinner by following your favorite recipe. You use a new high-quality set of knives and cooking implements, so the process of preparing the meal feels effortless. The meal tastes delicious.

3. You decide to plan an event on campus to honor your favorite professor. You choose the venue, speakers, and guests. Everyone you invite attends the event. The event is a huge success, and the professor tells you it was one of the most meaningful events of her life.

4. You choose to run for president of a student organization you're deeply involved with. You receive a lot of support from your peers and your campaign gains a lot traction. You win the election, so you get to set the organization's agenda and goals for the coming year.

5. You decide to start working a part-time job on campus. You make a list of the top three jobs you would like, and you get interviews and offers at all three. You choose your first-choice job, which will give you the flexibility to set your own hours each week.

6. You have just started a new diet, and you plan to avoid sweets. As you approach a bakery on your walk home from class, you catch a whiff of the warm scent of freshly baked chocolate chip cookies. You feel tempted to go inside, but you maintain your resolve and walk past the bakery without slowing down or glancing at the sweets in the window.

7. You plan to have a conversation with your close friend who's having relationship issues. As you two talk, you can see that he's really listening to what you have to say and taking your advice to heart. He texts you the next day saying that he feels 100% better about his relationship, and he's confident things will work out.

8. You have chosen to lead a tour group around Columbia, and you map out the precise route ahead of time. The tour proceeds as you intended, people enjoy themselves, and they stop to take pictures at many of the campus landmarks you wanted to show them. Many people in the group give you a tip.

Not-in-Control Episodic Simulation Prompts

1. You plan to have a conversation with your close friend who's having relationship issues. As you two talk, you can see that he's not paying attention to what you have to say and seems to be ignoring your advice. He texts you the next day with evidence that he's continuing to behave in a self-destructive manner. You are at your wit's end.
2. You choose to run for president of a student organization you're deeply involved with. You receive very little support from your peers and your campaign encounters many obstacles due to stiff competition. You lose the election badly and strongly disagree with the direction the new president wishes to take the organization.
3. You have a great idea for a group research project in your favorite class. However, the classmates in your group disagree with your ideas and are unreliable. You have frequent conflicts and it's a challenge to get everyone on the same page and put together a decent final product. Your team only earns a B-.
4. You decide to plan an event on campus to honor your favorite professor. However, the university requires that you jump through many bureaucratic hoops. The university denies you your first choice venue, forcing you to hold the event in a smaller, less impressive space. Very few people attend, and the professor leaves the event without saying a word to you.
5. You have just started a new diet, and you plan to avoid sweets. As you approach a bakery on your walk home from class, you catch a whiff of the warm scent of freshly baked chocolate chip cookies. Despite your best efforts to resist, you succumb to temptation, walk into the bakery, and buy three cookies. You finish them before you make it home.
6. You decide to cook dinner by following your favorite recipe. Your kitchen only has a dull set of knives and old appliances, so the process of preparing the meal is arduous and takes twice as long as it should. Furthermore, the oven is broken and the actual temperature far exceeds the temperature at which you set it. You burn the meal badly.
7. You decide to start working a part-time job on campus. One afternoon, your boss says you must work extra hours that night. You tell her you have an exam you need to study for, but she doesn't care. She says you must stay to work or she will find someone to replace you.
8. You have chosen to lead a tour group around Columbia, and you map out the precise route ahead of time. However, due to a massive protest on campus, you are forced to take the group through multiple detours and shortcuts. People seem distracted and disinterested, and many people leave the tour before you're able to finish.

In-Control Autobiographical Recall Prompt

Bring to mind an experience in your own life when you felt FIRMLY IN CONTROL.

Describe the experience in the book provided. Please do your best to write continuously until you hear the bell.

Not-in-Control Autobiographical Recall Prompt

Bring to mind an experience in your own life when you DID NOT FEEL IN CONTROL.

Describe the experience in the book provided. Please do your best to write continuously until you hear the bell.