Cognition and Consequences of the Belief in Free Will

by

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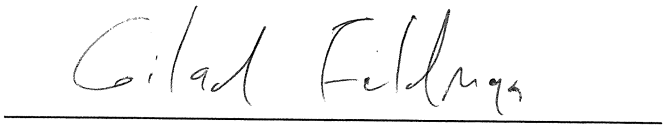

Gilad Feldman

Acknowledgements

As I took my first steps in the journey towards an academic career I have come to realize that the possibly illusory idea of free will is a concept of great relevance and importance to me. It was at the core of several life changing decisions I have taken that have brought me to a PhD program with the management department at the Hong Kong University of Science and Technology. The notion of free will has been at the heart of my ongoing pursuit of meaning, and has been a core motivation in my search for an academic identity that would allow me to conduct meaningful research that I believe in, to seek out an academic area of inquiry that would best fulfil my passion for understanding.

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This is to certify that I have examined this PhD thesis
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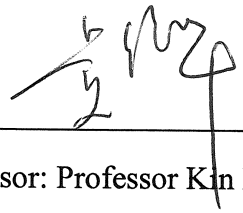

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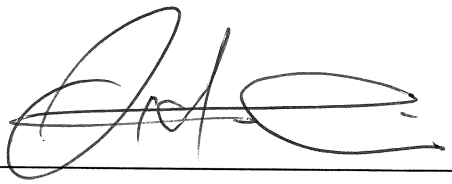

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"*Some things happen of necessity, others by chance, others through our own agency. For he sees that necessity destroys responsibility and that chance is inconstant; whereas our own actions are autonomous, and it is to them that praise and blame naturally attach*"

-- Epicurus allegedly discovers the free will problem
and links free will to accountability
(Letter to Menoeceus, ~3rd century BC).

Abstract

Free will is a core concept in many modern societies and religions, and the belief in free will is commonly held by a high percentage of people across the world. The centrality of the concept of free will underlying everyday life calls for a better understanding of its manifestation in people's cognition and behavior.

In this thesis I adopt the scientific approach to free will in exploring the psychological underpinnings and the behavioral implications of the belief in free will. The purpose of my dissertation is to advance our understanding of laypersons' beliefs in free will and to offer an empirical examination of the cognition and consequences of this belief.

In Chapter 2, four studies show that despite a wide and controversial assortment of conceptions of free will in the long unresolved philosophical debate, laypersons seem to associate free will more simply with the concept of choice. The more strongly people believed in free will, the more they liked making choices, the higher they rated their ability to make decisions (Study 1), the less difficult they perceived making decisions, and the more satisfied they were with their decisions (Study 2). High free will belief was also associated with more spontaneous associating of choice with freedom, and with the perception of actions as choices. Recalling choices (Study 3) and making choices (Study 4) led to a stronger endorsement of the belief in free will, and the level of choice involved in the choice contributed to the effect. These findings suggest that the everyday social reality of beliefs about free will is a matter of how people think and feel about choice.

In Chapter 3, six experiments showed that people associate higher freedom of will with negative valence as compared to positive valence, or put simply - that 'bad is freer than good'. Recalling actual events, people attributed more free will to negative actions than positive ones (Experiment 1). In hypothetical decision making tasks, negatives outcomes (Experiment 2) and negative framing (Experiment 3) were attributed higher free will than

positive ones. Using a game theory paradigm, defection against another player was perceived as involving higher free will than cooperation (Experiment 4). Findings were consistent for both actions taken by self and actions taken by others and using different measures. No support was found for reverse causality (Experiment 6) and several possible alternative accounts for the effect were ruled out (Experiment 5). These findings support free will as underlying laypersons' sense-making and attributions of accountability for negative actions and outcomes.

Chapter 4 details an examination of the consequences of the belief in free will. Perceptions of agency, freedom, and choice are at the core of human action, and the belief in free will has been shown to affect accountability, responsibility, motivation, and learning, all key components for achieving better performance. Three studies examine the relationship between the belief in free will and performance. The belief in free will predicted better academic performance (study 1) and job performance (study 2), as well as high job satisfaction (study 3), even when controlling for job self-efficacy and job autonomy. The belief in free will also interacted with self-control, such that the endorsement of the belief in free will and having higher self-control predicted the strongest performance. Results from a world-wide country-level analysis (study 3) indicated a positive relationship between the national endorsement of the belief in free will and country socio-economic performance indicators.

Together, these findings from 14 studies highlight the concepts of choice and accountability as underlying the folk cognition regarding free will and establishes the belief in free will as a powerful predictor for positive choice attitudes and performance outcomes.

Keywords: belief in free will, cognition, activation, choice, accountability, consequences, performance

Thesis Introduction and Structure

Free will is a basic concept in many modern societies and religions and the belief in free will is commonly held by a high percentage of people across the world (Sarkissian et al., 2010). Free will is associated with important aspects of human psyche – in attribution of intentionality, the understanding of moral responsibility and hence the perception of levels of accountability and the ability for action control (Greve, 2001). The centrality of the concept of free will as a core philosophy underlying everyday life calls for a better understanding of its manifestation in people's cognition and behavior.

Despite its importance the concept of free will remains an elusive topic of inquiry – free will is still considered a tough concept to understand or explain, making an academic pursuit of the concept challenging (Baer, Kaufman, & Baumeister, 2008). Countless philosophical debates regarding free will make it clear that free will is a highly loaded term (see recent special issues with heated discussions on free will in the Journal of Consumer Psychology, Volume 18, Issue 1, 2008 and Neuroethics, Volume 4, Issue 1, 2011), in that both philosophers, academics and laypersons tend to understand and perceive free will and its implications in different ways (Dilman, 1999; Honderich, 1993). Some of the questions that arise when one confronts the issue of free will are – What is free will? Where does free will come from? Can free will co-exist with determinism? Does free will negate causality? Does free will imply a supernatural force or dualism? And more importantly for this thesis - Is a scientific pursuit of free will at all possible?

These questions remain an ongoing challenge in our attempt to gain a better understanding of free will, yet a growing interest in the psychological aspects of the belief in free will offers several important advances. Recent literature in cognitive and social psychology as well as in the experimental philosophy movement have paved the way for a

deeper exploration into the layperson's cognition of free will, promoting a scientific view of free will and addressing some of the challenging issues in conceptualization and definition.

Research questions & general intended contribution

In this thesis I adopt the scientific approach to free will in exploring the psychological underpinnings and the behavioral consequences of the belief in free will. The purpose of my dissertation is to advance our understanding of laypersons' beliefs in freewill and to offer an empirical examination of the cognition and consequences of this belief. My research aims to address the following questions – (1) How is the concept of choice related to and affect the belief in free will? (2) How does the link between free will and accountability affect attributions of free will? (3) What are the behavioral implications of the belief in free will for outcomes and performance?

More specifically, I aim to make the following contributions to the current literature. First, rather than viewing the belief in free will as fixed and impermeable (Sarkissian et al., 2010), I argue that the belief in free will is contextually sensitive. I extend recent experimental work showing laypersons' will attributions to vary depending on target agent (Gray, Knickman, & Wegner, 2011 ; Pronin & Kugler, 2010) or time perspective (Helzer & Gilovich, 2012) to suggest that the belief in free will can be activated and that the attribution of free will varies according to context.

Second, based on recent findings in experimental philosophy regarding laypersons' common understanding of the concept of free will (Monroe & Malle, 2010 ; Stillman, Baumeister & Mele, 2011), I reason that the belief in free will holds a strong cognitive association with choice. I propose that making choices or thinking of choice would lead to an activation of the belief in free will, and that the belief in free will would be associated with a stronger preference for having choices, a higher perceived capacity to make choices, lower perceived difficulty in making choices, and higher satisfaction with decisions made.

Moreover, I hypothesize that those endorsing the belief in free will would associate choice with freedom, and would tend to see more selection situations in their lives as choices rather than must-do actions.

Third, I follow Nietzsche's (1886/1966) philosophical reasoning that the belief in free will is founded on the need for accountability. Going beyond the view that the belief in free will is a prerequisite to moral responsibility (Nichols & Knobe, 2007) and findings that a weaker belief in free will leads to acting less morally (Vohs & Schooler, 2008), I also argue that perceptions of free will are affected by one's need to attribute blame and hold someone accountable. Meaning, a context with negative valence (action or outcome) would trigger the need to hold someone accountable, resulting in a negative action being perceived as if involving higher free will than a positive action, or put simply, that 'bad is freer than good'.

Forth, I extend current literature regarding the positive consequences of the belief in free will to suggest that the belief in free will is an important factor in the prediction of actual performance. Furthermore, I explain the conceptual links between the belief in free will and self control, and theorize on their interaction in predicting performance. Previous literature has provided ample evidence that self-control (or willpower) is a strong predictor for positive outcomes in life (e.g. academic performance - Duckworth & Seligman, 2005 ; job performance - Porath & Bateman, 2006), yet the theorized link between the two constructs results in the hypothesis that the positive outcomes of self-control would be moderated by the belief in free will. The belief in free will may serve as the prerequisite for the exertion of willpower to achieve the goal, influence the pool of resources from which willpower draws energy, or allow for the person to self-control in a desired direction.

I return to these theoretical arguments and hypotheses in more detail in chapters 2 and 3.

Format and structure

The dissertation follows a three paper format, which includes three empirical investigations (chapters 2, 3 and 4) that are conceptually linked. These three chapters are constructed so that each chapter can stand on its own as an article, and those are written as journal submissions and written as involving plural authors. Chapter 1 is provided as the introductory chapter that reviews the literature that serves as the basis for the other chapters. Chapter 5 summarizes the empirical findings of the three investigations. Therefore, some parts of the three empirical chapters may repeat parts of the introduction chapter as setting the theoretical basis for the investigations.

The thesis framework consists of two conceptual parts comprised of three empirical investigations (see Figure 1 for a diagram of the thesis framework). The first part examines the cognition underlying free will beliefs (chapters 2 and 3), and the second part examines the consequences of free will beliefs (chapter 4).

In Chapter 1, I provide an overview of the current literature on free will and the belief in free will. I begin by summarizing key elements in the long debate regarding the concept of free will and detail my use of the many terms surrounding free will beliefs, clarifying the conceptual distinction of free will beliefs from other concepts. I expand on topics of laypersons' understanding of free will and laypersons' belief in free will as they are important aspects of the psychological and empirical pursuit of understanding of free will.

Chapters 2 and 3 look at the cognition underlying the belief in free will. Chapter 2 includes four studies that reveal the cognitive links between choice and the belief in free will. Chapter 3 includes six experiments which demonstrate that context valence affects attributions of free will so that bad (negative valence) is freer (higher free will attributions) than good (positive valence).

Chapter 4 examines the consequences of believing in free will. Three studies show that the belief in free will is predictive of academic performance, job performance and national level socio-economic performance.

Chapter 5 summarizes the main findings, provides an integrated discussion and concludes the thesis.

Chapter 1 - Free Will Beliefs – Overview & Research Question

Why free will

The concept of free will has been at the heart of many domains of human life. Free will has emerged as a fundamental notion to support a world in which a person is responsible for his/her own actions, either in a religious view in which God punishes sinners with damnation to hell (Walker, 1964), or more broadly in societies with moral and legal systems that attribute blame to wrongdoers and demand that those stand trial and be held accountable for their actions (Nietzsche, 1886/1966). The notion of free will has roots in grand philosophical debates dating back to ancient Greece (Democritus and Epicurus, 4th century BC) and the debate continues till this very day in an engaging dialogue between philosophers, neuroscientists and psychologists (see recent summary in Kane, 2011). A widely held view by theorists in psychology and management today considers the person as an entity capable of engaging in conscious and deliberate thought, with atleast some capacity for analysis, rational decision making, and an initiation of action (Baumeister, Masicampo, & Vohs, 2011). Across cultures and nationalities, laypersons commonly tend to believe in the self as an agent capable of free action regardless of actual life circumstances and the existence of external limitations (Sarkissian et al., 2010). A new direction in psychology and experimental philosophy aims to explore the psychological underpinnings of this belief with accumulating evidence suggesting that this belief holds important implications for people in their everyday lives in both cognition and behavior (Baumeister & Monroe, in press).

What is free will / The definition of free will

Recent efforts by a collaboration of social psychologists and philosophers to come to a unified definition of free will arrived at the definition of free will as being "the capacity to perform free actions" (Haggard, Mele, O'Connor, & Vohs, 2010). There are two main schools of thought regarding what "free actions" mean, debating on the question of how free will relates to determinism (see Table 1 for a summary of the views on free will and determinism). Broadly defined, determinism refers to the view that everything in the universe has been predetermined so that all events have a cause or a set of causes following the laws of nature (Haggard et al., 2010).

A group referred to as "incompatibilists" regards free will and determinism as incompatible, and hence considers free actions as actions that are not deterministic. Incompatibilists view people's ability to act freely in a way that would not be reducible to mere internal states (emotional or motivational states) or external influences (stimuli, culture, parents, etc.). The ability to act freely does not necessarily mean that people are completely oblivious to internal or external influences, but only that they possess the means to choose either to act regardless of those or to try and overcome such influences. Incompatibilists that believe that free will is impossible and hence the world is deterministic are commonly referred to as "hard determinists", while incompatibilists that reject determinism and entertain the notion that free will exists are referred to as "Libertarians". There is also an incompatibilist group that rejects both free will and determinism arguing free will does not exist but various elements of nature like quantum mechanics suggest randomness so that nothing is set and predetermined and is based on probabilities.

Compatibilists, on the other hand, do not see a contradiction between determinism and acting freely, focusing their definition of free will on intent and deliberation. Compatibilists would argue that a free action is "any intentional action performed on the basis of informed,

rational deliberation by a sane person in the absence of compulsion and coercion […] even if the action was deterministically caused" (Haggard etal., 2010). Hence, free action according to compatibilists is an action initiated by the person, but this action is still determined and can be causality linked to an interaction of natural causes like the person's attributes, surroundings, etc. Importantly, free will is understood and defined differently by compatibilists and incompatibilists, meaning that although the both use the same construct name they refer to different notions.

Regardless of the view on free will and determinism, there is a general agreement that for an action to be considered free it is required that the person acting *could have chosen to do otherwise* - atleast so in the appearance of the availability of alternative options and the capacity to choose among those options without coercion (Kane, 1996, 2002 ; Monroe & Malle, 2010 ; Pronin & Kugler, 2010).

It is important to note at this point that in this thesis I deliberately do not address this debate or take sides in the debate. The philosophical debate has been going on for almost 2500 years with very prominent people dissecting this issue from all possible angles, and part of the confusion is based on the insistence on trying to reach a resolution. To be able to make progress, as explained below, I aim to specifically focus on the belief in free will, regardless of the belief in determinism. The review in this chapter is simply meant as an introduction to the topic so that concepts such as "compatibilism" and "determinism" will be clearer when used later. Therefore, I put aside the debate regarding the link between free will and determinism and build upon the most widely accepted definition for both compatibilists and incompatibilists of free will as the capacity to consciously decide among multiple available options and deliberately select and execute one of those options without constraints (Baumeister, 2008a).

The scientific pursuit of free will

Can free will be studied scientifically? Even with an common definition of free will, there are those who consider the very notion of free will as being unscientific (Bargh, 2008 ; Hofmann, Strack, & Deutsch, 2008 ; Skinner, 1971). Their main issue with free will lies with the impossibility of ascertaining whether alternative courses of actions really exist. To truly demonstrate free will, they claim, one needs to demonstrate that people's actions were not casually determined, which suggests that people cannot be explained by laws of nature. Showing that free will exists is impossible as the only action that can be studied is the action that has been chosen, putting 'what might have been' and the perception of being able to choose otherwise to be a subjective personal experience which cannot be regarded as proof. Neuroscientists have also been hard at work showing evidence which they claim may disprove free will by demonstrating that what is often perceived as free action can be predicted by brain activation long before the action was consciously initiated (e.g. Libet, 1993 ; Soon, He, Bode, & Haynes, 2013), which is complemented by work in psychology demonstrating that what people often perceive as their own free will is triggered externally hence making the perception of free will illusory (e.g. Skinner, 1971 ; Wegner, 2003).

Skinner's (1971) stance on free will and control as being illusory has inspired a number of prominent psychologists who argue that actions perceived by people as free can be attributed to external influences (Bargh, 2008 ; Bargh & Ferguson, 2000 ; Bargh, Gollwitzer, Lee-Chai, Barndollar, & Trötschel, 2001 ; Wegner, 2002, 2003). Many studies in social psychology, judgment and decision making, and consumer behavior have indeed shown that choices can be influenced by external means and freedom of will can be bypassed or misdirected so that certain mindsets can be activated and certain options become more appealing or salient (Bargh, 2006 ; Bargh & Chartrand, 1999 ; Bargh & Williams, 2006 ; Srull & Wyer, 1980).

Is free will merely an illusion? Is it therefore impossible to study free will? Not necessarily (see Baer, Kaufman, & Baumeister, 2008 and Baumeister, 2008a for a detailed debate and summary). Many philosophers and scientists adopt the compatibilist view of free will allowing for the co-existence of free will and determinism (Kane, 2002). Even if one accepts incompatibilism, then there is no evidence clearly rejecting free will just as there is no clear evidence rejecting determinism (Chomsky, 1971 ; Baumeister, 2008b, 2008c). The general literature in psychology and organizational behavior frequently refers to agents as being able to freely choose and consciously deliberate in ways that enable them to decide on their behaviors and influence their futures (see discussion below). Results in various scientific domains increasingly describe scientific conclusions with probabilities rather than certainties, and not only merely because of problems in measurement but following on an assumption of agency (Searle, 2001 ; Wong & Cheng, 2013). This is inline with common laypersons' intuitions regarding the self-perception as having and executing choices (see more details in the next section). The evidence that suggests that there are deterministic forces that affect people's behavior (e.g. genes, needs, personality) is supplemented by accumulated evidence regarding the availability of psychological mechanisms that one may choose to enact aimed at over-riding such influences – willpower, self-control and self-regulation (Dennett, 2003) as well as the concept of a finite energy resource underlying these processes (termed 'ego depletion', Baumeister, Heatherton, & Tice, 1994 ; see later discussion regarding free will and these constructs). Even the researchers who argue that free will is an illusion recognize the importance of these individual differences between people – in the extent to which these illusions are dominant in their cognition. Even illusions hold important psychological consequences (Lefcourt, 1973; Perlmuter & Monty , 1977) such as in influencing motivations and intentions (Skinner, 1995, 1996). A common conclusion is therefore that it is often the interaction of the individual choice and the external influences

that leads to an action, as empirical studies are not able to demonstrate choice being completely overridden or that choice is completely free from any influences.

Another possibility is to conceptualize free will is as simply being on a different level of abstraction, existing as part of people's social reality (Baumeister, 2008a, 2008b, 2008c). In this view, there's a duality of physical life and social life, and free will would not contradict causality and the existence of laws of nature but would rather add a layer of meaning that relates to notions that cannot be simply referenced through lower-level more basic physical laws of natures ("What is the mass of English language or of democracy" asks Baumeister, 2008c, p.35). Higher levels of abstraction, such as that of culture and language, may affect or interact with the way in which lower levels occur, yet they cannot break the rules under which they operate (Anderson, 1972). In that sense – "Free will is genuinely free in the sense that action is <u>not entirely</u> dictated by physical, material causality. It is not free in the sense of being independent of all causes and influences" (p. 37, emphasis not in original text). Using this perspective, free will is considered another more complex source of causality. Interestingly, a group of biologists and neuroscientists has recently risen to support this view by forming an account of free will possible within the confounds of the physical world (e.g. Brembs, 2010 ; Haggard, 2008 ; Brass, Lynn, Demanet, & Rigoni, 2013 ; Zschorlich & Köhling, 2013) challenging previous interpretations of the classical neuroscientific free will experiments and offering new ways to understand how brain activity is related to actions.

Therefore, regardless of the debate on the definition and the existence of free will and its coexistence with determinism and science more broadly, the concept of free will as a lay belief still holds promise for the understanding of human psyche (Wertenbroch, Vosgerau, & Bruyneel, 2008). A person's experience of something as allowing for higher or lower free will and one's perception regarding the ability to freely make choices or choose otherwise

may hold important implications for a wide array of cognitive and behavioral outcomes, as it is fundamental to how people often think about the process of making choices (e.g. Iyengar & Lepper, 1999, 2000).

The scientific pursuit of free will therefore lies in the meaning that free will has in human psyche. Hence, my study of free will is a study of meaning, or rather – the importance and the meaning that people give to choices made, their understanding of freedom in the context surrounding choices, and the impact of these on their subsequent behavior. I do not endorse or reject any of the views detailed above, but rather base my inquiry on the widely shared understanding that these views matter, and that the cognition and consequences of these views is worthy of examination.

Belief systems and layperson' beliefs

When referring to the belief in free will, what is a 'belief'? Fishbein and Ajzen (1975) define a belief as a cognitive link between an object (e.g. person, group, institution, etc.) and an attribute (e.g. trait, property, quality, characteristics). In the case of the belief in free will the link would be between an agent (or all agents more broadly) and the freedom of action. In their theory, Fishbein and Ajzen refer to a belief as a fundamental building block of action, regarded as a learned process based on inference (inferential beliefs), direct observation (descriptive), or information received and leading to attitudes, then intentions, and finally behavior. The formation of an attitude can happen by making a belief or a set of beliefs more salient. Beliefs influence attitudes and the feedback received by the application of attitudes on intentions and behavior may reflect back on a change in a belief.

Though beliefs are sometimes confused with perceptions/inferences and attitudes/opinions, they are conceptually distinct (see Wyer & Albarracín, 2004 for an in-depth discussion). Simply summarized, beliefs are the endorsement of whether certain statements are true or accurate (e.g. I have free will) whereas attitudes/opinions involve

judgment or affect with valence (e.g. having free will is good/bad, and/or it makes me feel positive/negative), and a perception/inference is an evaluation of a situation or an object (e.g. this situation allows me to choose more/less freely).

Once a belief is formed, it is stored in memory to be used in a later point of time and its retrieval may vary according to situational cues or computational processes involved (Schwarz & Bohner, 2001; Wyer & Srull, 1989). There are some who consider beliefs as long lasting and durable (Wyer & Goldberg, 1970) while others consider them more situation specific (Hasher, Goldstein, & Toppino, 1977), and many of the recent theories have integrated between these two views so that the different sources used in the formation of beliefs also suggest that beliefs may be prone to situational cues. For example, one can infer that self is free based on experience in which self perceives one's actions as being free (illusory or not). Yet, a situation restricting the self's ability to choose may influence the long held belief that self is free, and the experience and situation can both interact to form a resulting belief.

The belief in free will falls into a more general category that goes beyond a singular belief regarding a single object or situation and reflects a belief system that links between an associative network of beliefs (Tesser & Shaffer, 1990). Furnham (1988) termed the concept of "lay theories" or "implicit theories" to reflect a series of beliefs regarding human nature held by non-scientists. The extent to which a person endorses a certain belief is referred to as "belief strength" and the evaluation of a belief strength typically involves directly asking a person to answer questions about agreement with elements of this belief. Belief systems appear generally stable, though the literature offers several mechanisms by which beliefs can overridden or changed (for example, pointing out paradoxes in the beliefs or confronting with contradictory evidence backed by authority figures, see Swann, Pelham, & Chidester, 1988 ; or through cognitive dissonance, see Festinger, 1964). Using this view, the extent to which

beliefs affect attitudes, intentions and outcomes would rely on several factors, such as the belief strength, the centrality of the belief to the self, the retrievability of the belief in the context, and the relevance of the belief to the target or situation evaluated.

Laypersons' understanding of free will

Though free will has been debated for long, it is only recently that scholars moved beyond the academic philosophical debate regarding free will to begin exploring laypersons' understanding of the concept of free will. Commonly, belief in free will has been assessed using scales emphasizing different aspects of the philosophical definition of free will (e.g., Paulhus & Carey, 2011; Stroessner & Green, 1990 ; Rakos, Steyer, Skala, & Slane, 2008, etc.), yet with a concept so highly controversial and abstract as free will scholars have realized the importance in assessing how laypersons generally think about and refer to free will (Monroe & Malle, 2010). A new movement in philosophy called experimental philosophy (Nichols, 2011) suggested that the philosophical issue of free will can be studied by applying social science techniques "diagnosing the psychological origins of philosophical problems" (p.1401).

Several studies have made an important advancement in the understanding of layperson's understanding of free will. In study of the folk intuitions regarding free will, Nichols (2004) has shown that children between the ages of three and five typically endorse free will and reject determinism by making the claim that a person in a given scenario could have chosen to act differently, much more so than a physical object could have. Nichols goes on further to argue that the perception of having free will in kids is innate rather than learned – that freedom of an agent is inferred by native evidence to form the belief that humans are different than objects in their ability to act otherwise. Other studies have extended these findings by demonstrating that not only do kids at the age of five perceive people to have the capacity to choose more freely than objects do but that they also clearly distinguish between

free and un-free actions by the same human agent (Chernyak, Kushnir, & Wellman, 2010 ; Kushnir, Wellman, & Chernyak, 2009).

Since then several experimental philosophers have debated whether laypersons typically understand free will and determinism as compatible (compatibilism) or not (incompatibilism). Several researchers have shown the endorsement of incompatibilism (Kane 1999; Strawson, 1986 ; Vargas, 2006) while others have shown that laypersons can accept compatibilism under certain situations (Nahmias, Morris, Nadelhoffer, & Turner, 2005). Yet when asked about the way the universe works people typically reject the notion of a fully deterministic universe and endorse having free will (Nichols & Knobe, 2007), possibly since determinism as driving human action seems to contradict common sense (Kane, 1999), introspection (Holton, 2006 ; Spinoza, 1677/2002) and the human need to perceive oneself as a free in-control agent (Dennett, 1984). These effects extend beyond cultures and so far appear to be universal (Sarkissian et al., 2010) as cultures all over the world mostly adopt the experiential non-deterministic "agent-causation" approach seeing the agent as the cause for choice and action and that the agent "could have done otherwise" (Bandura, 2008 ; Nichols, 2008).

Social psychologists have attempted to further extend the breadth and depth of this inquiry by working to establish clear working definitions of free will, testing casual hypotheses about human mind and behavior and examining the social reality underlying the understanding and endorsement of the belief in free will.

Monroe and Malle (2010) report having choice as being an important factor in how people perceive free will. While this seems to be a simple conclusion, it was the first real analysis of the folk understanding of the concept of free will and many researchers up to that point have assumed that people think of the concept of free will as something metaphysical (e.g. Brembs, 2010 ; Cashmore, 2010). Stillman, Baumeister and Mele (2011) asked for first-

person narratives of autobiographical accounts of daily events that are either free or not free. They showed that when asked about actions with free will people often associate free will with long-term and beneficial outcomes, mostly based in conscious reflection and associated with social action-control and a sense of moral responsibility.

Laybeliefs in free will

Although most cultures operate on the basis of some degree of belief in freedom of choice, people vary as to how much they regard human beings, including themselves, as having free will and capable of making free choices (e.g., Baumeister, 2008a ; Paulhus & Carey, 2011).

Free will beliefs were traditionally viewed as a binary universal truth – that free will either exists or it doesn't (see Table 1), and that the existence or non-existence of free will would apply to all agents to the same degree. Yet, recent findings suggest a much more nuanced view. Beliefs in free will are often linked to the attributions people make to both their own actions and the actions of others, and these attributions – though based in a long-term and stable belief – are influenced by the context under which they are made. For example, it has been shown that people differ in their perception of how much free will certain people have compared to others, such as people attribute more will to a dead person than to a person in a vegetative state of coma (Gray, Knickman, & Wegner, 2011) or that people attribute more free will to themselves than they do to others (Pronin & Kugler, 2010). People also make nuanced attributions regarding time, so that people perceive their future actions as having higher free will than their past actions (Helzer & Gilovich, 2012).

These research findings suggest several implications. First, people differ in the extent to which they believe in free will. Second, free will attributions based in one's beliefs can both be contextual and prone to activation by situational priming. Similarly, attributions of free will to actions taken by agents can be affected by who the agent is, by the action taken,

by the context of the action or even by the outcome. The empirical investigation in chapters 2 and 3 examining the cognition of the belief in free will is based upon these arguments and discussed in detail later.

The purpose of free will in laybeliefs

The prevalent endorsement of the belief in free will warrants another fundamental question – Why would anyone believe in free will? If one believes in free will – then what is free will meant for?

Different views have been offered as to the purpose of free will. Some scholars view free will as a mechanism that allows the self to pursue self-enhancing desired states and goals so that a person is free from external social constraints to pursue its own wants and needs (Hume, 1748 ; Edwards, 1754). Put more simply – free will is only worth having if it enables the individual to get what she or he wants (Dennett, 2003).

A second view often referred to as the 'action-control perspective' argues that the concept of free will has evolved to allow the self to coexist with others in society as to override inherent immediate biological urges that mainly focus on the self (Kant, 1797/1996 ; Roberts, 2002) thus allowing for prospection, long-term planning, action control and coordination with others (Baumeister 2005, 2008a). From an evolutionary perspective, the belief in free will could have possibly evolved so that people would be able to a deal with a world of increasingly complicated choices and complex societal interactions that require coordination and inhibition of self (Baumeister, 2008b ; Laurene, Rakos, Tisak, Robichaud, & Horvath, 2011; Rakos et al., 2008).

The close conceptual relationship that free will holds with moral responsibility supports the view that free will is a notion embedded in societal considerations. The concept of free will may be regarded by societies and religions as a solution to the predicament of laypersons that associate determinism with inevitability, reduced accountability, and thus

lower action control over socially undesirable behaviors. Based on the idea of free will as a social tool, the belief that a person could make different free choices in a given situation is considered essential to legal, moral, and political judgments (Juth & Lorentzon, 2010 ; Searle, 2007). More broadly, society often regards it as appropriate to adjust legal and moral judgments based on the assessment of whether a wrongdoer acted out of his or her own free will (Greene & Cohen, 2004 ; Roskies, 2006). In order to legally hold a person accountable and bring a person to trial it is now commonly expected that it be proven that the person could have done otherwise, meaning that there were no external influences coercing the person to act in this way (e.g. having a gun to the person's head) or that the person did not merely act out of uncontrollable urges (e.g. temporary insanity ; Burns & Bechara, 2007). Similarly, a contract between two people is only considered valid if the two sides have entered the contract out of their own free will, meaning that both sides were free from any coercion (Cohen, 1933).

A developmental perspective argues free will to be rooted in the perception people experience in their everyday choices while growing up – even if such a perception is illusory, serving as a self-indicator regarding the ability to execute and increasing one's motivation to enter difficult choice situations (Bandura, 2006; Rakos, 2004 ; Wegner, 2008). As previously discussed, children as young as the age of three are able to demonstrate intuitions and judgments regarding having free will.

To summarize, the role of free will in people's beliefs could be the pursuit of own goals and desires or in the evolutionary role of free will as overcoming self to allow people to coexist with others in society. This belief could also be rooted in an innate intuitive perception developed by people while growing up to self-motivate when faced with making choices. Currently there is little evidence to reject or support any of these views.

Differentiating the belief in free will from other constructs

The concepts of agency, control, choice, and freedom underlying the belief in free will are related to a number of other constructs in the literature. In this part, I will briefly overview related constructs and discuss how those are different from and may relate to the belief in free will. In the last part of this section I conduct an empirical pretest of the distinction and the relationship between the constructs.

Self-control / Willpower / Self-regulation

Self-control, self-regulation or willpower all refer to the same underlying concept of "an agent's capacity to sustain, stop, amplify, or otherwise modify an incipient or unwanted response or action" (Haggard, Mele, O'Connor, & Vohs, 2010). Self-control is associated with a conscious effort by the agent to exert energy (effort) needed in order to resist, manipulate or overcome oneself (affect, cognition, and behavior). Items measuring trait self-control typically ask about the ability to resist temptation, having self-discipline, ability to concentrate and avoid distractions, work effectively towards long-term goals, etc. (e.g. scale by Tangney, Baumeister & Boone, 2004). These focus on regulation and resistance and therefore highlight the conceptual difference from the belief in one's freedom to choose or do otherwise.

Willpower is often used as a metaphor conceptualizing self-control as an energy resource, which implies that it is of limited capacity and can therefore be depleted following a long effortful exertion termed 'ego depletion' (Baumeister et al., 1994 ; Baumeister, Vohs, & Tice, 2007). Some argue that self-control, together with the capacity for rational choice, are two adaptive forms of expressing free will (Kant, 1797/1967 ; Baumeister, 2008a). This seems to correspond to laypersons' notions of free will perceiving actions to be most free when they involve resistance to pressure, deliberate conscious thought, and rational choice (Stillman, Sparks, Baumeister, & Tice, 2006), yet even so - self-control mainly focuses on the

self, while free will is the a more general capacity to be free of all influences or forms of coercion.

Free will may be regarded as allowing for self-control to take place in the sense that it offers the agent the choice of whether one wants to exert self-control or not (Wertenbroch, Vosgerau, & Bruyneel, 2008), as there are cases in which agents deliberately decide to 'let go' and give in in order to fulfill some goal (Kivetz & Simonson, 2002), like when feeling distress and wanting to indulge the self in order to feel better (Tice, Bratslavsky, & Baumeister, 2001). This clarifies free will and self-control to be closely related yet distinct concepts, in that free will allows the agent to freely choose one's path and aim at a long-term goal, but it is self-control that allows the agent to pursue and persist in that path until the goal is reached. Using this view of free will as the capacity to choose the direction and self-control as the pursuit of this direction, I argue that for a person to successfully pursue own goals the person would require the belief in free will to be able to make the choice as well as the willpower to be able to pursue the choice made. I return to this prediction in Chapter 4 in hypothesizing about the interaction of the belief in free will and self-control in predicting performance.

Locus of Control / Perceived Control / Self-efficacy

Locus of control is a construct that aims to capture the extent to which people tend to attribute actions to internal versus external causes (Rotter, 1966). Those with an internal locus of control perceive a higher sense of mastery and the self as the cause of an intended outcome while those with an external locus of control attribute the cause of events to external determinants.

There are several differences between the belief in free will and locus of control. First, one's own genes, urges and needs, upbringing and family background, would be classified as an internal locus of control, but are considered constraints over the freedom of will. Second,

while internal locus of control and external locus of control are generally conceptualized on a single dimension, there are those – compatibilists - who consider free will and determinism as two distinct dimensions. Third, locus of control generally refers to the self, whereas the belief in free will is a belief more broadly and may refer to any agent - the self or the other. Finally, the literature often refers to free will as a more generalized enduring philosophy or belief about life whereas locus of control is more of an experiential self-assessment.

Waldman, Viney, Bell, Bennett, and Hess (1983) empirically tested the relationship between free will beliefs and locus of control and showed only a weak correlation ($r = .17$) indicative of free will beliefs being different than internal locus of control and determinism as being different from external locus of control. Stroessner & Green (1990) measured free will, religious determinism and psychological determinism separately and reported very weak correlations of locus of control with free will ($r = .03$) and religious determinism ($r = .09$, $p < .05$) but a moderate correlation with psychological determinism ($r = .40$, $p < .01$). A more recent scale by Rakos et al . (2008) measuring free will beliefs in self and in general reported that for college students locus of control holds a moderate correlation with general belief in free will ($r = -.22$, $p < .05$) and free will in self ($r = -.33$, $p < .01$), yet no association between locus of control and free will appear in high-school students. These results lend support for the discriminant validity of free will beliefs as being different than locus of control.

Perceived control is broadly defined as "people's perception of the degree to which they are capable of [...] performing a given behavior" (Ajzen, 1985, 1991) which is closely related to the previously discussed self-control and to self-efficacy as "a judgment of one's ability to organize and execute given types of performances" (Bandura, 1994). Rigoni, Kühn, Sartori and Brass (2011) make the distinction between free will beliefs and perceived control suggesting that free will beliefs affect intentional effort through perceived control and self-efficacy. The belief in the freedom to act affects the perceived capability of a person to

control own life. Perceived behavioral control answers the question “Can I successfully do it?” regarding a specific behavior (Yzer, 2012) whereas the belief in free will addresses the question of “Am I able to otherwise?” and is a more generalized belief about life (see previous discussion on the differences between self-control, locus of control and the belief in free will). Chapter 3 elaborates more on this point.

The conceptual similarities between locus of control, self-efficacy, and self-esteem have led researchers to view those as a single high order construct (Judge, Erez, Bono, & Thoresen, 2002). The meta-construct was named "core self-evaluations" (Judge, Locke, & Durham, 1997) and has been since used to predict a multitude of work related outcomes in the management literature (e.g. Judge & Bono, 2001). Yet, the arguments above differentiate the concept of the belief in free will from this meta-construct and its components.

Despite the predictive validity of this meta-construct and factors, recent reviews of the attribution literature in psychology have highlighted general concerns with its reliance on attribution theory emphasizing the distinction between attributions to the self versus attributions to the environment. Researchers have called for the field to return to the roots of Fritz Heider's (1944, 1958) original conceptualization of human behavior based in the recent understanding of laypersons' philosophy of action as differentiating between agentic versus non-agentic action (Malle, 2011). The latter differentiation makes a clear distinction between two types of actions that emanate from the self - actions that are free, intentional and deliberate and actions that are not. The recent criticism of the current attribution theory is in the grouping of these two forms of action in self as one whereas much of the psychology literature now assumes the distinction between these two forms of thinking (Kahneman, 2011) and the study of folk psychology supports the understanding that laypersons evaluate their own actions and the actions of others in a similar way (Malle & Knobe, 1997a, 1997b). This new direction relates to the distinction of two constructs of locus of control versus the

belief in free will as two competing cognitive differentiations regarding the origins of action. The construct of the belief in free will directly addresses many of the concerns related to the differentiation made by attribution theory and the locus of control construct.

Belief in Fate / Fatalism

There are several streams of literature that have looked at beliefs regarding fate, especially in the domains of cross cultural and religion psychology (Chan, Wan, & Sin, 2009; Chaturvedi, Chiu, & Viswanathan, 2009; Norenzayan & Lee, 2010; Young, Morris, Burrus, Krishnan, & Regmi, 2010). Broadly defined fatalism refers to the belief that the future was meant to be, especially in terms of fortune or misfortune (Pepitone, 1997). As such, it shares a conceptual overlap with determinism, and the two are sometimes used interchangeably (with concepts like 'deterministic fatalism', see Paulhus & Carrey, 2011), yet there are several distinctions between the two. First, fatalism often regards the future as a result of a meta-physical element - a super-force or a God - that influences people's lives, whereas determinism typically merely recognizes the casual chain of events from prior events often based on laws of natures (genes, education, environment, situation, etc., Paulhus & Carrey refer to this as "scientific determinism"). Second, fatalism considers a certain future as being inescapable and is suggestive of the futility of human will or the inexistence of free will, whereas determinism considers the future as simply caused by earlier events.

In terms of outcomes, fatalism is associated with a different set of outcomes than does the belief in determinism or free will that often includes a spiritual element, like superstitious behavior (Mowen & Carlson, 2003), coping mechanisms to explain losses or failures, and risk taking behavior such as gambling (Darke & Freedman, 1997; Friedland, 1998).

Essentialism / Implicit theories

Essentialism refers to the tendency to essentialize - or categorize – entities into natural categories, based on the assumption that all entities belong to fixed categories which make and define who or what they are (Atran, 1998; Gelman, 2009). This cognitive heuristic appears to be universal, though different cultures differ in the degree to which members of that culture tend to essentialize (Norenzayan & Heine, 2005). People fall into two main groups endorsing different implicit theories based in essentialism – the entity theorists who believe that human attributes are fixed, and incremental theorists who see human attributes as malleable. Measures of implicit lay-theories typically ask participants to indicate their agreement to statements like "Everyone is a certain kind of person, and there is not much that can be done to really change that" endorsed by entity theorists as opposed to "Anyone can change even their most basic qualities" endorsed by incrementalists (Levy, Stroessner, & Dweck, 1998). The study of essentialism examines how related implicit theories affect human cognition and behavior (Dweck, 1999 ; Levy, Plaks, Hong, Chiu, & Dweck, 2001), so that – for example – entitists may use categories of race to explain someone's behavior and expect behavior to be predictable and stable while incrementalists would expect behavior to vary between situations (Chiu, Hong, & Dweck, 1997).

Some of the current implicit theories can be seen as a specific form of the belief in determinism. Racial implicit theories, for example, argues that a person's race biologically determines abilities and traits which influence behavior and fate. At first glance, the belief in determinism seems to encompass all implicit theories in one overarching belief about life, yet there are fundamental differences. Determinism considers all causal determinants as equally important while each of the implicit theories focuses on and emphasizes one specific category. Racial lay theories, for example, argues that the way people view race as malleable or not is crucial to the understanding of how they explain behavior of people in regards to the

racial category. Determinists would consider race, or any other essentialized category as just one of the factors that determines one's behavior. Determinists would generally accept that genes interact with the environment to produce different behaviors by the same agent, while entitists would be less supportive of this claim. A determinist generally does not assume or claim the ability to explain one's behavior using a certain category, and the closest a determinist would come to being an entitist is possibly in the acceptance of increased likelihood of a certain behavior by a member of a certain category. Similarly, incrementalists do not necessarily have to endorse the belief in free will. The belief that people do not have to follow the stereotypical behavior of their category or that the category is malleable does not imply that they perceive agents to be free of other casual determinants.

Though determinism can be conceptualized as more domain specific, such that a person would believe that in the causal determinism of personality (e.g. extroverts are better leaders) but reject the causal determinism of genes (e.g. race or gender does not matter for leadership), yet the literature has so far not addressed this distinction or the underlying bias and have generally viewed the belief in determinism as a core generalized philosophy. However, as my discussion above suggests, lay-theories seem to fit the concept of domain specific determinism.

The incrementalist view is more likely to perceive the self as being free of internal constraints. Yet, perceiving the self as able to change from certain innate categories does not necessarily mean that the self is perceived as being able to freely choose when and how to change, nor does it address the freedom from external constraints.

Autonomy

Like free will, the concept of autonomy has also been a focus of heated philosophical debate and at the center of controversy for long. Pfander (1967) refers to autonomy as being "self-determined acts" in the sense that actions are viewed "not as an occurrence caused by a

different agent but as an initial act of the ego-center itself'' (p. 20). Scholars have defined the concept of autonomy in different ways, yet most converge on seeing autonomy as based in congruent acts that could be endorsed and fully identified by the self. Autonomy is therefore not merely defined by the absence of external influences (independence) but by "one's assent to such influences and inputs" (Ryan, 1993; Ryan & Deci, 2006). It is based in high-order reflections that enable a person to identify with own actions, or "self-governance" of the individual being able to maintain a separate identity and meaning from others (Ryan & Deci, 2006).

Though free will beliefs are conceptually similar to perceived autonomy, there are several distinctions. Autonomy mainly refers to the self as maintaining a separate and independent self from other agents, rather than the independence from influences more broadly encapsulated in free will beliefs (external and internal influences - situation, biological and developmental variables, etc.). In that sense, autonomy is mainly about the existence in social environments and the interplay between the self and others, between a need for relatedness to others and the need for maintaining autonomy, often involving the exercise of self-regulation (Reis, Sheldon, Gable, Roscoe, & Ryan, 2000). Autonomy is also less of a general belief about life and more of an individual response to the environment, so that the feeling of autonomy can change by simply changing the context by which the individual operates where the perception of autonomy in one context do not necessarily have anything to do with the perception of autonomy in another.

The empirical measures of autonomy tend to follow this direction. Autonomy in kids is often measured as styles of self-regulation (e.g. the self-regulatory style questionnaire, Connell & Ryan, 1987) also including items that refer to locus of control ("Because I'll get into trouble if I don't" or "Because I'll feel bad about myself if I don't do it" as a response to "Why do I do my homework?"). Autonomy is often measured as social

connectedness or attachment with factors relating to self-awareness, sensitivity to others, and self-efficacy (Bekker & van Assen, 2006).

Autonomy in the workplace measures include items such as "The way the job is performed is influenced a great deal by company rules, policies and procedures" and "The way the job is performed is influenced a great deal by what others expect" (Barrick & Mount, 1993) or "I can decide on my own how to go about doing my work" or "I have considerable opportunity for independence and freedom in how I do my job" (Oldham & Hackman, 1981). Other measures simply ask the participant to report the activities that require them to ask permission from superiors (Spector & Fox, 2003). Hence, it appears that job autonomy reflects an overall perception in regards to the capacity or the ability to work without constraints from the social environment in the specific work context to pursue work goals.

Counterfactual Thinking

Counterfactuals are mental representations of alternatives outcomes that may have occurred if things have happened differently ("what might have been" or "if only…") (Epstude & Roese, 2008). Counterfactual thinking refers to a person's tendency to imagine counterfactuals and is often evaluative – thinking of better or worse alternatives than what has happened. The literature on counterfactual thinking suggests that certain situations lead to more counterfactual thinking than others. For example, Kahneman & Miller's (1986) norm theory showed that people engage in counterfactual thinking more in exceptional events compared to ordinary events and it has been shown that negative outcomes activate counterfactual thinking (Gilovich, 1983). Counterfactuals are important for learning (Boninger, Gleicher, & Strathman, 1994 ; Roese, 1994, 1997) and having implications for people's subsequent performance (Ciarocco, Vohs, & Baumeister, 2010; Roese, 1994).

There are several distinctions between free will perceptions and counterfactual thinking. Free will refers to the ability of an agent to do or choose otherwise whereas

counterfactuals are not limited to the agent and include a more generalized perception of what might have been different. Also, counterfactual thinking mostly refers to past events and is triggered by an experience where outcome falls below or over a certain reference value whereas free will is a more stable general belief that applies to past, present and future. Chapter 3 elaborates on this point.

Burrus and Roese (2006) demonstrate that the belief in fate is negatively related to counterfactuals showing a moderate yet significant correlation (r = -.32). The belief in fate and counterfactual thinking appear independent, in that construal (abstract versus concrete) affects fate beliefs but not counterfactuals and that temporal distance affects fate significantly stronger than it does counterfactuals. Alquist, Ainsworth, Baumeister, Daly & Stillman (draft) report even weaker correlations between counterfactuals and free will beliefs (r = .19 after controlling for self-esteem).

Summary and an empirical pretest

In this section I covered several well-known constructs and discussed how they are different from and may relate to the belief in free will. Although previous literature has on occasion provided an empirical test for the relationship between the various constructs, there has thus far not been a complete empirical test of the relationship between the belief in free will with all of those constructs. To further examine the nomological network of the belief in freewill with the other constructs, I constructed a pretest.

Method.

Participants and procedure. Ninety eight participants were recruited online using Amazon Mechanical Turk for US$0.3. The pretest included a battery of scales measuring the belief in free will and the constructs discussed above. The order of the scales and the order of the items within each scale were randomized for each participant and the items of the scales were intermixed with seven attention check items to check participants' attentiveness while

answering the scales (see Appendix A for a full list of scales and attention checks). Fifteen participants failed more than one attention check and were therefore removed from the analysis, leaving a sample of 83 participants (33 females ; M_{age} = 33.99, SD_{age} = 12.28).

Measures. Full list of measures is detailed in Appendix A. Most importantly, the belief in free will was assessed by using two of the most widely used scales for measuring the belief in free will. The Free Will and Determinism scale (FWD, Rakos et al., 2008) includes two subscales, one measuring the belief in free will in self (8-items), and one measuring the general belief in free will (14-items). The Free Will and Determinism Plus scale (FAD+, Paulhus & Carrey, 2011) is designed for a clearer differentiation between the belief in free will and the belief in determinism to address the compatabilism debate reviewed above. This scale includes four subscales measuring the belief in free will, scientific determinism, fatalistic determinism and unpredictability. The main differences between the belief in free will subscales is in the incorporation of items regarding moral responsibility in the FAD+ scale (such as "criminals are totally responsible for the bad things they do"). The FWD subscale measure of the belief in free will in self is conceptually closest to the other constructs discussed, hence serving as the most conservative test for construct differentiation, and to make the reporting clearer, the findings below are reported using the belief in free will FWD self subscale (full correlations with the other two subscales appear in the table).

Results & discussion. Correlations and reliabilities are provided on Table 2. The three free will subscales showed moderate (r = .49, p < .001) to strong (r = .82, p < .001) relationships with the weakest relationship between the FWD belief in free will in self with the FAD+ general belief in free will.

Several constructs showed a moderate correlation with the belief in free will. Strongest correlations were with personal control (r = .57, p < .001), self-control (r = .49, p < .001), perceived mastery (r = .47, p < . .001) , self efficacy (r = .47, p < .001) and self-esteem

(r = .50, $p < .001$). The correlations between these constructs alone were moderate to strong, especially for personal control, self esteem and self-efficacy ($r = .71$ to $r = .82$, $p < .001$). This indicates that the belief in free will has a close link to the concept of control underlying these constructs, possibly because – as I argued above and in support of Rigoni et al. (2011) – the belief in free will is a prerequisite for the perception of having and being able to exert control. The belief in free will shows a much weaker relationship with two other constructs I discussed– essentialism ($r = .02$ to $r = -.25$), locus of control ($r = .22$). This supports the weaker conceptual link.

On the issue of the belief in free will and the belief in determinism, the correlations with scientific determinism (FWD self; $r = -.02$, p = n.s. ; FAD+: $r = .31$, $p < .01$) lends support for the laypersons' compatibilist view that the free will and determinism can co-exist. Yet, laypersons also tend to see the belief in free will as holding negative relationship with fatalism (FWD self : $r = -.58$, $p < .001$).

Finally, I ran a confirmatory factor analysis to examine whether a model including the belief in free will and the constructs above would yield a better fit than a model including the two constructs separately. Table 3 details the analysis for four of the factors - self control, self-efficacy, self-esteem and locus of control. The analysis shows a significantly better fit for the belief in free will scale as different from the other scales than as a single factor, lending support for the belief in free will as a unique construct.

Taken together, the findings of this pretest support the conceptual differentiation of the belief in free will from the other constructs and establish the construct of the belief in free will as distinct yet meaningfully related to the constructs of self-control, self-efficacy, self-esteem, and perceived control.

Summary of Chapter 1

Chapter 1 provided an overview of the free will literature. I began by introducing the concept of free will and highlighting the scientific approach to free will as being about studying the meaning and the consequences of the laypersons belief in free will. I then defined what a belief, laybeliefs, and the belief in free will are. I proceeded to summarize the current literature regarding the understanding that laypersons have of free will, recent findings regarding the belief in free will and then discussed the views regarding the purpose of free will as a laybelief. Finally, I covered and tested the nomological network that the belief in free will holds with other constructs.

Chapters 2 and 3 will address the first research question by hypothesizing that (1) the belief in free will is linked with the concept of choice (chapter 2), and that (2) attributions of free will to agents are influenced by contextual valence (chapter 3).

Chapter 4 will address the second research question by hypothesizing that free will is predictive of performance, also interacting with self-control.

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Chapter 2 - Free will is about choosing:

The link between choice and the belief in free will

Abstract

Expert opinions have yielded a wide and controversial assortment of conceptions of free will, but laypersons seem to associate free will more simply with making choices. We found that the more strongly people believed in free will, the more they liked making choices, the higher they rated their ability to make decisions (Study 1), the less difficult they perceived making decisions, and the more satisfied they were with their decisions (Study 2). High free will belief was also associated with more spontaneous associating of choice with freedom, and with the perception of actions as choices. Recalling choices (Study 3) and making choices (Study 4) led to a stronger endorsement of the belief in free will, and an additional effect of the level of choice involved in the choice. These findings suggest that the everyday social reality of beliefs about free will is a matter of how people think and feel about choice.

Introduction

Whether human beings have free will has been discussed and debated for centuries. Free will has been challenged on conceptual grounds from multiple arguments that supposedly render it impossible because the future is fixed and inevitable and therefore impervious to human choice (Kane, 2011). These arguments include theological assertions of divine omniscience that entails foreknowledge of all future events (Calvin, 1559), as well as the relentless ineluctability of scientific causation (LaPlace, 1902). Meanwhile, thinkers have objected to assorted concepts of free will on various grounds, such as believing that free will constitutes an exemption from causation (Bargh, 2008), that free will postulates causation by nonphysical entities such as souls (Montague, 2008), or that free will is a psychological

illusion (Wegner, 2003), a logically impossible construct used to rationalize behavior (Miles, 2011).

In recent years, however, attention has turned to layperson concepts of free will and to how that understanding operates in human social life (Baumeister, 2008 ; Knobe, et al., 2012 ; Nahmias, Morris, Nadelhoffer & Turner, 2005 ; Nichols, 2006, 2011). Variations in beliefs about free will have been shown to cause a variety of changes in interpersonal and moral behavior (e.g., Vohs & Schooler, 2008). This has raised the question of how ordinary people understand the concept. Monroe and Malle (2010) found that people spoke about free will as making choices unconstrained by external factors (or even going against external pressures) and doing what one wants, possibly aided by planning and forethought. Stillman, Baumeister, and Mele (2011) found that people's notions of free will were linked to morally responsible behavior, self-control, achieving goals, and high levels of conscious thought and deliberation. Implicit in many of these conceptions is the notion of acting on the basis of deliberate choice (Baumeister, Sparks, Stillman & Vohs, 2008). The present investigation was designed to test the hypothesis that beliefs about free will are vitally linked in ordinary understanding to making deliberate, uncoerced choices.

In contrast to the metaphysical conundrums mentioned above, the idea that people associate free will with making choices seems simple and straightforward. However, the present investigation intended to go beyond mere definitional issues. We examined associations between the beliefs about free will and choice to show that there is a positive relationship between people's belief in free will and the extent to which they like and enjoy making choices, their perceived ability to successfully make decisions, their perception of making choices as being less difficult and finally their satisfaction with decisions they have made. Furthermore, we predicted that the more people believe in free will, the more likely they would be to associate the concept of choice with freedom and to perceive their own

actions as choices. Last, we sought to show that activating the concept of choice by means of autobiographical memories of choosing or an action task that involves choice would increase people's reported endorsement of the belief in free will. Taken together, we aimed to demonstrate that lay beliefs about free will are cognitively linked to choosing, both within and between persons, and that the associative links likely operate in both directions.

Study 1 - Choice perceptions and attitudes

Study 1 measured individual differences in belief in free will and, much later, assessed perceived ability of choosing, preference for choice, and cognitive associations about choice. We predicted that people who held a stronger belief in free will would express more liking for choice, higher perceived ability to choose, and would display more associations of freedom with choosing.

Method

Participants and procedure. Ninety eight university students (M_{age} = 19.09, SD_{age} = .54, 51 females) participated for partial course credit. At a mass testing session at the start of the semester, they filled out the belief in free will scale. Two months later, participants took part in another session and completed the choice cognitive association task and answered items regarding perceived ability to choose and preference for having choice.

Measures.

Belief in free will. The belief in free will was measured using the eight item belief in self free will subscale of the Free Will and Determinism Scale (FWD scale, Rakos, Laurene, Skala, & Slane, 2008). The items refer to oneself having free will, such as "I am in charge of my actions even when my life's circumstances are difficult" and "I have free will".

Choice cognitive association. Adjusting the method developed by Stephens, Fryberg, and Markus (2011) for studying associations, we asked participants to write three words they

thought of when faced with the word "choice." The responses were automatically coded according to whether they referred to being free (e.g., free, freedom).

Perceived ability to choose. Two items assessed perceived ability for choice: "It's very hard for me to choose between many alternatives" (reversed) and "When faced with an important decision, I prefer that someone else chooses for me" (reversed) on a scale of 1 (*strongly disagree*) to 7 (*strongly agree*).

Preference for choice. Two items measured liking for choice: "The more choices I have in life, the better" and "In each decision I face, I prefer to have as many options as possible to choose from" on a scale of 1 (*strongly disagree*) to 7 (*strongly agree*).

Results

Correlations between belief in free will, choice cognitive association with freedom, perceived ability to choose and preference for choice are summarized in Table 4. The belief in free will was associated with a higher preference for choice ($r = .26$, $p < .01$) and higher perceived ability to choose ($r = .38$, $p < .001$). Also, those with stronger endorsement of the belief in free will were more likely to associate choice with freedom ($r = .25$, $p < .05$). The correlations between choice association with freedom, preference for choice and perceived ability to choose were weak ($r = .00$ to $.17$, p = n.s.).

Semantic analysis. Logistic regression tested the link between scores on the free will belief scale and whether the participant associated choice with freedom. Participants with higher belief in free will were more likely than others to respond with "free" or related words as a spontaneous association to "choice" ($\chi^2(1, N=98)=6.46$, $p = 0.011$; $\beta=1.63$, $w=5.76$, $p=0.016$). Thus, belief in free will was linked to whether people spontaneously think of choosing as something related to being free or having freedom.

Perceived ability to choose. We ran a multi-step regression examining the relationship between the belief in free will and the perceived ability to choose, controlling for age and

gender. A stronger endorsement of the belief in free will beliefs was positively related to having perceived ability to choose ($F(3, 94) = 8.28$, $p < .001$; βFW = .36, $p < .001$; $R^2 = .18$; $\Delta R^2 = .13$). The relationship held even without the inclusion of controls.

Liking for choice. A multi-step regression analysis was conducted to test the relationship between the belief in free will and liking for choice, controlling for age and gender. The belief in free will was found to predict strong preference for having choice ($F(3, 94) = 2.94$, $p = .037$; $\beta_{FW} = .27$, $p = .008$; $R^2 = .09$; $\Delta R^2 = .07$). The controls did not affect the relationship.

Discussion

As predicted, belief in free will had multiple positive links to making choices. People who expressed higher belief in free will reported enjoying making choices more than other people. They also had a greater sense that they were capable of making choices effectively. The two-months delay between the measures rendered it highly unlikely that filling out the free will scale had any direct (e.g., priming) effect on responses regarding choice. More likely, believing in free will is cognitively associated with a preference for choice and the feeling of being a capable as a decision maker.

The semantic analysis data provided further evidence that free will and choice are linked, even in people's spontaneous responses and thought patterns. The more strongly people believed in free will, the more likely they were to associate choosing with freedom.

Study 2 - Recall task, actions as choices and choice attitudes

Study 2 was designed to extend the findings from Study 1 in several ways. Following the growing literature about choice and choice making we sought to examine whether the belief in free will would be associated with a stronger tendency to see everyday life actions as choices. Markus and colleagues have shown that people differ in the extent to which they perceive choice in their lives and consider their actions to be choices, even if those actions

clearly involve selecting between alternatives (Markus & Schwartz, 2010). For example, Americans have a stronger tendency to perceive their actions as choices compared to Indians (Savani, Markus, Naidu, Kumar, & Berlia, 2010; Savani, Stephens, & Markus, 2011). Quite possibly, cultural differences in the perception of choice may be related to the cultural differences in the endorsement of the belief in free will. We therefore asked participants to recall actual behaviors in specified situations and to indicate the extent to which they consider these actions a choice.

Also, Study 1 recognized the cognitive association between the belief in free will and choice attitudes using a general choice scale, which - despite the time lag - may share some conceptual similarities with the belief in free will scale. In this study we asked participants to indicate their attitudes (enjoyment, perceived difficulty, and satisfaction) regarding specific situations rather than a general tendency. We also ran a more comprehensive set of free will belief scales which also included items regarding determinism, fatalism and chance as to provide a fuller picture of the effect as well as minimize any possible priming effects one way or the other. Moreover, to show the generalizability of the findings from Study 1, the sample in Study 2 was from a much older working population based in the United States.

Based on the findings from Study 1 we hypothesized that those with stronger endorsement of the belief in free will would be more likely to consider their own actions as choices, to enjoy making selections and to report higher satisfaction with the results of their selection.

Method

Participants and procedure. Sixty three American participants were recruited online using Amazon Mechanical Turk in return for US$0.3 ($M_{age}$ = 38.73, SD_{age} = 12.92, 40 females). Participants were led to believe that they're participating in two separate studies. In the first part, participants were asked to report their belief in free will. In the second part,

participants were asked to recall the last time they engaged in a four specific actions, and for each of these actions they were asked about related attitudes and about the extent to which they perceived these actions to be choices. To make sure participants understood the task, the explanation of the task was followed by a two quiz questions participants had to answer correctly in order to proceed to the task.

Measures

Belief in free will. The belief in free will was measured using two scales. The Free Will and Determinism Scale (FWD scale, Rakos et al., 2008) included two subscales - 8 items measure the belief in free will for self (used in Study 1) and 14 items measure a general belief in free will. The Free Will and Determinism Plus Scale (FAD+, Paulhus & Carey, 2011) includes four subscales - free will (7 items), scientific determinism (7 items), fatalistic determinism (5 items) and unpredictability (8 items). The items of the two scales were intermixed and displayed in a random order different for each participant with a scale ranging from 0 (*Not at all true*) to 4 (*Always true*).

Action as a choice. We adapted the recall task in Savani et al. (2010, study 4b). Participants were asked to recall the last instance of four real-life selection situations - purchasing electronics, watching television, eating breakfast and voting. All participants answered questions regarding all four situations and the order of the situations was randomized. For each of those situations, participants were asked to first recall and describe the situation [e.g. "Please describe the last time that you purchased electronics (a mobile, a computer, etc.). Please indicate - what did you purchase? when did you purchase it? where? and why did you make this purchase?"]. Participants were then asked regarding the number of alternative options they made the selection from, the importance of the decision to them at the time, and whether they believe that this selection constitutes a choice (e.g. "Would you agree or disagree that buying electronics constitutes as a choice?" ; 1 - *Strongly disagree that*

this action is a choice - I had no choice ; 5 - *Strongly agree that this action is a choice*). We averaged the scores across the four scenarios.

Choice ability and attitudes. For each of the four scenarios above, participants were also asked to indicate their perceived ability and attitudes towards the selection process, in terms of difficulty (0 - *Not at all difficult* ; 7 - *Very difficult*), enjoyment (1 - *I did not enjoy it at all* ; 5 - *I enjoyed it very much*), and satisfaction (1 - *Not satisfied at all* ; 5 - *Very satisfied*). For each of these items, we averaged scores of all four scenarios.

Results and discussion

Correlations between the free will beliefs scales, choice perceptions, choice ability and attitudes, and demographics is presented in Table 5. The three free will subscales were highly correlated (r = .58 to .82, p < .001). Across all free will subscales, the belief in free will was positively correlated with the perception of the selection actions as choices (FWD general: r=.56, FWD self: r=.51, FAD+: r=.49 ; all p < .001) while beliefs in fatalism were negatively related to perceptions of choice (r=-26, p < .05). The two FWD subscales were also positively correlated with perceiving selections as less difficult (FWD general: r = -.27, p <.05 ; FWD self: r = -.34, p < .01) and reporting higher satisfaction with their selection (FWD general: r=.27; FWD self: r=.29, both p < .05). The FAD+ free will subscale was correlated with perceived importance (r = .34, p <.01) and enjoyment (r = .33, p < .01). The differences in findings between the free will beliefs subscales might be attributed to the inclusion of items in the FAD+ free will subscale about moral responsibility (e.g. "criminals are totally responsible for the bad things they do" ; "people are always at fault for their wrong behavior") and self-control (e.g. "strength of mind can always overcome the body's desires" ; "people can overcome any obstacles if they truly want to"). Quite possibly, the enjoyment of the tasks recalled (eating breakfast ; selecting a TV show) is related to one's ability to self control (eating healthy and balancing work and leisure).

A multi-step regression analysis controlling for demographics, situation importance and number of alternatives shows all three free will subscales to have a strong relationship with perceiving actions as choices (e.g. FWD self: $F(5,57) = 5.04$, $p = .001$; $\beta_{FW} = .51$, $p < .001$; $R^2 = .31$, $\Delta R^2 = .25$, $p < .001$; demographics, number of alternatives and situation importance not significant).

We also tested for a mediation model of the belief in free will (with FWD self subscale) predicting higher satisfaction with selection through perceived difficulty, while controlling for age, gender and selection enjoyment. We conducted a series of multiple regression analyses. First, the belief in free will was positively related to satisfaction with choice ($\beta = 1.26$, $t(63) = 2.17$, $p = .034$), and negatively related to perceived difficulty ($\beta = -1.65$, $t(63) = -3.12$, $p = .003$). The mediator, perceived difficulty, was also negatively related to satisfaction ($\beta = -.44$, $t(63) = -3.28$, $p = .002$). We therefore ran the bootstrapping mediation analysis with bias-corrected confidence estimates, using a 95% confidence interval and 5000 bootstrap resamples (Preacher & Hayes, 2008). Results indicate that perceived difficulty mediated the relationship between belief in free will and satisfaction with selection ($\beta = .71$, CI = .14 to 1.72), and the direct effect of belief in free will became non-significant ($\beta = .54$, $t(63) = .92$, $p = .359$) therefore indicative of a full mediation (model summary: $R^2 = .29$, $F(5, 57) = 4.69$, $p = .001$). The inclusion of the controls had no effect over the model and the findings were similar for the FWD general subscale.

These findings show support for the link between the belief in free will and the concept of choice. Those who endorse the belief in free will tend to perceive actions involving a selection between alternatives as choices rather than mere actions that involve no choice. Moreover, two of three of the free will subscales also indicated the belief in free will to be associated with perceiving selections as less difficult and with having higher

satisfaction with the result of their selection. An analysis of a full mediation model indicated that the belief in free will predicts satisfaction with selection through perceived difficulty.

Study 3 - Choice activation

Studies 1 and 2 showed support for the relationship between the belief in free will and choice. To extent these findings we sought to examine the possible causal activation of the belief in free will using the concept of choice. Study 3 experimentally manipulated the idea of choice. The prediction was that the activation of the idea of choice would influence reported belief in free will.

Method

Procedure and Participants. One hundred and forty four participants were recruited through Amazon Mechanical Turk. Participants were led to believe they are participating in two separate studies. In the first part, participants performed a recall task designed to activate the idea of choice. Next, all participants were asked about their beliefs about free will. Lastly, participants were probed for suspicion as to the ostensible separateness of the two studies or the purpose of the manipulation. As some MTurk participants respond capriciously, we verified the attention check questions and compliance with instructions. Data from 30 participants were deemed contaminated by either failing the attention checks or unintentionally conflating the two conditions (e.g., writing actions instead of choices, or vice versa) thereby leaving a sample of 114 (M_{age} = 32.70, SD_{age} = 10.63, 65 females).

Measures

Choice manipulation. Choice manipulation was adapted from Savani and Rattan (2012). Participants will be randomly assigned to one of two conditions of the choice manipulation. In the action condition, participants were asked to recall five things they did the previous day during four different time periods: morning (8am-noon), afternoon (noon-4),

evening (4-8pm), and night (8pm-midnight). Participants in the choice condition were instructed to list choices and decisions among alternatives made in the same time periods.

Belief in free will. Belief in free will was measured using an eight-items self free will subscale of the Free Will and Determinism Scale (FWD scale, Rakos et al., 2008), as well as the belief in free will and fatalistic determinism subscales of the Free Will and Determinism Plus scale (Paulhus & Carey, 2011). The items from all subscales were intermixed with additional attention check questions, and the order of items was randomized so that the sequence was different for each participant.

Results and discussion

The two belief in free will subscales were highly correlated (r = .47, p < .001). Belief in fatalistic determinism was negatively correlated with the belief in free will in self but a had a much weaker correlation with the general belief in free will (FWD self: r = -.50, p < .001 ; FAD+ general: r = -.14, p =.13).

To assess how choice affected participants' beliefs in free will and determinism we analyzed differences between the two conditions using an independent samples t-test.. Results show that participants who had recalled making choices expressed higher belief in free will than participants who had recalled actions (FWD : M=4.15, SD=.51 versus M=3.85, SD=.46, t(112)=2.91, p=0.004 ; FAD+ : M=4.01, SD=.54 versus M=3.74, SD=.51, t(112)=2.451, p=.016). The FAD+ fatalistic determinism subscale also yielded differences: participants who recalled choices expressed less fatalistic determinism than those who recalled actions (M=2.31, SD=1.05 versus M=2.99, SD=1.04, t(112)=3.142, p=0.002). These results clearly show that recalling choices made compared to actions made strengthened participants beliefs in free will and weakened participants beliefs in fatalistic determinism.

Study 4 – Degree of choice activation

Study 4 was constructed to extend the findings in Study 3 in two ways. First, this study manipulated the degree of choice, aiming to show that more choice leads to a stronger activation of the belief in free will. Second, the findings in Study 3 had only two conditions which makes it unclear whether it is the choice recall that activates the belief in free will or whether it is the actions recall that causes disbelief in free will. This study therefore added a control condition. Lastly, this study was designed to replicate the findings from Study 3 using a different choice manipulation.

Method

Procedure and Participants. One hundred and eighty six participants were recruited through Amazon Mechanical Turk (M_{age} = 30.31, SD_{age} = 8.35, 77 females). Participants were led to believe they are participating in two separate studies - a marketing study followed by a psychology study. In the first part, participants were asked to perform a task designed to activate the idea of choice. In the second part participants were asked about their belief in free will using two free will scales (FWD and FAD+). Last, participants were probed for suspicion as to the purpose of the manipulation and the study.

Measures

Choice manipulation. The Vohs et al., (2008) choice manipulation was adjusted for the purpose of this study. Participants were randomly assigned to one of five conditions in three categories - choice (high choice, low choice), actions (rating, describing) and a control group (recalling the weather the previous day). In the choice conditions, participants were asked to make 13 choices. In the low choice condition, in each of the choice sets the participants chose between two pens, while in the high choice condition the choice was between four pens. The action conditions did not involve any choices but rather required the participants to perform 13 actions. In the rating condition, participants were asked to rate

pens on a scale of 0 (*Do not like it at all*) to 100 (*Like it very much*), while in the other condition participants were asked to describe the pens' features. The order of the pens in these four conditions was randomized. The control condition asked participants to recall the weather conditions the day before during morning (8am-12pm), afternoon (12pm-4pm), evening (4pm-8pm) and night (8pm-midnight ; temperature, rain, wind and pollution conditions). To make sure participants understood the task assigned to them, participants first read a description of the task they have been assigned to and were asked to answer a two quiz questions they had to answer correctly in order to be able to proceed to the task.

Free will beliefs. Free will beliefs were measured using the eight item self free will subscale of the Free Will and Determinism Scale (FWD scale, Rakos et al., 2008) and the general belief in free will subscale from the Free Will and Determinism Plus scale (FAD+, Paulhus & Carey, 2011). The items from the two subscales were intermixed and the order of items was randomized so that the sequence was different for each participant.

Results

The correlations between the FWD belief in self free will (α = .66) and the FAD+ general belief in free will (α = .76) subscales was high (r = .54, p < .001) yet there were slight difference in the way the two were affected by the choice manipulations.

The choice manipulation affected the general belief in free will so that the belief in free will was highest in the choice conditions and lowest in the control condition (Choice: M = 4.03, SD = .54 ; No Choice: M = 3.87, SD = .62 ; Control: M = 3.67, SD = .59 ; F(2, 183) = 3.75, p = .025). There were no significant differences between the two choice conditions (High choice: N=46, M = 4.03, SD = .58; Low choice: N=44, M = 4.03, SD = .51) or between the two action conditions (Rating: N=43, M = 3.85, SD = .58 ; Describing: N=32, M = 3.88, SD = .67). Significant differences were found between the choice conditions and the control

condition ($t(109) = 2.64$, $p = .009$), but not between the choice and no-choice or between the no-choice and control conditions.

The choice manipulation also affected the belief in self free will, but the pattern of results was slightly different. There were no significant differences between the low choice, rating, describing and control conditions, yet the high choice condition resulted in significantly higher rating of belief in self free will compared to all other conditions (High choice: M=3.83, SD = .55 ; Low choice: M = 3.51, SD = .44; Rating: M = 3.59, SD = .40; Describing: M = 3.38, SD = .50 ; Control: M = 3.55, SD = .47 ; $F(4, 181) = 4.91$, $p = .001$; High choice compared to the other conditions - low choice: $t(88)=3.01$, $p = .003$; rating: $t(87) = 2.41$, $p = .018$; describing: $t(76) = 3.73$, $p < .001$; control: $t(65) = 2.06$, $p = .044$).

Discussion

This study offers several significant extensions over study 3. First, the inclusion of the control condition makes it clear that it is the choice condition that leads to the activation of the belief in free will rather than actions leading to an activation of disbelief in free will. Second, the degree of choice matters, atleast for the belief in free will in self. While a choice between two pens was sufficient to activate the general belief in free will, it did not affect the belief in self free will. However, a choice between four pens successfully activated both beliefs, meaning that it is not only the actual existence of choice but also the extent of the choice or the number of options available within the choice that matters.

These findings may seem contradictory to Vohs et al., (2008). In their study, a similar choice manipulation was used and the findings indicated that making choice, as compared to taking actions, depleted participants of their self-control (termed 'ego depletion') so that they were less able to control their temptations in subsequent tasks. A depletion of self-control is conceptually close to having less free-will as a person is less able to overcome internal constraints in the form of urges, desires, wants and needs and therefore less able to make free

choices. Yet, a possible way to resolve the two sets of findings is that choice stimulates belief in free will, but having too much choice or having to make too many choices can be depleting and limiting to the feelings of having free will, especially so for 'maximizers' who are constantly preoccupied with making the best choices (Iyengar & Lepper, 2000 ; Schwartz, 2000, 2004). Quite possibly, the findings regarding choice manipulation of Vohs et al. (2008) and Iyengar & Lepper (2000) suggest that the effects found in this study may be reversed if one is faced with 'too much' choice, indicating a curvilinear relationship. Yet, it is important to note our findings clearly indicate that the presentation of simple choices stimulates the belief in free will in people's minds.

General Discussion

Four studies confirmed that, at least among laypersons, belief in free will is strongly and multiply linked to the idea of choosing. The first two studies showed that the more strongly people endorse the belief in free will, the more they associate choice with freedom, the more they perceive their actions to be choices, the more they enjoy making decisions and choices, the more confident they are about their ability to make such choices, the less difficult they perceive their selections to be and, finally, the more satisfied they were with their selections in life. Some of these factors were found to be correlated in Study 1 across a two-month hiatus and must therefore be assumed to reflect quite stable cognitive structures.

That high belief in free will entails belief in one’s ability to choose may be considered a matter of definition, though it may be important given the controversial variety of specialists’ definitions of free will. The link to liking choice in Study 1 however is not explicable based on definition, and indeed some have regarded free will as a burden of having to make choices (Fromm, 1941 ; Sartre, 1956) and choice as a possible constraint to elements that allow for more free will (Vohs et al., 2008), so that, in theory, free will belief might be associated with disliking choice. The liking finding thus suggests a motivational aspect.

People who like to make decisions may be glad to have the capacity to choose freely, and so they endorse that belief. In contrast, people who dislike choosing may wish to shed some responsibility for their decisions. Denying their own free will may be an appealing way of distancing themselves from their choices and the anticipated (or even feared) outcomes of those choices. Presumably, people do not need to worry about having chosen the wrong thing if all actions are inevitable and caused by prior events.

Study 2 extended the association between the belief in free and choice even further. People generally differ in the extent to which they perceive their lives to have choices (Savani et al., 2010; Savani, Stephens, & Markus, 2011), in the perceived difficulty in facing choices (Novemsky, Dhar, Schwartz, & Simonson, 2007), their enjoyment of making choices, and the level of satisfaction that they receive from their choices (Iyengar & Lepper, 2000 ; Mellers, 2000 ; Schwartz, 2000, 2004) and our findings indicate that these choice related factors are linked with the belief in free will. Those who believe in free will seem to welcome choices in their lives as a positive aspect in their lives.

Study 3 provided further evidence linking choosing to free will. Some participants recalled a series of choices they had recently made, and they subsequently expressed higher belief in their own free will than participants who recalled actions. The use of actions as the comparison group is revealing, because one could have thought that free will is more associated with taking action than with facing a choice. But our results clearly indicated that thinking about choice led to higher beliefs in free will than thinking about action. Furthermore, we found that thinking about choice reduced participants' belief in fatalistic determinism. Thus, as a result of recalling their own choices, people became less likely to think that human life is a preordained sequence of events and experiences, and they became more likely to regard it as something the individual controls and selects from amongst a range

of alternative possibilities. Use of the faculty of choice sensitizes one to its power and efficacy (or causes one to overestimate those, such as a salience bias).

But it is not merely choice itself that activates the belief in free will, but also the level of choice. Using a behavioral task involving choice, Study 4 revealed differences between having some choice (between two options) to having more choice (between four options), such that the activation of the belief in free will in self only took place when choice was high. The findings from Study 4 also makes it clear that it is choice that activates the belief in free will rather than having no choice that leads to disbelief in free will. Hence, combining with the findings from Study 2, it appears that those who believe in free will tend to view their own actions as choices, and that making choices reinforces their belief in free will.

The present findings suggest that the associative link between free will and choice is robust and potentially bidirectional. The belief in free will is conceptually more enduring and stable than attitudes and perceptions (Baumeister, Masicampo & DeWall, 2009 ; Wyer & Albarracín, 2004), and beliefs are generally viewed as the building blocks of action, and leading to the formation of attitudes and perceptions (Fishbein & Ajzen, 1975). Although studies 1 and 2 are correlational in nature, it is more reasonable to view the belief in free will as leading to the choice related attitudes and perceptions, rather than vise versa, especially given the timelag introduced in study 1. Hence, higher belief in free will was linked with a general tendency to view life as comprised of choices and a general positive attitude towards having choices and making decisions. Conversely, being faced with choice led people to report higher belief in free will.

Questions of free will have been debated for centuries, often in connection with abstruse metaphysical conceptions such as uncaused causes and immaterial but physically efficacious souls. The present findings add to a growing body of research suggesting the possibility of an alternative account of free will as being based on people's cognition and

behavior related to the concept of choice (Guglielmo, Monroe, & Malle, 2009 ; Monroe & Malle, 2010). For ordinary folk, free will seems to have a strong cognitive link to making choices without external coercion — and enjoying the process. Possibly this reflects a pragmatic orientation. Insofar as notions of free will serve social functions, the resolution of metaphysical disputes about causation and souls is not of pressing or practical importance. In contrast, making decisions and choices is for most people a vital part of daily life. People may be highly attuned to both external and internal forces that affect their capacity to choose freely in the situations they face.

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Chapter 3 - Bad is freer than good : The impact of valence over attributions of free will

Abstract

Six experiments showed that people associate higher freedom of will with negative valence as compared to positive valence. Recalling actual events, people attributed more free will to negative actions than positive ones (Experiment 1). In hypothetical decision making tasks, negatives outcomes (Experiment 2) and negative framing (Experiment 3) were attributed higher free will than positive ones. Using a game theory paradigm, defection against another player was perceived as involving higher free will than cooperation (Experiment 4). Findings were consistent for both actions taken by self and actions taken by others and using different measures. We did not find support for reverse causality (Experiment 6) and ruled out possible alternative accounts for the effect (Experiment 5). These findings support free will as underlying laypersons' sense-making and search for accountability for negative actions and outcomes.

Introduction

The idea that people have the capacity to make free, autonomous, responsible choices is one fundamental assumption of most if not all modern civilizations. For example, the belief that a given person could make different choices in a given situation is often essential to legal, moral, and political judgments (Searle, 2008). The conceptual plausibility of various notions of free will has long been disputed on various theoretical grounds, including the assumption of divine omniscience (Calvin, 1559) and the presumably deterministic nature of scientific causation (e.g., LaPlace, 1902). Regardless of the long complex conceptual philosophical disputes, free will can more simply be represented as a social reality looking at common beliefs people hold regarding human freedom and choice. Although most cultures

operate on the basis of some degree of belief in freedom of choice, people vary as to how much they regard human beings, including themselves, as being capable of making free choices (e.g., Baumeister, 2008 ; Paulhus & Carey, 2011). They also differ in their perception of how much free will people have compared to others (Gray, Knickman, & Wegner, 2011 ; Pronin & Kugler, 2010) and how much free will was exerted in certain situations (Helzer & Gilovich, 2012). Such fluctuations in degree of belief in free will are far more than idle metaphysical speculations, having been shown to alter behaviors (e.g., Alquist, Ainsworth, & Baumeister, 2013; Vohs & Schooler, 2008). More broadly, society often regards it as appropriate to adjust legal and moral judgments based on the assessment of whether a wrongdoer acted of his or her own free will (Greene & Cohen, 2004 ; Roskies, 2006).

Conceptual and cognitive links between free will and accountability suggest that people may associate different levels of free will for actions or situations that are of different valence and that the perception of contextual valence may influence variations in beliefs of free will. Previous findings regarding free will generally show higher perceptions of free will to be associated with more positive and less negative behavior (e.g. Vohs & Schooler, 2008), though conceptually free will can be thought of as having more freedom from social constraints which are generally meant to drive people to behave in a positive pro-social manner. Classic self-serving biases hint towards a possible interaction between valence and agent (e.g. less free will in ability to choose otherwise for bad actions taken by self), while some findings have shown that people generally tend to attribute higher free will in self versus others regardless of valence (Pronin & Kugler, 2010). These potentially contradicting predictions drive the present investigation examining the hypothesis that in laypersons' cognition actions with different valence would reflect different levels of free will, so that a negative or a positive action would motivate stronger or weaker overall beliefs in free will, possibly dependent on the agent in charge of the action. Findings from six studies

demonstrate that negative actions are perceived as freer and drive a stronger belief in free will than good actions, for both actions taken by self and by others.

Belief in free will and accountability

Why would people believe in free will at all? what is free will meant for? The philosopher Kant (1788/1997) proposed that obeying moral principles is an essential definition of free action and Nietzsche (1886/1966) went further with the assertion that the very idea of free will was invented as a societal tool to furnish a basis for blaming other people for their moral misdeeds. Baumeister (2008, in press) has contended that the human capacity for free action evolved to enable people to perform socially and culturally valued actions, especially when those conflict with animalistic and antisocial selfishness. In other words, the advanced form of action control that lies behind the popular notion of free will may have evolved to enable people to follow moral and legal rules rather than to be guided by socially undesirable impulses — thus to do good actions, not bad ones.

Several studies have provided evidence that the belief in free will is associated with positive behavioral effects. High belief in free will has been linked to being honest rather than cheating (Vohs & Schooler, 2008), to restraining aggression and promoting helpfulness (Baumeister, Masicampo & DeWall, 2009), to thinking for oneself rather than conforming mindlessly to other people (Alquist et al., 2013), and to learning positive lessons from one's guilty misdeeds (Stillman & Baumeister, 2010).

Yet, the effects of the belief in free will are not necessarily all positive. People with a stronger belief in free will also tend to be more punitive and retributional (Aspinwall, Brown, & Tabery, 2012 ; Carey & Paulhus, 2013 ; Clarke et al, 2014 ; Nettler, 1959 ; Shariff et al., under review) and less likely to forgive others for their mistakes and wrongdoings (Baumeister & Brewer, 2012 ; Nadelhoffer & Tocchetto, 2013).

However, a possible way to integrate and interpret all these findings is to assert that belief in free will is basically about accountability. The world view of those who believe in free will is grounded in the view that agents make a choice to act in a certain way that leads to a certain outcome and that . Those high in free will belief are more willing to exert effort (Alquist et al., 2013), have better self-control (Rigoni, Kühn, Gaudino, Sartori, & Brass, 2012 ; Rigoni, Wilquin, Brass & Burle, 2013), with stronger self-efficacy and lower helplessness (Baumeister & Brewer, 2012), and a much stronger motivation to succeed (Stillman et al., 2010). This encompasses a much wider view of free will than Kant's (1788/1997) and Nietzsche's (1886/1966) accounts of free will as being based in moral responsibility, and extends to accountability for outcomes more broadly. The belief in free will would also affect perceptions regarding general factors in life - success versus failure, self control versus giving in to temptations, self-orientation versus other-orientation, etc.. High belief in free will may lead to the expectation that agents, both others and self, are to be held more accountable for their actions, emphasizing deliberate agency rather than explanations of circumstances and personal uncontrollable factors when evaluating outcomes.

This formulation benefits from conceptual plausibility. A judgment based in accountability (moral, legal, performance, and otherwise) is essentially a decision about whether a person should have acted differently in a particular situation, especially if the situation outcome is perceived as negative. To assert that someone should have acted differently only makes sense if one assumes that the person could have acted differently and that the actions and the outcomes were not predetermined without any room for agentic choice (Nichols, 2006). The assumption that the same person could act differently in the same situation is the essence of most laypersons' conception of free will (e.g., Monroe & Malle, 2010; Stillman, Baumeister, & Mele, 2011).

Linking free will to accountability provides a basis for proposing that it should be particularly relevant to negative actions or outcomes. Negative outcomes are generally undesirable thus when evaluating the past provoking the need explain what went wrong, stimulating counterfactual thinking of what could have happened differently (Epstude & Roese, 2008), and searching for a cause and an agent to be held accountable. Looking at the future, the belief in free will motivates prospection, encouraging the generation and evaluation of options and increasing their complexity, time horizon, and accuracy (Seligman, Railton, Baumeister, & Sripada, 2013), allowing the person to better plan how to best avoid negative outcomes. Negative actions undermine the cultural and socio-economic fabrics of society (e.g., trust, cooperation, incentives, respect for rights of others), and therefore elicit stronger judgments and impressions than positive ones (Riskey & Birnbaum , 1974 ; Skowronski & Carlston, 1992).

Re-examining what has happened in the past, counterfactual thinking involves the tendency to think of all possible alternatives that could have happened, both in circumstances ('if only the bus came on time) or for the person ('if only I didn't oversleep'), upwards or downwards, and negative actions and outcomes generally elicit more upward counterfactuals of what may have happened to lead to a better outcome (Boninger, Gleicher, & Strathman, 1994; Roese, 1997). The need for accountability underlying the belief in free will is likely elicit a much more specific set of counterfactuals, one that mainly involves agentic 'could have's. Findings regarding counterfactual thinking triggered by negative outcomes show thought of a very broad range of counterfactuals. These may be situational 'could have's based on notions of luck ('if I only had luck on my side'), nature ('if only it did not rain'), fate ('if only I my astrological sign was different'), and laws of physics ('if only the sun did not rise this morning'), or person related 'could have's that are not based in choice but rather on personality ('if only I were an extrovert'), background ('if only I was born rich'), genes ('if

only I was taller') or counterfactuals that do not involve a deliberate choice ('if only I was not so tired'). However, the need for accountability underlying the belief in free will is likely to focus attention to what specifically the agent could have chosen to do otherwise, either acting in a more positive manner for negative actions or in affecting circumstances so that the result would have been different for negative outcomes.

The attribution of blame

When do people perceive others as accountable? When are agents blameworthy for an action or an outcome? Agents are more likely to be blamed if the action or the inaction to prevent was perceived as intentional (Davis, Lehman, Silver, Wortman, & Ellard, 1996; Masselli & Altrocchi, 1969; Shultz & Wells, 1985). Cushman (2008) makes a clear differentiation between two factors of moral judgments: the assessment of the agent's causal responsibility and an assessment of the agent's intent to harm. This distinction is important, since Cushman argues that the extent to which an action is perceived negative relies on the agent's intent, but the blameworthiness is more dependent on the perception of cause. Like free will, the term of intentionality is defined differently by different scholars, but Malle and Knobe (1997) summarize that atleast for laypersons an action is deemed intentional if it includes - (1) a desire for the outcome, (2) a belief that the action would lead to the outcome, (3) an intent to perform the action, (4) a conscious action, and (5) the capacity to act or not act. Free will underlies atleast two of these components, so to reduce ambiguity in the use of these terms, we refer to intentionality as involving the intent to perform the action so that it leads to a desired outcome (factors 1 and 3) while free will is about conscious action with the capacity to act or to not act (factors 4 and 5). Intent addresses the question - did the agent mean for this outcome to take place while free will addresses the question of whether the agent chose to act freely and could have chosen to act otherwise.

Malle, Guglielmo and Monroe (2012) theorize a process model of blame involving a few stages - (1) the detection that a negative outcome occurred, (2) an assessment of the agent as the casual determinant of the action, (3) a decision whether the agent acted intentionally, (4) a an evaluation of justification and obligation, and finally (5) an evaluation of the ability to execute and to have chosen to act otherwise. The belief in free will relates to both the perception of the agent as the casual determinant of the action and the capacity of the person to act. This process model therefore further extends the Malle and Knobe (1997) intentionality conceptualization to support intent and free agency as two core factors that underlie the attribution of blame (Shaver, 1985 ; Lagnado & Channon, 2008).

The culpable control model (Alicke, 2000) bases the attributions of blame in personal control, consisting of volitional behavioral control (freely chosen or compelled), causal control (causal link between the action and agent), and volitional outcome control (the exertion of control and effort leading to the outcome). All three components are factors in the way people make attributions and assign blame. This model views free will a component of personal control and makes a distinction between what the agent 'should have done' (volitional outcome control) to what the agent 'could have done' (volitional behavioral control; Lagnado & Channon, 2008). Using this view, actors are held accountable for their actions when there is a perceived link between the outcome and the agent, the action is perceived to originate from the agent, and the agent is perceived to have been able to choose otherwise (Heider, 1958 ; Schlenker, Britt, Pennington, Murphy, & Doherty, 1994).

The attribution of intentionality

It is not only that intent and free will affect attributions of blame, but the need to attribute blame in a negative situation may also affect attributions of intent and free will. Studies by Knobe (“Knobe effect”, 2003; Nichols, 2011) show that participants judged an

action by a CEO leading to negative outcomes as more intentional than actions leading to a positive outcome, possibly because of the need to attribute blame.

The classic attribution theory (Heider, 1944, 1958) and the correspondent inference theory (Jones & Davis, 1965) have set the basis for the investigation of how people make attributions to actions. While the original theories were hypothesizing regarding attributions of whether the actions were freely chosen by the agent, intentional and deliberate, attribution theory has since evolved to mainly focus on attributions to either the person or the situation, with constructs such as locus of control (Rotter, 1966) that tend to overlook the agentic origin of the action (Woolfolk, Doris, & Darley, 2005). Theorists have recently called for attribution theory to return to its theoretical roots by focusing on the free choice and intentionality of the enacting agent rather than whether it originated from the agent (Malle, 2011a, 2011b), calling into question findings regarding the classic fundamental attribution error that relies on the person-situation dichotomy (Malle, 2006; Malle, Knobe, & Nelson, 2007).

The Knobe (2003) findings have therefore since been challenged, also suggesting that the need to blame in negative circumstances is affected not only by intent but also by other factors in intentionality (e.g. desire versus intention, Guglielmo & Malle, 2010, see explanation about differences above). Moreover, the Knobe findings have been limited to the exploration of attributions in regards to others and not the self. We therefore extend this basic idea to argue that people make attributions of intentionality (intent and free will) to actions and outcomes based on circumstances, both in self and in others.

People's beliefs regarding the nature of mankind

Another possible factor that might affect perception of free will is whether people are perceived to be inherently good or bad. From very early stages babies not only make a clear distinction between good and bad (Premack & Premack, 1997) but also moral evaluations of agents as good or bad (Kuhlmeier, Wynn, and Bloom, 2003) and change their behaviors

towards those agents accordingly showing preference towards good over neutral and neutral over bad (Hamlin, Wynn, & Bloom, 2007). These findings suggest that we are born with the inherent expectation of agents to behave in a positive manner and to reject an agent that behaves badly (Wynn, 2008). Other work with children suggests that kids think of their moral actions as based in their freedom of will to and capacity to have done otherwise (Chernyak & Kushnir, 2013). Recent research on laybeliefs regarding good and evil and judgments of good and bad have shown that people perceive the 'true self' is a virtuous one and that people, both self and others, are inherently good, independent of mental states (Newman, Bloom, & Knobe, 2014). Moreover, moral traits are considered the most essential part of identity and the self (Strohminger & Nichols, 2014). Valence has shown to affect meta-desires, the degree to which agents embrace or reject impulses leading to their actions, such that people assume that agents would embrace their uncontrollable positive impulses and reject uncontrollable negative impulses, thereby discounting blame for impulsive bad behavior, but not so for impulsive positive actions (Pizarro, Uhlmann, & Salovey, 2003).

This line of research suggests the laypersons' assumption that agents would rather not possess negative impulses, or put another way - that agents are inherently good. If that is indeed the case, then good actions would be perceived as being the default and bad actions would be perceived as being more driven by free will and the decision to behave badly. Although a different set of beliefs, our arguments regarding the belief in free will suggest that belief in the good nature of mankind is possibly based in Nietzsche's (1886/1966) idea of an internalized cognition driven by social functioning of promoting good behavior over bad (Baumeister, 2008). Quite possibly, the belief in freedom of will and the belief in people's good nature may be interconnected.

Valence and attributions of free will

Our review the folk psychology of blameworthiness and the belief in the inherent good nature of man-kind is linked to the notion of free will, to suggest that the valence of an action or outcome would affect the attributions people make about freedom of will. Based on our theoretical analysis of free will belief as linked to accountability, we predicted that people would judge bad actions and outcomes to reflect higher free will than good actions.

In the present investigation we examined both beliefs about free will in general regarding others, as well as particular beliefs about one's own free will. With regard to free will in others, we expected that in order to be able to hold someone accountable people may find it useful to attribute free will to the enacting agent.

This hypothesis that people attribute free will to negative actions and outcomes is however not easily extended to cases in which the agent is the self. People may be motivated to deny their own free will so as to reduce accountability for negative things happening to them. We therefore entertained competing predictions regarding such cases. One prediction derived from the widely familiar self-serving bias (e.g., Kunda, 1987 ; Zuckerman, 1979), by which people seek to take credit for success but deny blame for failure. Similarly, negative agency bias (Baumeister, Stillwell, & Wotman, 1990 ; Morewedge, 2009) argues that people tend to hold attributions of success to internal factors and attributions of failures to external cause or to an agent. If so, positive actions by self might motivate higher free will ("I could have done bad, but I made the decision to do good") and negative actions to less free will in order to reduce feelings of guilt ("I had no other choice, but to do harm," "It was out of my control," or "It was someone else's fault."). On that basis, it was possible to predict that people would perceive high free will in connection with negative outcomes for others but not in connection with their own circumstances.

A second possible prediction is that attributions of free will would be higher in connection with one's own actions than in connections with others — possibly regardless of the valence of those actions. Pronin and Kugler (2010) found that people generally think they have more free will than other people. Their work did not specifically examine valence, so contrary findings would not necessarily conflict with their work, but it was at least possible that the same pattern they found would minimize differences in attribution according to valence.

The third possible prediction was simply that results would be quite similar for self as for others. That is, in both cases, negative actions and outcomes would elicit higher attributions and perceptions of free will than good behaviors. This would constitute a broader version of Kant and Nietzsche's account of free will as based on societal accountability, that free will serves a social-cultural role to allow to hold agents accountable for outcomes and that people internalize such views to affect cognition for both others and self.

Experiment 1

Experiment 1 provided the first test of the hypotheses. Participants rated their perceptions of free will after recalling either a good or a bad action by themselves or by someone else. We assessed attributions of the recalled actor's free will, both at present and in future situations. In order to avoid priming people's beliefs in free will and confounding answers to the different perspectives people hold regarding the loaded term of 'free will' we applied indirect measures of free will attributions and avoided using the term of free will (Pronin & Kugler, 2010), instead asking the relevant operative question of whether the person could have acted differently (Chernyak & Kushnir, 2013; Nichols, 2004). We adopt the definition by a recent combined effort of social psychologists and experimental philosophers of free will as the capacity to perform free actions (Haggard, Mele, O'Connor, & Vohs, 2010) meaning that the person could have acted otherwise in the availability of options and the

capacity to choose among those options without coercion (Baumeister, 2008; Kane, 2002). Both sophisticated philosophical treatments (e.g., Kane, 2011) and layperson views (e.g., Monroe & Malle, 2010) tend to regard the capacity to act otherwise as an essential core of free will (Nichols, 2004). These measures were specifically meant to provide the clearest and simplest measure of free will attributions without addressing the issue of determinism, capturing the participant's own views of free will regardless of views on compatibilism (Nahmias, Morris, Nadelhoffer & Turner, 2004).

Method

Participants and design. Undergraduate students (N=212, 112 females ; M_{age} = 19.17, SD_{age} = .97) at a university in Hong Kong received course credit for completing one of four versions of a survey questionnaire (2×2, randomly assigned ; self versus other as agent, and negative versus positive situation recall).

***Procedure and materials*.** Participants were instructed to recall and describe in writing a recent interaction with another person, in which one person did something to the other. By random assignment, half were assigned to write about the self doing something to the other person and the rest were assigned to write about the other person doing something to them. Cross-cutting this, half were randomly assigned to write about positive actions, and the rest about negative ones.

Following the short essay, the participants were asked to indicate their level of agreement with free will statements (1= *strongly disagree*, 5= *strongly agree*). In line with the definition of free will, we asked the participants about the ability of the acting person to choose otherwise. The first question asked whether the person (self or other) “could have chosen to act differently in that situation”. To go beyond counterfactuals for what might have happened we also asked about future situations of what may be. The second asked that if the two people “were to face the same situation again” whether the actor “would be able to

choose a different course of action that would lead to a different outcome". These two items were designed to capture the dimensions of both past agentic counterfactuals and future prospection.

To better capture agentic counterfactuals we also adapted the Pronin and Kugler measure of free will as alternatives to action (2010, studies 2 and 3) and asked about whether the self or other person could have done regarding the specific recalled situation. Participants were asked "looking back, how - if at all - could [you/the other person] have acted differently? Please provide as many options as you can about how you think [you/the other person] could have acted differently in that situation" further instructing that "write down 'no other possible actions' if and only if you think [you/the other person] could not have acted differently in any way". Responses were coded for the number of alternatives mentioned.

Also, based on Pronin and Kugler's (2010, experiment 1) conceptualization of free will attributions one item measured free will by an indirect measure of predictability (lower free will) - "The decision in this situation could have been predicted."

Results & Discussion

The bad actions were rated as freer than the good ones, as indicated by analysis of variance (ANOVA). There was a significant main effect for the valence of the action. That is, participants gave higher free will ratings to the actor who performed the bad action than the actor who did something good, both for the specific action they wrote about (self-negative: M = 3.68, SD = 1.00; self-positive: M = 2.48, SD = 1.09; other-negative: M = 3.94, SD = 1.03; other-positive: M = 3.41 , SD = 1.05; negative/positive: F (1,211) = 36.16, $p < .001$), and for possible, similar situations in the future (self-negative: M = 3.33, SD = .98; self-positive: M = 2.55, SD = 1.04; other-negative: M = 3.15, SD = 1.16; other-positive: M = 2.79 , SD = 1.04; negative/positive: F (1,211) = 15.54, $p < .001$). Participants also wrote down more agentic counterfactuals in the negative conditions than in the positive condition (self-negative: M =

1.36, *SD* = 1.26; self-positive: *M* = .91, *SD* = 1.12; other-negative: *M* = 1.92, *SD* = 2.26; other-positive: *M* = 1.42 , *SD* = 1.47; negative/positive: *F* (1,211) = 12.19, *p* = .029).

On the measure of perceived free will in the recalled situation there was also a significant main effect of self vs. other, *F*(1, 211) = 17.40, *p* < .001. A significant interaction also emerged, *F* (1,211) = 5.46, *p* = .02, indicating that differences between self and other were larger with regard to the positive action than the negative one. A main effect for self versus other was also found for the number of agentic counterfactuals, *F*(1, 211) = 15.23, *p* = .015, but no interaction was found (*F* = .02, n.s.).

Lastly, negative actions were found as less predictable, but only for actions by the self, with a main effect for valence, a marginal main effect for self/other, and an interaction (self-negative: *M* = 2.58, *SD* = .95; self-positive: *M* = 3.41, *SD* = .92; other-negative: *M* = 3.33, *SD* = 1.04; other-positive: *M* = 3.16 , *SD* = .99; negative/positive: *F* (1,211) = 6.14, *p* < .001 ; self/other: *F* (1,211) = 3.53, *p* < .001; interaction: *F* (1,211) = 13.30, *p* < .001).

All four measures point to negative valence as being associated with a higher degree of free will. The finding that people attributed higher free will to others than to the self in the first three measures may seem to contradict earlier evidence that people believe they have more free will than other people have (Pronin & Kugler, 2010). A possible explanation for the Pronin & Kugler findings has to do with their indirect measures of free will. Regarding their use of predictability, our forth measure, the authors argue that there is an alternative account to their findings regarding the self/other main-effect as it is possible that people see predictability as undesirable and were trying to protect their self image as being unpredictable. Our findings of an interaction between valence and agent using their measure of predictability suggest that participants are acting to maintain their self image, but in this case - as being inherently good, as they report their negative actions to be less predictable than their good actions. In their other studies (measuring possible alternatives and agency) the

authors looked at neutral situations in life that involve no valence (e.g., school, career, romance, social life, and everyday life) and no implications for others. Quite possibly, the need to attribute blame or praise or the underlying assumptions regarding the nature of mankind triggered by valence affect the impact of self-other for attribution of free will.

While an autobiographical recall measure is an effective way to assess participant's cognition about real events of personal relevance and importance, it also introduces the possibility that people selectively recall different sorts of actions in different conditions. It is possible, for example, that participants chose to write about free actions by others and less free actions by themselves (though we know of no compelling theoretical basis for that interpretation). The subsequent studies sought to rectify some of these ambiguities.

Experiment 2

Experiment 2 sought to replicate the findings of Experiment 1 with several vital refinements and improvements. The autobiographical recall procedure used in Experiment 1 has several advantages such as invoking actual experiences, but it inevitably sacrifices control over just which experiences people choose to describe. In Experiment 2, all participants contemplated carefully controlled variations on the same (hypothetical) event.

The event itself was a variation on the “Asian disease” scenario originally used by Tversky and Kahneman (1981). It refers to an impending epidemic and a choice between two public health interventions, one of which might save everyone but might also save no one, whereas the other would guarantee saving some lives but not all. Tversky and Kahneman used it to show that people’s preferences between those options shifted as a function of whether the interventions were described in terms of lives saved or lives lost. Our adaptation of the scenario went a step farther, however. Participants were told to imagine that the decision had been made either by themselves or by someone else, and that the decision made was to pursue the high-risk, high-payoff option (i.e., take a chance on saving everyone). Half

were told the decision had turned out well, saving all lives, whereas the others were told to imagine it had gone badly and no one was saved.

This specific problem was chosen because it entails a more complex decision than simply doing something good or bad. The assumption is that the decision maker was trying to do something good and save lives but had to choose between a chance at saving many or a certainty of saving relatively few. The goodness or badness of the action was thus not in the actor's intent but rather in how the risky decision turned out, thereby ruling out intent as a possible alternative explanation.

Method

***Participants and design*.** Two hundred and four participants (M_{age} = 30.15, SD_{age} = 8.99 ; 84 females) on Amazon Mechanical Turk received US$0.05 for completing one of four versions of a questionnaire (2×2, self versus other and negative versus positive, randomly assigned).

***Procedure and materials*.** Participants were presented with the "Asian disease" problem (Tversky & Kahneman, 1981), in which a decision maker faces a dilemma of choosing between two types of medicine aimed to help a situation where 600,000 people are expected to die from an impending epidemic. There were two options. The riskier one offered a 1/3 chance of saving everyone but a 2/3 chance of not saving anyone. The safer option presented a certainty of saving one-third of the lives at stake but thus consigning the other two thirds to certain death. Participants were also told that the decision had been made to pursue the riskier option. Half were told to assume that they themselves had made that decision, whereas the rest were told to imagine that someone else had decided. Outcome was also manipulated: Half were told to assume that the intervention had been successful and everyone was saved, whereas the rest were told to imagine that it had failed, and all 600,000 lives had been lost.

The scenario was followed by two multiple-choice quiz questions participants had to answer correctly (as an attention check, because Mturk participants sometimes respond randomly or capriciously) and a manipulation check. Participants were then asked to indicate their agreement with the two measures of the ability to choose otherwise in the past and in the same situation in the future that had been used in Experiment 1 (adapted slightly for this scenario).

Results & Discussion

The manipulation of valence was successful. Participants in the negative conditions rated the outcome as more negative than those in the positive conditions (self-negative: M = -36.62, SD = 68.95; self-positive: M = 78.73, SD = 38.00; other-negative: M = -62.18, SD = 58.02; other-positive: M = 75.80 , SD = 35.80; negative/positive: F (1,203) = 303.97, p < .001).

Experiment 2 replicated and extended the findings of Experiment 1. Contemplating the bad outcome led people to attribute greater freedom to the decision maker than contemplating the good outcome. ANOVAs revealed main effects for outcome valence on both measures. That is, participants rated the bad-outcome decision as freer than the good-outcome one (self-negative: M = 3.87, SD = .90; self-positive: M = 3.20, SD = 1.24; other-negative: M = 3.78, SD = 1.01; other-positive: M = 3.12 , SD = 1.24; negative/positive: F(1,203) = 16.45, p < 0.001), and likewise they rated the bad decision maker as freer with regard to possible future decisions in similar situations (self-negative: M = 4.13, SD = .85; self-positive: M = 3.43, SD = .98; other-negative: M = 4.17, SD = .83; other-positive: M = 3.33 , SD = 1.21; negative/positive: F(1,203) = 30.76, p < 0.001).

The main effects of the self/other variable were not significant on either measure. The interactions between outcome valence and self/other were likewise not significant. These

findings speak against placing much weight on the significant interaction effects obtained with two (out of four) of the measures in Experiment 1.

Thus, both studies found that people attribute more free will to the authors of an action with a bad outcome than to the authors of an action with a good outcome. The finding from Experiment 1 was not dependent on differential selection of what event to recall, because it was replicated in Experiment 2 with all participants contemplating the same scenario.

Experiment 3

Experiment 3 was a companion to Experiment 2. It again used the Asian disease scenario, but this time with good or bad (framed) outcome and decision by self or other. Experiment 2 manipulated the outcome of a risky decision that turned out either well or badly. Experiment 3 held the outcome constant and simply manipulated the framing, that is, whether the outcome was described in terms of lives saved or lives lost. This would address a potential confound in Experiment 2, which is that the number of deaths exerted some untoward effect on persons' judgments (e.g., the feeling someone must be blamed for so many deaths).

Method

***Participants and design*.** Two hundred and ten participants (M_{age} = 29.98, SD_{age} = 9.11; 93 females) on Amazon Mechanical Turk received US$0.05 for completing one of four versions of the "Asian disease" scenario (2×2, self versus other and negative versus positive frame, randomly assigned).

***Procedure and materials*.** The Asian disease scenario used in Experiment 2 was adapted for Experiment 3. As in the previous study, it described an impending epidemic and a choice of interventions, made by either the self or another person. This time, however, participants were instructed to visualize that the non-risky option had been chosen, thus

saving a third of the at-risk lives. For half the participants, this outcome was described in terms of the lives that were saved. For the rest, the outcome was described in terms of the number of deaths. This differential framing was similar to what was originally used by Tversky and Kahneman (1981) with this scenario.

The scenario was followed by a two multiple-choice quiz questions participants had to answer correctly in order to proceed (again, intended as checks on attention and understanding) and a manipulation check. Participants were then asked to rate their perceptions of whether the person could have acted differently, using the same two items as in Experiment 2.

Results & Discussion

Participants in the positive framing conditions rated the outcome as more positive than those in the negative framing conditions (self-negative: M = 3.80, SD = 65.87; self-positive: M = 47.75, SD = 41.62; other-negative: M = 2.04, SD = 70.07; other-positive: M = 58.89 , SD = 35.01; negative/positive: F (1,209) = 44.47, $p < .001$) indicating a successful manipulation of the framing valence.

An ANOVA analysis revealed significant main effects of framing on both measures. Regarding the decision itself, participants perceived more scope for the decision maker to have chosen otherwise when the outcome was framed in terms of losses than in terms of gains (self-negative: M = 3.59, SD = 1.12; self-positive: M = 3.00, SD = 1.12; other-negative: M = 3.44, SD = 1.13; other-positive: M = 2.89 , SD = 1.10; negative/positive: F(1,209) = 13.74, $p < 0.001$). They also attributed higher freedom to the decision maker in future similar situations following the death frame than the lives-saved frame (self-negative: M = 3.67, SD = 1.13; self-positive: M = 3.18, SD = 1.13; other-negative: M = 3.48, SD = .95; other-positive: M = 3.26 , SD = 1.18; negative/positive: F(1,209) = 5.34, p = .022).

As in Experiment 2, the main effect of decision maker (self versus other) was not significant on either measure. The interactions were also not significant.

Thus, even when the decision outcome was objectively the same (i.e., 400,000 deaths and 200,000 lives saved), and only the framing was manipulated, attributions of free will varied as a function of valence. Contemplating the outcome in terms of lives lost made people attribute more freedom to the decision maker than contemplating it in terms of lives saved. As in the preceding studies, the same effect was found for judging the specific decision as for evaluating future possible similar actions.

Experiment 4

This experiment sought to extend previous experiments using a specific interaction between two persons. That is, it measured free will perceptions in a two-person "prisoner's dilemma" interaction (Rapoport & Chammah, 1965), in which the actions of a person hold direct and clear consequences for the other party. The decision is either positive or negative and made by either self toward a friend or a friend toward self. This specific paradigm was chosen as a widely-used simplified classical representation of a social interaction with clear positive or negative valence attribution for both sides. The general prediction was that participants would perceive more free will when the person defected (seeking one's own benefit at the other's expense) than when the person cooperated (taking a risk in pursuit of mutual benefit).

Method

Two hundred and eight participants on Amazon Mechanical Turk received US$0.05 for completing the study. They were randomly assigned among four conditions (2 × 2, self versus other and negative versus positive action).

Participants were presented with a "prisoner's dilemma" scenario, in which they were asked to imagine playing together with a friend to win a possible prize and where both self

and friend have the option to cooperate or defect. Unilateral defection brought big gains for the defector (US$75) while the cooperating partner received nothing. Mutual cooperation brought both parties the good outcome of US$45. Mutual defection resulted in a small benefit (US$15) to both. Four multiple-choice questions were administered to ascertain that the participant understood the game and instructions and had to be answered correctly before proceeding.

Next, participants were told to imagine that the game had been played. They were told to imagine a particular response by either themselves or the friend (other player). Thus, there were four conditions: the friend cooperated or defected, or the participant cooperated or defected. Game theory situations with cooperation and defection can be considered positive or negative depending on the view used to assess the situation. We administered manipulation check questions aimed to measure the perceived implications of the action on the other player (1 - "please indicate whether [your/your friend's] choice has positive or negative implications for [your friend/you]" with positive or negative options, and 2 - "On a scale of -100, most negative, to 100, most positive, how would you rate the implications of [your/your friend's] decision for [your friend/you]"). A correct answer in the manipulation checks was a prerequisite to inclusion in the analyses, because only their data can properly be considered a test of the hypotheses regarding valence, leaving a sample of 135 (M_{age} = 30.36, SD_{age}= 9.56 ; 63 females).

Last, the dependent measures were administered. Perceived freedom to act differently was measured with the same two items as in the preceding studies, plus an additional item measuring predictability (see study 1; Pronin & Kugler, 2010, experiment 1).

Results & Discussion

For attributions of the the current decision made, participants perceived a negative action (defection) to be of higher free will than that in a positive action (cooperation), but

only for the other condition, indicating an interaction (self-negative: *M* = 3.42, *SD* = 1.26; self-positive: *M* = 3.40, *SD* = .97; other-negative: *M* = 4.00, *SD* = .74; other-positive: *M* = 3.24 , *SD* = 1.17; negative/positive: $F(1, 136) = 4.03$, $p = .047$; interaction: $F(1,136) = 3.69$, $p = .057$).

The pattern for similar future decisions and predictability, however, resembled the pattern in previous studies. Defection showing higher free will attributions than cooperation for the same situation in the future (self-negative: *M* = 3.84, *SD* = 1.17; self-positive: *M* = 3.36, *SD* = 1.26; other-negative: *M* = 3.73, *SD* = .87; other-positive: *M* = 3.20 , *SD* = 1.16; negative/positive: $F(1, 136) = 5.75$, $p = .018$) and predictability (reversed ; self-negative: *M* = 2.94, *SD* = 1.03; self-positive: *M* = 3.38, *SD* = .99; other-negative: *M* = 2.77, *SD* = .86; other-positive: *M* = 3.36 , *SD* = 1.17; negative/positive: $F(1, 136) = 7.22$, $p = .008$).

The predictability measure in this study, unlike the one in study 1, followed the overall expected pattern of differences between positive and negative. A possible reason for the differences lies with the flexibility of study 1 recall task as compared with the fixed situation in this study. Also, study 1 possibly involved stronger bad actions than mere defection in an overall theoretical gain-oriented game theory paradigm. Thus far, in studies 1, 2 and 3, there were no differences between the free will attributions of past or current decision, as compared to the same situation in the future. Yet, in this study there were differences, with the past attribution valence effect only showing for the other condition. Quite possibly, the perceived implications of a defection in this theoretical paradigm were not as strong as the Asian disease and personal recall in the other studies that would trigger the need for a higher attribution of will.

Yet, overall, free will was again perceived more strongly in connection with misdeeds than with virtuous action, which in this study took the form of making defensive / exploitative moves that promoted one's own interests at the expense of the other, rather than

cooperation for mutual benefit. Thus, our findings generally suggest that people perceive more free will in cases of bad than good actions, regardless of who performed those actions.

Experiment 5

Experiment 5 was constructed to extend findings by examining possible mechanisms by which valence leads to perceptions of free will. Specifically, we look at whether these findings might be driven by the "bad is stronger than good" effect (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001), in that more significant actions would be perceived as more free and hence - bad will be more free. In order to keep all other variables constant, we extend the Asian Disease design from experiment 3 by manipulating the number of people saved/killed, which is an indictor for the significance of the decision involved. If more significant events are perceived as involving higher free will then we expect that an action involving a larger number of people saved/killed would be attributed more free will.

A possible competing hypothesis is that more significant (stronger) actions are perceived as less free because of perceived stronger expectations of scrutiny from the environment as to what would be considered an acceptable action or outcome. Previous findings regarding the manipulation of the number of lives saved/killed in the Asian Disease scenario (Shimizu & Udagawa, 2011) follow the "peanut effect", in which people are higher risk-takers when the number of lives at stake is lower (Weber & Chapman, 2005). This might imply that risk-taking with a larger number of lives is perceived as less acceptable because the consequences of the decision are more serious and should not be gambled with, hence as allowing for less freedom of will.

Another possible alternative account for our findings is that 'free to have chosen otherwise' is simply derived by 'should have done otherwise'. In the introduction we discuss the differences between 'should' (volitional outcome control) and 'could' (volitional

behavioral control; Lagnado & Channon, 2008), and we therefore also measure the perception that things should have been done differently.

Method

Participants and design. One hundred and seventy eight undergraduate students participated in return for course credit, completing one of six versions of the "Asian disease" scenario (3×2, negative versus positive frame and number of lives – 6 / 60 / 600, randomly assigned). Twenty six participants failed to answer screening questions assessing participants' attentiveness, leaving a sample of 152 participants (M_{age} = 18.90, SD_{age} = .75 ; 97 females)

Procedure and materials. Participants were presented with a scenario. As in experiment 3 the scenario described an impending epidemic and a choice of interventions made by another person. Participants were instructed to visualize that the non-risky option had been chosen, thus saving a third of the at-risk lives. For half the participants, the outcome was described in terms of the lives that were saved. For the rest, the outcome was described in terms of the number of deaths. Following Shimizu and Udagawa (2011) we manipulated the strength of the situation by manipulating the number of lives that were at stake – 6, 60, and 600.

The scenario was followed by a two multiple-choice quiz questions participants had to answer correctly in order to proceed (intended as checks on attention and understanding) and a manipulation check (positive/negative). Participants were asked to rate their perceptions about the decision maker's freedom ("Frank was free to choose to act differently in this situation") and to indicate the extent to which they think the decision maker should have made a different decision ("Frank should have made a different decision") on a seven item scale (1 = *Strongly disagree* ; 7 = *Strongly agree*).

Results & Discussion

The manipulation of the framing valence was successful. Those presented with the negative framing perceived the outcome to be more negative (M = 4.65, SD = 51.33) than those presented with the positive framing (M = 37. 92, SD = 35.7 ; $t(146) = 20.71$, $p < .001$).

The strength of the situation affected the extent to which the decision was perceived as free. Those presented with a stronger situation (600 lives: M = 3.94, SD = 1.39) perceived the decision as less free than those presented with weaker situations (60 lives: M = 4.83, SD = 1.35, $M_{diff600,60}$ = -.89, p = .007 ; 6 lives: M = 4.60, SD = 1.69, $M_{diff600,6}$ = -.66, ; $M_{diff60,6}$ = n.s. ; $F(2, 146) = 5.17$, p = .007). This supports the hypothesis that more significant (stronger) situations are perceived as less free. There was a marginal main effect for the valence framing, indicating that those who were presented with the negative frame generally perceived the situation to be freer than those presented with the positive frame (negative: M = 4.65, SD = 1.46 ; positive: M = 4.27, SD = 1.55 ; $t(146) = 2.80$, p = .10). No interaction was found between valence framing and situational strength. Full report of means is detailed in Table 6.

Taken together these findings provide marginal support for the findings in experiment 3 regarding the effect of valence over free will attributions. We conclude that the effect of negative being freer than positive can not be attributed to the 'bad is stronger than good' effect (Baumeister et al., 2001), as stronger situations are perceived as confounding freedom rather than supporting it.

We further examined whether this effect is due to a simple association between 'person could have done differently' and 'person should have done differently'. We found a significant interaction between situation strength and framing valence ($F(2, 146) = 5.21$, p = .007). There were significant differences in perceptions of whether the decision maker should have chosen differently between the situation strength conditions for the positive framing

(600 lives: M = 3.56, SD = 1.32 ; 60 lives: M = 3.70, SD = 1.58 ; 6 lives: M = 5.24, SD = 1.64 ; $M_{diff600,6}$ = -1.68, p < .001 ; $M_{diff60,6}$ = -.1.54, p = .001 ; F(2, 146) = 8.70, p < .001) but not for the negative frame (600 lives: M = 4.15, SD = 1.75 ; 60 lives: M = 4.00, SD = 1.77; 6 lives: M = 3.91, SD = 1.34, F(2, 146) = .146, p = n.s.). These findings indicate that people believed that the risky choice should have been chosen instead of the non-risky choice only when the frame was positive and the number of lives involved was small. This could be attributed to the "peanut effect", meaning that people are more risk seeking when the number of lives involved is smaller, but only so if the outcome was positive. Meaning, since the decision was to pursue the non-risky choice and the outcome turned out positive then the the decision maker should have chosen the riskier medicine that might have resulted in more lives saved (Weber & Chapman, 2005). Importantly, the pattern of results differed between the freedom of the actor and what the actor should have done, especially when the significance of the decision is lower. Therefore, the perception of the capacity to choose otherwise could be a prerequisite that someone should have acted otherwise but the underlying meaning and the pattern of results seems to differ.

Experiment 6

Experiment 6 was constructed to test reverse causality and the hypothesis that the more actions are perceived as free the more likely people would be to perceive those actions as negative, also looking at the associations between the belief in free will and accountability.

Method

***Participants and design*.** Seventy nine undergraduate students participated in this study in return for course credit. Participants were randomly assigned to one of four conditions (ultimate constraint, high constraint, medium constraint, low constraint).

***Procedure and materials*.** We adapted the constraints manipulation of Woolfolk, Doris and Darley (2006) in which participants were presented with different versions of the

same negative action – killing another person. The manipulation about the level of external coercion to perform action. The background story in all conditions was a situation in which a plane had been hijacked by kidnappers asking for a very high ransom with the plane forced to land in unfamiliar territory and the hijackers having executed one passenger to show their commitment. The story focuses on the actions of Frank who has been ordered by the hijackers to kill another passenger. In the absolute coercion condition, Frank was injected with a “compliance drug" that makes him unable to resist commands to kill a person. In the high, medium and low coercion conditions Frank has a gun to his head forcing him to kill another passenger with varying chances to overcome the situation. In the high (medium) condition there are eight (three) kidnappers with (three) machine guns and Frank is told that if he does not comply he and 10 other passengers will be shot. In the low coercion condition there are two kidnappers with two machine guns and if Frank does not obey, he will be shot.

Participants were asked to answer a manipulation question “Was Frank free to choose to action differently in this situation?” (0 – *Not at all free* ; 6 – *Completely free*).

Perceived action valence. One item measured the participants perceived valence of the action (-100 – *Very negative* ; 100 - *Very positive*).

Moral responsibility. Woolfolk et al. demonstrate that conditions with different coercion are perceived with increasing degrees of moral responsibility. We asked participants - “To what extent do you think Frank is responsible for what he did, should be held accountable and is to be blamed for his actions?” (0 – *Not at all* ; 6 – *Fully responsible for his actions*) ;

Perceived guilt. One item measured Frank's perceived guilt - “To what extent [does Frank/do you] feel guilty?” (0 – *Not at all guilty* ; 6 – *Feels very guilty*).

Results

The correlations between the measures of perceived free will, moral accountability, guilt and valence are reported in Table 7. Perceived free will was associated with higher moral accountability (r = .48, p < .001), and negative valence (r = -.25, p = .029), and was also marginally related to guilt (r = .19, p = .097).

An ANOVA analysis of the manipulation check indicated that the manipulation of coercion level was successful (ultimate coercion: N = 16, M = 1.50, SD = .63; high coercion: N = 22, M = 2.59, SD = 1.50 ; medium coercion: N = 19, M = 2.89, SD = 1.29; low coercion: N = 22, M = 3.45, SD = 1.60 ; F(3, 75) = 6.69, p < .001). Also, in line with Woolfolk et al. (2006), higher level of coercion (less free will) was associated with decreased levels of moral accountability (ultimate coercion: M = 2.00, SD = .97; high coercion: M = 2.68, SD = 1.25 ; medium coercion: M = 3.05, SD = 1.08; low coercion: M = 3.32, SD = 1.29 ; F(3, 75) = 4.31, p = .007).

However, there were no differences between the conditions regarding perceived guilt (ultimate coercion: M = 4.44, SD = 1.86; high coercion: M = 4.77, SD = 1.41 ; medium coercion: M = 4.58, SD = 1.17; low coercion: M = 5.27, SD = .98 ; F(3, 75) = 1.43, p = .239ns) or perceived action valence (ultimate coercion: M = -12.38, SD = 49.73; high coercion: M = 4.91, SD = 56.07 ; medium coercion: M = 17.32, SD = 52.83; low coercion: M = -18.77, SD = 47.51 ; F(3, 75) = 2.00, p = .121ns). The manipulation fell short of showing support for the hypothesis that perceived freedom of will leads to actions being perceived as more negative. The main deviation in results from the hypothesis is regarding the high coercion condition, which - although perceived as less free and with less moral responsibility, is still perceived as very negative valence. It is possible that the dilemma posed in the other condition of shooting the person or saving self and other people makes the agent a hero despite a very negative action, while in the ultimate coercion condition there were no

suggested positive outcomes to the act of killing. Another possibility is that the ultimate coercion makes the action seem as if it was initiated by the hijackers rather than the person, hence attributing them with a stronger negative attribution. Regardless, this study provides an example where higher attributions of free will which are associated with stronger moral accountability do not necessarily mean that the perceived action was more negative.

General Discussion

The primary finding of this investigation was that bad actions were perceived as freer than good ones, for both actions taken by self and actions taken by others. Participants rated the agent who performed the bad actions as having greater capacity to act differently both in that situation and in other possible similar situations in the future (experiments 1 to 4), also indicated by the number of agentic counterfactuals associated with the action (experiment 1). Bad actions were also rated as less predictable than good actions, which is indicative of higher freedom to act, and indicative of expectations for people to be inherently good (experiments 1 and 4). The higher perception of freedom for bad than for good actions was consistent across multiple methods, including recalling actual autobiographical experiences from participants' lives (experiment 1), and carefully crafted hypothetical scenarios with general (experiments 2 and 3) and specific (experiment 4) implications. We showed that the valence effect over free will attributions generalizes for actions taken (experiments 1 and 4), outcomes (experiment 2) and mere framing (experiment 3). We addressed possible alternative accounts, showing that this effect is not driven by intent (experiments 2 and 3), the 'bad is stronger than good' effect or semantic similarities between what a person 'could have' and 'should have' chosen to do (experiment 5).

The finding that bad actions are perceived as freer than good ones constitutes a substantial extension of the Knobe effect, which was that people attributed more intention to a hypothetical person who had expressed indifference to the good or bad anticipated

consequences of his acts. Intention judgments are essentially about motivation, insofar as they reflect what outcome the person wanted. Our findings were more about action *capability* than motivation: We measured whether participants thought the person could have acted differently. Bad actions motivated people to perceive greater scope than good actions for having acted otherwise. Another extension of the Knobe effect was that we found effects for one's own actions, not only in others' actions. Moreover, we provided support for the effect but demonstrating that it is not driven by the 'bad is stronger than good' effect or by the confounds of sematic similarities between 'should have's and 'could have's (experiment 5).

There were no consistent differences between perceptions of free will for self and for other people. Many studies have found evidence of a self-serving bias, by which people deny blame for failure but claim credit for success (see Zuckerman, 1979, for early review). We did not find that people downplayed their ability to have done otherwise, even when reflecting on their past misdeeds, as has been evident in some work on people's accounts for their prior misbehavior (e.g., Baumeister, Stillwell, & Wotman, 1990). Nor did we find that people systematically rated their own freedom of action as higher than that of other people, as some prior studies have (Pronin & Kugler, 2010). A possible explanation is that the tendency to rate oneself as high on freedom may have combined with the self-serving bias to cancel each other out, thereby producing levels of perceived freedom for self roughly equivalent to what one perceived in other people. Yet, a more plausible explanation would be that the nature of the actions reflected upon in our studies is somehow different, specifically – that the actions examined involve consequences for a person with harm or support rather than general positive or negative actions, therefore activating a cognition more driven by accountability than the alleged motivation to enhance self over others.

The present results indicate that people perceive free will more strongly in connection with bad than good actions. This may at first seem to contradict the many theories about free

will that have emphasized its usefulness for performing good actions. In particular, Kant (1797/1997) equated freedom with behaving according to moral principles. Our findings point to the opposite conclusion, namely that people perceive high freedom in connection with morally undesirable acts. Yet, it may be possible to resolve the apparent contradiction, however. Humans may have evolved an unusually powerful capacity to behave in morally good and socially desirable ways — so much so that doing good has become the accepted, expected norm. Our results using the predictability measure support this view (experiments 1 and 4), indicating that people find bad actions as less predictable than good. Good actions, short of extraordinary heroism, may therefore elicit relatively little notice. In contrast, bad actions stand out because they undermine the social system and its implicit agreements by which people live together in harmony. Yielding to selfish or animal impulses may produce bad actions, which prompted Kant to view such actions as falling short of the human capacity for free action. But for many layperson perceivers, the very undesirability of such actions calls attention to the fact that the person really could have (and probably should have) done otherwise. That conclusion dovetails well with research on counterfactual thinking: People engage in counterfactual thinking most by reflecting on bad actions and bad outcomes, and the benefits of such thinking as linked to thinking about how one could have acted differently (Roese, 1997).

Whether good or bad actions actually emerge from a different kind of causation or even a transcending of certain types of causes (as Kant suggested) is far beyond the scope of this investigation. On the other hand, the *perception* of freedom and the ability to do otherwise may be socially useful as it emphasizes accountability. The present findings make sense in that context: It is seemingly most useful to perceive freedom of action when someone is behaving badly. The unique form of action control that humans exercise, which in layperson perspective corresponds to free will, may well be an adaptation to enable people to

follow rules and behave virtuously so as to enable human society to thrive and prosper as well as to encourage stronger motivations for action (e.g., Baumeister, 2008, in press). People may only reflect on it when faces with subpar or negative outcomes, or with an agent breaking those rules and behaving in ways that undermine the social compact — because those are the cases in which society would benefit by changing the person's behavior. In other words, if free will is the ability to act otherwise, people may invoke free will most readily when they want someone to act otherwise or to hold that someone responsible for consequences. Bad behaviors presumably constitute the vast majority of such situations.

A possible alternative explanation to these results could have to do with the assumptions people hold regarding the human nature of man kind, whether people are inherently good or inherently bad. The predictability measures in experiments 1 and 4 show that people find bad actions to be more unpredictable, which according to some scholars (Pronin & Kugler, 2010 ; Brembs, 2010) and is a measure indicative of more free will, therefore suggesting that people assume good behavior and are surprised by bad actions or bad outcomes. Future research may examine the interaction of these implicit laybeliefs of agency and human nature against one another to see the effect those may have over attributions, teasing apart the two effects. Quite possibly, the two laybeliefs may interact so that free will would be attributed to negative situations when assumptions are that human nature is good, but that this effect might be reversed if the assumption is that human nature is bad.

Experiments 2 and 3 may also offer a new perspective on the classical paradigms of the framing effect (Tversky & Kahneman, 1981), possibly shedding light over an unexplored factor involved in decision making. A possible interpretation of our findings regarding the framing effect could be that the tendency to undertake riskier decisions under negative framing may be related to the perception that negative situations involve a greater ability to

see other options or to choose non-conforming or unexpected options. A negative context may be a cognitive trigger to perceived free will thereby leading one to consider taking more risks (Hills, Noguchi, & Gibbert, 2013). A competing theory to prospect theory and the framing effect regarding risk strategies is threat rigidity (Staw, Sandelands, & Dutton, 1981) which argues actors (manager or organization) facing a possible loss of control (e.g more government regulations) aim to re-establish control by initiating risk-averse isomorphic strategies (George, Chattopadhyay, Sitkin & Barden, 2006). Using this view, a negative situation that may lead to a possible loss of control triggers the need to exercise the will and regain control over the situation, yet the outcome of this decision might be different and risk-averse. Therefore, the association between risk seeking or avoidance behaviors and free will deserves further exploration. Future studies may attempt to examine free will attributions for different negative outcomes regarding either resources (prospect theory) or control (threat rigidity).

Experiment 6 failed to establish that the causal effect found in experiments 1 to 5 between valence and free will attributions can also be reversed. Although free will manipulations yielded differences in moral responsibility, it failed to produce significant differences in perception of the action valence.

Considerable evidence indicates that bad actions and bad events have a stronger impact than good ones (for reviews, see Baumeister et al., 2001; Rozin & Royzman, 2001). The present findings extend that work to show that bad actions are also seen as freer than good ones and that this is despite stronger situations found as allowing for less free will (experiment 5). Hence, lending support to the present results indicating a unique effect. Although it may be disappointing that people seem to think that freedom of action is mainly used for performing bad actions, that perception may be socially useful for promoting moral responsibility and perhaps, in the long run, promoting more positive and desirable actions.

Ultimately, bad actions do highlight the importance of being able to change and act differently.

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Chapter 4 - The freedom to excel: Belief in free will predicts better performance

Abstract

Perceptions of agency, freedom, and choice are at the core of human action. The belief in free will is a generalized lay-belief that encompasses these elements and views the self as free from internal and external constraints, with implications for the domains of accountability, responsibility, motivation, and learning - all key components for achieving better performance. Three studies examine the relationship between the belief in free will and performance. The belief in free will predicted better academic performance (study 1) and job performance (study 2), even when controlling for self-efficacy and autonomy. The belief in free will also interacted with self-control, such that the endorsement of the belief in free will and having higher self-control predicted the strongest performance. Results from a world-wide country-level analysis (study 3) indicated a positive relationship between the national endorsement of the belief in free will and country economic performance indicators.

Introduction

The last decade has witnessed the emergence of research recognizing the importance of people's lay beliefs regarding human agency and how those affect people's perceptions, motives, attitudes, and behaviors (Bandura, 2006; Dweck, 2008). Research on agency lay beliefs focuses on people's core beliefs regarding the human capacity to choose own path, change if so desired, and control own actions to achieve desired goals, as well as examines the associated implicit assumptions people hold about the way the world and humans operate. Studies have explored the consequences of lay-beliefs, implicit theories, and philosophical views of the world for everyday life (Baumeister & Monroe, 2014 ; Molden & Dweck, 2006) and at the workplace (Burnette, O'Boyle, VanEpps, Pollack, & Finkel, 2012; Heath & Staudenmayer, 2000 ; Heslin & VandeWalle, 2008, 2011). These theoretical and empirical

links illustrate the potential of lay theories as important predictors of actual behavioral outcomes. However, the link to objective real-life performance outcomes has received limited attention thus far.

Of all agency related lay-beliefs, we focus on the belief in free will as a core belief that encompasses people's overall perceptions of humans as being free from both external constraints (environment, society, other agents, etc.) and internal factors (urges, needs, genes, personality, etc.). Although the concept of free will seems philosophical in nature and distant from people's everyday reflections and real-life consequences, increasing evidence suggests that the belief in free will is related to a wide array of cognitive and behavioral outcomes (e.g., Vohs & Schooler, 2008; Rigoni, Kühn, Sartori, & Brass, 2011). The concept of free will underlies important aspects of the human psyche: the attribution of intentionality (Roskies, 2006), the understanding of moral responsibility (Kant, 1788/1997; Nietzsche, 1886/1966; Stillman, Baumeister, & Mele, 2011), perceptions of blame, and accountability (Burns & Bechara, 2007), as well as the perceived ability and the drive for action control (Greve, 2001). Agency beliefs are at the core of the self; people who hold a strong belief regarding their ability to choose their own path freely tend to be more future-oriented, assume responsibility, and are more self-reflective and motivated (Bandura, 2006). The centrality of the concept of free will for both self and society, serving as a fundamental philosophy embedded in most modern societies and life (Greene & Cohen, 2004), lends support to the hypothesis that the belief in free will is predictive of performance.

The psychological inquiry into the belief in free will has emerged from the research domain of willpower and self-control, that is, the inherent ability to resist and overcome one's own desires and temptations (Baumeister, 2008a; Baumeister, Sparks, Stillman, & Vohs, 2008; Baumeister, Vohs, & Tice, 2007). The belief in free will and self-control are distinct yet closely related constructs that work together to enable the agent to pursue goals

effectively (Baumeister, 2008b, Baumeister, 2008c). Self-control has previously been recognized as one of the most important predictors for positive outcomes (Duckworth & Seligman, 2005; Porath & Bateman, 2006), yet an integrative agentic view combining the belief in free will and self-control suggests that the belief in free will would interact with self-control in predicting better performance.

Three studies aim to demonstrate the positive implications of the lay-belief in free will for performance as well as the interaction with self-control. Study 1 examines academic performance in an undergraduate course. Study 2 extends to job performance in an online labor market. Study 3 examines the relationship between the national endorsement of the belief in free will and country-level economic performance indicators (i.e., Gross Domestic Product [GDP] per capita and labor productivity).

Belief in free will and performance

At the heart of the belief in free will is the view that people have the capacity to act freely (Haggard, Mele, O'Connor, & Vohs, 2010), both in the perception that alternative options are available for the self to choose from and the ability of the self to choose among these options freely without internal or external constraints (Kane, 1996, 2002). In the category of external constraints to agentic freedom are broad influences that include other agents (family, friends, strangers), environment (such as the workplace), society, norms, and even broader factors, such as nature, fate (Au et al., 2011; Chan, Wan, & Sin, 2009), luck (Lench, Domsky, Smallman & Darbor, 2014) and even God (Shariff & Norenzayan, 2007), angels, and demons (Fromm, 1941). All these factors are barriers to free choice, such that a person may perceive everything to be causally determined by laws of nature or predestined by the rule of God or fate, thus leaving humans without any ability to choose. The second category involves internal factors that are about oneself. These factors include genes (Schmidt & Hunter, 2004), personality (Barrick & Mount, 1991), urges, needs, and desires

(Greguras & Diefendorff, 2009). For example, people may believe that their actions and future are predetermined by genes since birth, thus preventing them from changing and limiting their choice for a course of action atypical to their genetic predestination (Dar-Nimrod & Heine, 2012). Both internal and external factors affect one's perceptions of freedom, and both are dependent on the belief in free will.

The belief in free will is related to performance through three main mechanisms discussed below: perceptions of human agency, perceptions of freedom, and perceptions of choice.

The belief in free will is fundamental to human agency, underlying its four core elements, namely, intentionality, forethought (future planning), self-reactiveness (motivation and self-regulation), and self-reflectiveness (learning; Bandura, 2006, 2008[1]). Without the perception that the self is free, all four elements of agency are undermined. Disbelief in free will leads people to assume less responsibility for their actions as they may claim they had no option to have done otherwise and they are hence excused of responsibility for the outcome (Greve, 2001). Without the belief in free will, life in the present appears to be more driven by the past rather than as a potential for action to influence the future (Helzer & Gilovich, 2012; Stillman et al., 2010) and thus less forward-looking (Seligman, Railton, Baumeister, & Sripada, 2013). Disbelief in free will causes people to perceive themselves as being unable to exert effort (Alquist, Ainsworth, & Baumeister, 2013) or self-control (Rigoni, Kühn, Gaudino, Sartori, & Brass, 2011). Finally, if one does not perceive actions and choices as

1 The belief in free will differs from and is related to other agentic constructs, such as self-efficacy (Bandura, 1997) or perceived control (Ajzen, 1985, 1991) in that these constructs answer the question "Do I possess the means to execute this successfully?" or "Can I achieve this?," whereas the belief in free will asks "Do I have a choice, and if so, can I freely choose to do otherwise?" (Bandura, 2008). These other constructs are more self-focused, contextualized (e.g., job or task self-efficacy in the workplace), and address specific domains of human agency, whereas the belief in free will is a more generalized belief about life in general for all agents. The belief in free will is crucial for one's view of the self as capable and having control. For a in-depth conceptual and empirical review comparing the belief in free will to other constructs see Rakos, Laurene, Skala, & Slane (2008) and Feldman (2014).

free, then learning from one's own misdeeds seems pointless because the action is not associated with the self and change needed is perceived as not being under one's own control (Stillman & Baumeister, 2010). Accountability, goal-setting, motivation, and learning are the corresponding core elements that enable agents to achieve better performance, and the belief in free will is essential for all four.

Along with perceptions of human agency, perceptions of freedom have also been recognized as important (Bandura, 1977, 1997; Ryan & Deci, 2000), and the concept of freedom is at the core of several organizational constructs associated with better performance (e.g. job autonomy, empowerment, see Langfred & Moye, 2004; Morgeson, Delaney–Klinger, & Hemingway, 2005; Thomas & Velthouse, 1990). Common to the freedom related constructs is the understanding that freedom is an essential factor in people's sense-making, search for meaning and purpose, as well as for building positive self perceptions and stronger motivations to do better (Spreitzer, 1995, 1996). Hence, perceptions of freedom have positive consequences for performance. The belief in free will addresses perceived freedom much more broadly than autonomy and empowerment[2]. The belief in free will extends to freedom from a broad range of generalized factors and encompasses perceptions of freedom within a context. For example, even when instructed exactly on what to do at work with minimal discretion indicating low granted autonomy, a person with a strong belief in free will can still perceive his or her own ability to choose whether to adhere, to choose how to adhere, or to choose to move to an environment that will grant more autonomy. As an opposite example, a person granted high autonomy may perceive the self as being primarily driven by uncontrollable factors, such that the person's gender role, social status or personality traits

[2] The belief in free will is conceptually different from autonomy (job or task autonomy) in that it does not only imply independence from other agents, but also independence from all external and internal constraints, which is the crucial element that also differentiates the belief in free will from other well-studied constructs, such as locus of control (Rotter, 1966). Actions that originate from one's own personality, urges, and needs are considered actions driven by an internal locus of control, but are considered actions lacking free will. For a in-depth conceptual and empirical review comparing the belief in free will to other constructs see Rakos et al. (2008) and Feldman (2014).

preventing him or her from assuming responsibility and making decisions. Hence, the belief in free will affects both the perceptions of the freedom one has in a given situation and, more importantly, the perception of one's ability to overcome internal and situational constraints and make one's own path regardless.

Finally, the belief in free will may lead to better performance through the concept of choice (Baumeister, 2008a, 2008c; Baumeister & Monroe, in press). The ability to make choices is fundamental in the decision-making literature with important implications for applied settings (Chua & Iyengar, 2006), but for one to be able to make choices effectively, one needs to first perceive that choices are available and that the self is capable of making a choice (Monroe & Malle, 2010). Similarly, the belief in free will can form positive attitudes toward making choices with a strong cognitive association between the concepts of choice and freedom (Baumeister et al., 2008), thereby enabling the person to make choices when needed, thus resulting in better performance.

The belief in free will and self-control

The belief in free will is closely related to the construct of self-control, and the two maintain important connections that impact goal pursuit and performance. Self-control refers to "an agent's capacity to sustain, stop, amplify, or otherwise modify an incipient or unwanted response or action" (Haggard, Mele, O'Connor, & Vohs, 2010; Vohs & Baumeister, 2004) and is associated with a conscious effort by an agent to exert energy (effort) needed to resist, manipulate, or overcome oneself (affect, cognition, and behavior). Items measuring trait self-control typically ask about the ability to fight temptations, self-discipline, and having the ability to concentrate, avoid distractions, and work effectively toward long-term goals (e.g. scale by Tangney, Baumeister & Boone, 2004). Hence, self-control is about the regulation of self and opposing urges and desires, whereas the belief in free will is about one's generalized belief in human freedom of action and the perceived

capacity to choose one's own actions or to do otherwise (Baumeister, 2008a). Linking the two, the belief in free will may be regarded as allowing for self-control to occur in that it offers the agent the choice of whether or not to exert self-control (Rigoni et al., 2012; Wertenbroch, Vosgerau, & Bruyneel, 2008). For example, people at times deliberately decide to "let go" and give in to temptations to fulfill some chosen goal (Kivetz & Simonson, 2002), such as when feeling distress and allowing for self-indulgence to feel better (Tice, Bratslavsky, & Baumeister, 2001). Some scholars consider self-control as an important component in the capacity to enjoy actual freedom of action (regardless of the person's belief), as a person who is better able to resist self and overcome internal constraints may be regarded as having more choice and a better ability to choose (Baumeister, 2008b; Baumeister & Monroe, in press). As a simplified metaphor, the belief in free will can be regarded as the choice of direction for action, while self-control is the enabler of the successful long-term pursuit of that direction (Mukhopadhyay & Johar, 2005 ; Rigoni et al., 2012).

Self-control has long been one of the strongest predictors of performance (de Ridder, Lensvelt–Mulders, Finkenauer, Stok, & Baumeister, 2012). A classic longitudinal study found that children who exhibited strong self-control had better academic performance 10 years to 15 years later (Mischel, Shoda, & Peake, 1988; Mischel, Shoda, & Rodriguez, 1989). Many studies have since followed with clear demonstrations of the positive effects of self-control on behavior and performance. Those with higher self-control exhibit less negative outcomes, such as workplace deviant behavior (Bordia, Restubog, & Tang, 2008; Vazsonyi, Pickering, Junger, & Hessing, 2001) and hostile actions (Lian et al., 2012), and more positive outcomes, such as better academic performance (e.g., Duckworth & Seligman, 2005; Mischel, Shoda, & Rodriguez, 1989; Schmitz & Skinner, 1993) and better job performance (Porath & Bateman, 2006). A review and meta-analysis of the self-control literature

concludes a moderate effect size of .36 for self-control in predicting school and work performance (de Ridder et al., 2012).

Self-control requires effort, and energy resources are limited. Thus, the ability for self-control is believed to be finite. The process by which the self loses the energy for self-control is commonly referred to as ego depletion (Muraven & Baumeister, 2000) and is now believed to be based on both cognition and motivation (Fujita, 2011). A person who perceives the self as depleted or is not motivated to act is less likely to be able to exert further self-control, and both factors can be affected by beliefs and implicit lay theories (Boucher & Kofos, 2012 ; Clarkson, Hirt, Jia, & Alexander, 2010 ; Job, Dweck, & Walton, 2010; Miller et al., 2012 ; Vohs, Baumeister, & Schmeichel, 2012). That is, the effects of self-control depend on the belief that one has self-control, is capable of exerting self-control, and finally on the motivation one has to exert self-control (Mukhopadhyay & Johar, 2005). Therefore, the belief in free will both may interact with self-control by serving as the motivation to exert it and by affecting the perceived size of the mental resource pool from which self-control draws energy. We therefore hypothesize that the belief in free will would moderate the positive relationship between self-control and performance, such that performance will be the highest when both self-control and the belief in free will are high.

Study 1 – Academic performance

Study 1 was designed to examine the relationship between the belief in free will, self-control, and academic performance in an undergraduate course. The students reported their belief in free will and self control at the beginning of the semester, and the data were used as predictors for a number of objective and subjective performance indicators of the students' performance throughout the semester provided by the course instructors.

Method

Procedure and participants. Six hundred and fourteen undergraduate students at a university in Hong Kong participated for course credit (M_{age} = 18.90, 54.6% female, 438 from Hong Kong, 92 from mainland China, and 84 international students). The students completed questionnaires of the belief in free will and trait self-control at the beginning of the semester, and these questionnaires were later matched against the students' scores in a core undergraduate course at the business school provided by the course instructors. The mid-term grade was given after the mid-term exam at the middle of the semester, and all other grades were given at the end of the semester following a final exam and course project submission. The course was taught by five different professors in 10 different sessions, using a similar yet slightly different syllabus and course structure.

Measures. *Belief in free will*. The belief in free will was measured using an eight-item self subscale of the Free Will and Determinism Scale (FWD scale, Rakos et al., 2008). The averaged items refer to oneself as having free will, such as "I am in charge of my actions even when my life's circumstances are difficult," and "I have free will" (1 = *not true at all* to 5 = *always true*). The belief in free will scale was completed by the students at the beginning of the semester.

Self control. Self-control was measured using the short version of the Self Control Scale (SCS, Tangney et al., 2004). The scale includes 13 statements, such as "I am good at resisting temptation," and "People would say that I have iron self-discipline" (1 = *not at all* to 5 = *very much*), which were averaged into a self-control score. The self-control scale was completed by the students at the beginning of the semester.

Course performance. The course included several measures of performance. The course included two exams: a mid-term exam with only multiple-choice questions and the final exam, which included multiple-choice questions, open-ended questions, and open-ended case-studies (essays). The course also included a measure of students' participation in class

discussions. Finally, these measures and a group project, a research component, and attendance were combined into a final score, which was submitted as the students' official course performance score. To eliminate possible differences in scoring, all scores were standardized within each of the 10 class sessions.

Demographics. Age, gender, and country of origin were collected as control variables.

Results

Correlations among self-control, the belief in free will, and outcomes, along with the reliability information, are detailed in Table 8. Self-control and the belief in free will were positively correlated (r = .19, p< .001). Self-control had a positive correlation with the final exam score (r = .09, p< .05), participation (r = .08, p < .05), and final course score (r = .09, p< .05), whereas the belief in free will had a positive correlation with the mid-term exam score (r = .15, p< .001) and the final course score (r = .08, p< .05).

A hierarchical regression analysis was conducted to examine the interaction between self-control and the belief in free will in predicting outcomes while controlling for age, gender, and country of origin. The interaction between self-control and the belief in free will was found to be a significant predictor of the final course score, with a main effect for the belief in free will [$F(7, 606) = 4.20$, p< .001 ; $\beta_{\text{interaction}} = 0.84$, p = .039 ; see Table 9 for full regression table ; $\beta_{\text{BFW}} = 0.95$, p = .022 ; $\beta_{\text{SC}} = 0.91$, p = 0.24]. A simple slope analysis indicates that when belief in free will is high (+1 standard deviation), the self-control slope is positive (=.12, p< .001), yet when belief in free will is low (-1 standard deviation), the slope is no longer positive (= -.01, p = n.s). Figure 2 plots the interaction, indicating that self-control is a stronger predictor of higher final score the stronger the belief in free will. We found no significant differences in performance or this relationship between course sessions or instructors.

The patterns for the mid-term exam, the final exam, and the participation scores differed. The mid-term exam revealed a main effect for the belief in free will [$F(5, 608) = 6.04$, $p < .001$; $\beta_{BFW} = .17$, $p < .001$; $\Delta\underline{R}^2 = .03$] but not for self-control, the final-exam had a main effect for self-control [$F(5, 608) = 3.46$, $p = .004$; $\beta_{SC} = .09$, $p = .033$; $\Delta\underline{R}^2 = .01$] but not for the belief in free will, whereas participation showed a main effect for self-control [$F(5, 608) = 3.20$, $p = .007$; $\beta_{SC} = .09$, $p = .049$; $\Delta\underline{R}^2 = .01$] but not for the belief in free will. The interaction between self-control and the belief in free was marginally significant for the mid-term exam [$F(7, 606) = 5.02$, $p< .001$; $\beta_{interaction} = .068$, $p = .093$; $\Delta\underline{R}^2 = .004$], and no interaction for the final exam was observed. However, the interaction for participation was significant [$F(7, 606) = 3.19$, $p = .003$; $\beta_{interaction} = .10$, $p = .02$; $\Delta\underline{R}^2 = .01$] and resembled the final score interaction plot.

Discussion

Study 1 showed support for the importance of the belief in free will in predicting academic performance and as a moderator of the positive effects of self-control. The belief in free will was a significant predictor of the mid-term exam and the final course scores. Self-control was a predictor of the final-exam and participation scores. The interaction between the belief in free will and self-control emerged for the mid-term exam, participation, and the final course score.

These findings support self-control and the belief in free will as different yet related and complementary constructs that address different aspects of the self, with the combination of both resulting in the best positive outcomes. The belief in free will was a stronger predictor than self-control for the mid-term exam, possibly because the multiple-choice questions in the mid-term exam require the ability to make choices. If one does not perceive one's capacity to choose, one might be more distracted or misled by decoy answers that lure examinees away from the real answer. An alternative explanation could be about the timing

of the two exams, the mid-term exam being closer in time to the report of the belief in free will. It is therefore possible that self-control becomes more important in the long-term pursuit of goals and that the belief in free will affects the pursuit of more distant goals by means of interaction with self-control rather than a direct effect. Another possibility is that the multiple-choice question exams involve lower cognitive skills (Martinez, 1999; Warren, 1979), are less influenced by personal characteristics that may inhibit performance (e.g., anxiety, see Crocker & Schmidt, 1987), require less rigorous preparation, and leave instructors with less room for subjective interpretation of the answer, hence allowing for less influence of self-control. The final exam with the open-ended questions required a longer and more rigorous study and concentration, which both require more willpower and also involve more subjective scoring by the instructor that may consider the depth and overall writing skills reflected in the answer, going beyond the mere correct answer. Similarly, classroom participation may require more self-control in being able to overcome self and external distractions and guard the self so that a person would feel less susceptible to considerations of possible disheartening social scrutiny. However, the interaction effects for the final score and participation suggest that for self-control to truly have the desired positive outcome, one does need to perceive the self as being able to initiate self-control strategies. For example, for a student to participate in a classroom discussion regardless of being shy, one has to perceive oneself as being able to overcome one's own personality and decide on exerting the willpower to engage in the class discussion. Even if a shy student does have high self-control in the ability to study well for an exam or prepare for class while overcoming temptations and distractions, not believing in free will might cause this student to perceive the self as being predetermined to remain shy and inactive in class and hence fail to exert willpower to overcome shyness to engage in the discussion. The combination of the belief in free will and

self-control enables a person to direct the self in the right direction (free will) and persist in such direction to achieve the desired goal (self-control).

Study 2 – Job performance

Study 1 showed support for the belief in free will and self-control as important predictors of academic performance in a university course. We sought to replicate and extend these findings to a work context using a more experienced, diverse, and international sample on Amazon Mechanical Turk (or MTurk).

Stillman et al. (2010) offered initial evidence for the link between free will beliefs and work related outcomes by showing that free will beliefs are associated with higher self expectations of career performance indicating higher motivation, as well as higher supervisor ratings of work effort, consistency and social impact. The effects found were significant, even when controlling for other important factors such as the big five personality traits, intelligence, protestant work ethic, vitality, life satisfaction, and locus of control. This study sought to extend these findings in a few important aspects. First, this study examined a direct measure of performance rather than indirect social variables. Second, this study included objective and subjective performance measures rather than only subjective evaluations by the supervisor. Third, this study also examined the interaction between the belief in free will and self-control as predicting better performance, also controlling for widely established factors in predicting performance.

MTurk is a relatively new online labor market that connects employers and employees around the world, with hundreds of thousands of users from over 100 countries either seeking or offering work on the platform. Well-defined tasks are offered by "requesters," and "workers" that match the criteria set by the requester can choose to work on those tasks. Worker performance is tracked and observed. Worker tasks are evaluated by the requesters, and their performance on the task determines whether they get paid on the current task, as

well as affects their overall task approval rate (acceptance/rejection rate). A requester can choose to reject a task if the work completed by a worker is considered not up to the standards defined in the terms of the task, thereby denying payment from a worker and hurting the worker's overall approval rate. The worker approval rate provides requesters with an indication of the worker's performance, and a requester can define for each task the minimum approval rate needed for a worker to qualify for undertaking the task. Requesters can also define the number of tasks a worker must have already completed successfully.

A growing number of behavioral science articles have recently evaluated MTurk as a platform for data collection, with generally positive reviews. Buhrmester, Kwang, and Gosling (2011) conclude that data obtained in psychological experiments using MTurk is at least as reliable as more traditional methods, offering quick and easy data collection using an inexpensive and diverse sample. Mason and Suri (2011) conclude that MTurk is a valid useful tool for behavioral scientists. Paolacci, Chandler, and Ipeirotis (2010) address concerns about MTurk to compare MTurk results with that of other methods and conclude that MTurk is a valid tool for social scientists studying judgment and decision making. Horton, Rand, and Zeckhauser (2010) argue that online economics studies using MTurk are as valid as other means, both internally and externally, and that MTurk studies offer several important advantages over more traditional methods. Shapiro, Chandler, and Mueller (2013) see MTurk as an innovative tool for studying real-life phenomena in clinical psychology.

MTurk is commonly used as a data collection platform to run experiments or collect data unrelated to the MTurk worker's actual performance. However, in this study, we examine MTurk for what it is: an online labor market that serves as a work environment for a very large number of people. The scales were completed by MTurk workers, and the performance score was provided by the Amazon MTurk platform of the worker's overall performance in all tasks they performed since joining the labour market.

This study also extends Study 1 by measuring and controlling for contextual factors of job autonomy and job self-efficacy (Bandura, 1977, 1997), as both are conceptually related to freedom and ability to execute and have both been linked to job and task performance (job autonomy - Langfred & Moye, 2004 ; self efficacy - Judge & Bono, 2001 ; Stajkovic & Luthans, 1998).

Method

Procedure and participants. Two hundred and eighteen participants on MTurk (M_{age} = 31.80, SD_{age} = 11.09 ; 91 females) were recruited for US$0.10 and answered a series of scales. To increase the participation rate of workers from all ranges of job performance, we set up 21 different Human Intelligence Tasks (HITs) on MTurk leading to the same survey that included our scales and recorded the originating HIT. The only differences between the HITs was that we specifically set the approval rate required for participation, from rate=80% in the first HIT to rate=100% in the last HIT. It is important to note that Amazon Mechanical Turk has a default requirement in new HITs for an approval rate of atleast 95% which can be changed manually by the requesters, but the implications of this default setting are that workers with an approval rate below 95% are much more limited in the number of tasks available to them. Workers with an approval rate below 90% tend to drop out of the labour market, and therefore workers with an approval rate below 85% are quite rare. Our data collection was designed specifically to force the sample to include all ranges of the MTurk workers and not just the recommended high performers. This way, we ensured a more diverse sample with a larger variance of job performance and were able to deduce the participants' approval rate as an objective job performance measure. We set a maximum of 20 participants for each HIT (or, approval rate group) and only allowed participation for workers who have already successfully completed at least 50 tasks on MTurk. The 21 HITs ran online for five days before automatically terminating. The workers in our final sample have worked on

MTurk for an average of 22.05 months (*SD* = 14.91), have completed an average of 6,549.79 tasks (*SD* = 16,187.37), had an average approval rate of 93.93 (*SD* = 4.81), and spent an average of 17.45 hours a week on MTurk (*SD* = 20.65). Approximately a third of the workers reported MTurk as their main source of income (N = 74, 33.9%).

Measures. *Belief in free will*. The belief in free will was measured using two free will scales: the FWD scale (Rakos et al., 2008) and the Free Will and Determinism Plus scale measuring belief in free will and in determinism (FAD+, Paulhus & Carey, 2011).

Self control. As in study 1, self-control was measured using the short version of the SCS (Tangney et al., 2004).

Job performance. We collected several measures for both objective and self-reported job performances. The objective job performance measures provided by MTurk refer to the workers' approval rate (ratio of approved versus rejected tasks). To complement the objective measures, participants rated their own performance by indicating their own approval rate and answered a job performance scale (Pruden & Reese, 1972). The job performance scale included questions regarding the workers' MTurk work, asking workers to subjectively compare themselves to other workers on MTurk in terms of quality, meeting expectations, and speed (from 1 = *Below Average - Below 25%*; 2 = *About Average – Better than 25%*; 3 = *Above Average – Better than 50%*; 4 = *Near the top – Better than 75%;and* 5 = *The best - Better than 90%*). Several studies have shown support for self assessments and self rating as a reliable measure of performance (Anderson, Warner, & Spencer, 1984; Fox & Dinur, 1988).

Job autonomy. Job autonomy was measured using the Hackman and Oldham (1980) scale adjusted for MTurk with the following three items: "I have significant autonomy in determining how I do my job on MTurk," "I can decide on my own how to go about doing my work on MTurk," and "I have considerable opportunity for independence and freedom in how I do my job on MTurk" (1 = *Strongly Disagree* ; 7 = *Strongly Agree*).

Job self efficacy. Three items adjusted from Spreitzer (1995) for MTurk measured the workers' job self-efficacy: "I am confident about my ability to successfully do the tasks I do on MTurk," "I am self-assured about my capabilities to perform well on my MTurk tasks," and "I have mastered the skills necessary for me to do the tasks that I do on MTurk" (1 = *Strongly Disagree* ; 7 = *Strongly Agree*).

Results

The correlations between the collected measures and scale reliabilities are provided in Table 10. The correlations between the objective job performance measure of the approval rate provided by MTurk and the self-reported approval rate were high, and the scores were almost identical (r = .87, p< .001), indicating very high levels of honesty, with the differences caused by the limitations of the MTurk approval rate measure as not including decimal point numbers. The correlation between the approval rate and the job performance scale was moderately positive (r = .20, p = .003).

The belief in free will subscales scales (FWD self, FWD general, and FAD+) were highly correlated (r = .56 to .76, p< .001). To simplify the results, we report findings regarding the belief in free will using the FWD self free will subscale because we were conceptually mainly interested in the belief in free will in self. However, we note that the results generally replicate using the other sub-scales. Both the belief in free will and self-control were positively associated with the approval rate (FWD self: r = .27, p< .001; Self control: r = .15, p<.05), the performance self-ratings (FWD self: r = .32, p< .001; Self control: r = .20, p<.01), job autonomy (FWD self: r = .41, p< .001; Self control: r = .35, p<.001), and job self-efficacy (FWD self: r = .40, p< .001; Self control: r = .46, p<.001).

We examined the main effects and the interaction between self-control and the belief in free will in predicting the approval rate and performance self-rating by executing several hierarchical regression analyses. Table 11 includes the regression analyses results, once only

controlling for age and gender (as in study 1) and once controlling for job autonomy and job self-efficacy. The belief in free will was strongly associated with the approval rate (β = .21, p< .001) and performance self-ratings (β = .29, p< .001), even when controlling for job autonomy and self-efficacy. Self-control was only associated with the performance self ratings (β = .16, p = .024). The analysis revealed an interaction between self control and the belief in free will in predicting the approval rate [β = -.17, p = .013 ; F(5, 212) = 7.20, p < .001, ΔR^2 = .03,; R^2 = .15] and the performance self ratings [β = -.13, p = .048 ; F(5, 212) = 6.58, p< .001, ΔR^2 = .02; R^2 = .13]. Figure 3 plots the interactions. The interaction between self-control and the belief in free will in study 2 shows self-control as compensating for the lack of the belief in free will, such that self-control has little effect in predicting performance when the belief in free will is strong, but becomes an important factor when the belief in free will is weak. The interaction effect for the approval rate remained significant even when controlling for job self efficacy and job autonomy, but the interaction for performance self-rating became non-significant.

Discussion

Study 2 replicated and extended the findings from study 1. The belief in free will was consistently shown as an important predictor of performance, even when controlling for job autonomy and self-efficacy. Moreover, the strength of belief in free will as a predictor for performance was on par with other more contextual and less abstract constructs that have long been considered as some of the best predictors for performance. We consider these findings as a striking demonstration of the far-reaching implications of free will as a core lay-theory in people's lives.

The belief in free will was again found to interact with self-control in predicting performance, but the pattern of the interaction with self-control differed from that in study 1. In study 2, the belief in free will seemed sufficient for predicting performance, with self-

control showing no further positive effect beyond that of the belief in free will. However, self-control made a positive difference when the belief in free will was low.

We offer several possible explanations for the differences in the interaction pattern between studies 1 and 2. First, the samples of the two studies were from different parts of the world, with MTurk workers mainly from the United States and India, whereas the students were mainly from Hong Kong and China. Thus, a cultural moderator may be in play which affects the relationship among the belief in free will, self-control, and performance. For example, the United States and India are both democracies that emphasize personal liberties and the pursuit of freedom as opposed to Hong Kong and China, such that the belief in free will might serve a much stronger function for MTurk workers. We return to this hypothesis in study 3. Second, another difference between the samples was the average age of the participants. The MTurk workers were over a decade older than the student sample, and the belief in free will and the ability for self-control seem to change over the course of one's life, as indicated by the results for the age control variable. Finally, the two performance measures and contexts differed significantly. The MTurk environment in which workers can choose which task to undertake from a very large variety of tasks possibly involves a very high degree of choice, and once the right matching task was selected, this environment requires less self-control. Meanwhile, students have much less influence over the tasks and measures set by the course instructor while in the classroom and the tasks they perform for the course and a high-demand academic environment requires much higher self-control.

Study 3 - National economic performance

Studies 1 and 2 demonstrated the belief in free will as an important factor in predicting academic and job performance. Study 3 was constructed to extend these findings in several ways. First, study 3 included data from all over the world in an attempt to generalize the findings beyond culture and context. Second, the large world-wide survey

allowed for a national-level analysis of the effect of the average of the belief in free will in predicting performance at a national level.

Method

Participants and procedure. The World Values Survey (WVS, 2008) is a survey collected between 1990 and 2008 of 257,597 participants from over 40 countries (over 70% of the countries in the world). Of the participants included in the WVS sample, 238,634 participants answered a question regarding their perceptions of freedom of choice and control in their lives, 66,989 answered a question regarding their belief in fatalistic determinism (as opposed to the belief in the ability to control fate).

Measures. *Belief in free will*. Two items were used to assess the belief in free will in the WVS dataset. One item (a173) measured perceptions of freedom of choice and control for the individual: "Indicate how much freedom of choice and control you feel you have over the way your life turns out" (1 = *no choice and control* to 10 = *a great deal of choice and control*), and another item (f198) measured the belief in free will more broadly for all and in contrast to fatalistic determinism, "Some people believe that individuals can decide their own destiny, while others think that it is impossible to escape a predetermined fate" (1 = *everything in life is determined by fate* to 10 = *people shape their fate themselves*).

National level performance measures. *Per capita GDP*. GDP is commonly referred to as one of the primary indicators of a country's economic performance. Per capita GDP (PPP) divides the GDP by the number of people in that country and is used as a common measure of the standard of living and prosperity for its people, thus allowing for a comparison of economic performance between countries. National-level performance indexes for PPP were drawn from the World Bank Group (2012) archive. Values for PPP were log transformed.

Workforce productivity. GDP per employee is a common measure for labor productivity that considers the number of people that are employed within each country. The index was collected from the Total Economy Database (Conference Board, 2014). Values for workforce productivity were log transformed.

Results

We examined the relationship between the belief in free will and outcomes at the national level. We fixed the analysis to the last round of the WVS 2005–2007 and correlated the national average for the belief in free will items with the GDP per capita (PPP) and labor productivity for the year 2006. Means, standard deviations and correlations are reported in Table 12. Higher PPP was positively correlated to the national averages of both belief in free will items (first item: N = 50, r = .42, p = .003; second item: N = 42, r = .49, p = .001). Labor productivity was also positively correlated with both belief in free will items (first item: N = 51, r = .46, p = .002; second item: N = 43, r = .34, p = .015).

A hierarchical regression analysis controlling for the Gini coefficient for income disparity and political freedom (drawn from the Human Development Report, 2013) supported the relationship between belief in free will and national performance (see Table 13 ; PPP: first item: $F(3, 44) = 10.56$, $p < .001$; $\beta_{FW} = .50$, $p < .001$; $R^2 = .42$, $\Delta R^2 = .20$; PPP second item: $F(3, 37) = 10.21$, $p < .001$; $\beta_{FW} = .43$, $p = .002$; $R^2 = .41$, $\Delta R^2 = .17$; Productivity first item: $F(3,45) = 7.73$, $p < .001$; $\beta_{FW} = .49$, $p = .001$; $R^2 = .34$, $\Delta R^2 = .19$; Productivity second item: $F(3,38) = 7.43$, $p < .001$; $\beta_{FW} = .43$, $p = .002$; $R^2 = .37$, $\Delta R^2 = .18$). A higher national endorsement of the belief in free will was therefore positively associated with better national PPP and labor productivity.

We then proceeded to explore whether there were any cultural moderators to this relationship, based on our previous discussion regarding differences between the findings in study 1 and study 2. We examined the five Hofstede (2001) cultural factors (power distance,

uncertainty avoidance, individualism-collectivism, masculinity, and long-term orientation) as possible moderators of the main effect between the national endorsement of the belief in free will and national performance. We found no evidence for cultural moderators of this relationship, yet we note that this may be due to the small number of countries in our cross cultural sample.

Discussion

Findings from the WVS provide support for the belief in free will as predicting national performance indexes at a country level. Countries with higher national endorsement of the belief in free will enjoy a higher PPP and higher workforce productivity. Owing to the correlational nature of the analysis, it is not possible to determine whether the belief in free will is the cause for better economic performance or vice versa - that the strong country level performance indices are what leads people to hold stronger beliefs in free will. Although we controlled for income disparity and political freedom, it is possible that another factor is affecting both the belief in free will and performance, yet regardless, the relationship between the two appears consistent and strong.

General discussion

Three studies show support for the importance of the belief in free will in predicting academic performance, job performance, and national-level socioeconomic performance. The belief in free will was found to be a strong predictor, on par with the predictive powers of autonomy, self-efficacy, and self-control, which are all considered powerful predictors of positive outcomes in life. Studies 1 and 2 also demonstrate the belief in free will as interacting with self control in predicting performance, such that the strongest performance is achieved by both endorsing the belief in free will and having the willpower to pursue what the will has seemingly chosen freely. Study 3 highlights the belief in free will as also having positive outcomes for the society in general; the average national rate for the belief in free

will was associated with stronger economic performance and productivity. The diversity of the samples and context, as well as the replication of the findings at both the individual and national levels of analysis, provides strong support for the generalizability of the findings.

This investigation adds to an emerging line of research showing the importance of core lay-beliefs about human agency for people's everyday cognition and behavior (Bandura, 2001; Baumeister & Monroe, in press; Dweck, 2014). While the debate over whether free will exists seems philosophical and abstract in nature, the implications of the belief regarding free will appear to have real implications in many aspects of everyday life (Baer, Kaufman, & Baumeister, 2008 ; Baumeister, 2008a; Baumeister et al., 2008).

A notable consistent finding across the three studies is regarding the predictive powers of the belief in free will. The relationship between the belief in free will and performance held even when self-control, self-efficacy, and autonomy were controlled for. The belief in free will had moderate correlations with the three factors (self-control: .19 to .29; self-efficacy: .40; autonomy: .22 to .41), which indicates that these factors are meaningfully different from the belief in free will yet positively related. Quite possibly, the generalized belief in free will encompasses or at least affects these three specific factors.

Supplementing the direct main effect, the belief in free will also interacts with self-control in predicting performance. The patterns of the interaction differed slightly between the two studies. In study 1, the belief in free will emerged as an important factor for the positive effects of self-control over performance, and findings indicated that disbelief in free will eliminates all positive effects of self-control for performance. In study 2, belief in free will alone was a strong predictor for performance, and self-control only affected performance when the belief in free will was low. Possible reasons for the differences in pattern were discussed above, yet two points remains clear: (1) the belief in free will matters for the effects of self-control over performance, and (2) the best performing were those who both held a

strong belief in free will and had high self-control. The recent literature has shown that the resource model view of self-control as withdrawing from an energy pool that can be depleted ("ego depletion") might actually be based on mental rather than physical factors. Ego depletion was found to be counter-acted by task motivation (e.g., Muraven & Slessareva, 2003), beliefs regarding the nature of self-control (e.g., Job, Dweck, & Walton, 2010 ; Job et al., 2013), and other factors, all suggesting that self-control is dependent on self-perceptions, motivation, affect, and attention (Inzlicht, Schmeichel, & Macrae, 2014). Our findings are in line with the premise that the ability to exert self-control relies on mindsets regarding the human capacity to exert self-control, or in this paper, the belief in the ability to freely choose to exert self-control. We argued that the belief in free will influences the positive effects of self-control by altering mindsets and affecting motivations. As discussed above, self-control might also be one of the mechanisms by which the belief in free will results in better performance.

In this study we refer to performance broadly as wide construct aiming to establish the overall importance of this belief, yet and the belief in free will may prove more relevant for specific types of tasks and may depend on the context. In study 1, the belief in free will was more relevant in a mid-term exam and predicted later outcomes mainly by the interaction with self-control. As we discussed above, it is quite possible that the belief in free will may be more relevant to tasks which are more specifically about choice (as in the multiple-choice questions in the mid-term). The differences in the interaction pattern between study 1 and study 2 may also indicate that the context matters, in that higher freedom in the context - either culturally, in a democratic society, or in the nature of the task as allowing choice of task or choice in the task - may lead to higher importance of the belief in free will. Sarkissian et al. (2010) previously assessed the prevalence of the belief in free will across cultures and have concluded a "striking degree of cross-cultural convergence", yet it is possible that the

relationship between the belief in free will and outcomes varies between cultures although we found no evidence for that in our data.

We have shown initial support for the premise that the belief in free will is not merely important for the self, but that the endorsement of free will is an important factor for societies more broadly. Philosophers and theorists have debated on the concept of free will as an essential component in the behavior of humans as cultural animals, in the ability to accept moral responsibility, outcome accountability, and pro-social behavior more generally (Baumeister, 2008a, 2008b; Baumeister & Monroe, in press). Our findings suggest that the promotion of the belief in free will within an organization or society is likely to increase agency and result in positive outcomes regarding performance. We note, however, that studies 1 and 2 focused on performance for the individual rather than for the group or for an organization, although the findings from study 3 are indicative that at least group benefits can be obtained from the increased individual performance and, quite possibly, additional benefits in better performance for work with others or in teams. Future research might aim to examine how the belief in free will specifically affects group performance. Owing to the very different nature of people endorsing or rejecting the belief in free will, people of different mindsets are likely to take up different roles in the team, and these core differences in thought can possibly result in conflict or at least in the need to find a way to bridge between two mindsets to find a common way.

Our findings suggest some directions for future research. The pattern of interaction between the belief in free will and self-control differed between studies 1 and 2, possibly because of the nature of the samples as being from different cultures, age groups, or with a different domain of performance. Future research may look at these factors as moderating the relationship among the belief in free will, self-control, and performance.

We also note limitations in our research. All three studies are correlational, which hinders the determination of the causal direction. Although beliefs are considered stable over time and not easily changeable, it is still possible that those who perform better may endorse stronger beliefs in free will, as suggested by the line of research examining the illusion of free will (Wegner, 2002, 2003). Future studies may attempt to manipulate the belief in free will experimentally (e.g., Vohs & Schooler, 2008) and examine its effects over subsequent performance.

These limitations notwithstanding, we believe that this work makes significant contributions to the literature. First, we establish a clear and direct link between lay-beliefs regarding free will with objective performance in several domains. The findings suggest that mere philosophical views of the world result in important implications for actual behavior in real life. Second, we have shown that the belief in free will interacts with self-control, which suggests a more complex view of how self-control is linked to outcomes. Third, we show initial evidence of the importance of the belief in free will for societal outcomes, supporting long-theorized views of free will as an important functional element in human behavior as an accountable and personally responsible cultural animal coexisting with others in society. Overall, we consider this work as a first step in a promising direction for understanding the human psyche and behavior in real life contexts.

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Chapter 5 - General discussion and conclusion

Three empirical investigations with 14 studies examined the cognition and the consequences of the belief in free will. Table 14 provides an overall summary of the studies in each chapter and the contributions of each study. Previous chapters have each described a theoretical background and development, followed by detailed descriptions of the findings, and finally an in-depth discussion of the findings and the implications. Below, I summarize the main points of these investigation and their findings and discuss possible implications.

Thesis summary

The thesis included four chapters - one introduction chapter and three chapters consisting of an empirical investigation with a number of studies.

In the first chapter I provided an overview of the concept of free will, endorsing the scientific pursuit of the concept by focusing on the folk psychology and studying the cognition and behaviors associated with the belief in free will. I introduced the construct of the belief in free will, and covered some of the main findings in the relatively recent literature. Finally, the chapter included a section that explains how the belief in free will is conceptually and empirically distinct yet meaningfully related to a number of well-established constructs in the literature.

In chapter 2, I proposed that the belief in free will is tied in laypersons' cognition to the concept of choice. Much of the literature has regarded the belief in free will to be a metaphysical notion (e.g. mind-body dualism, a supernatural force, directed by God, etc.) and it is only recently that folk psychology has unveiled laypersons understanding of free will as being based in having choice and being able to make choices without internal or external constraints. I conducted an empirical test with four studies of the cognitive link between the belief in free will and choice.

Those who endorsed the belief in free will viewed choice as means to freedom (study 1) and their everyday actions as choices (study 2). Moreover, those with higher belief in free will reported a higher perceived ability to choose, and a stronger liking to making choices (study 1), as well as perceived choice situations as less difficult and as resulting in higher satisfaction from their decisions (study 2).

Priming choice activated the belief in free will. Recalling choices (versus actions, study 3) and making an actual choice between products (versus rating or describing, study 4) led to an activation of the belief in free will. The degree of choice available also mattered, and a choice between four products as compared to two, led to stronger activation of the belief in free will in self (study 4).

The concept of free will is considered a core construct underlying agency, serving as the foundation for accountability and moral responsibility. In chapter 3, I explored attributions of free will to agents, both in the self and in others, to find that actions involving negative valence (either the action or the outcome) led to perceiving the action as involving higher free will by the agent. In six experiments I demonstrated this effect using negative versus positive recalled general actions (study 1), a decision situation with positive versus negative outcomes (study 2), a decision situation with fixed outcome with positive versus negative framing (study 3), and a game-theory two person interaction (study 4). I then proceeded to address two possible alternatives accounts by demonstrating that this effect is not driven by the "bad is stronger than good" effect or the perception that the person should have acted differently (study 5). Lastly, I examined the possibility of reverse causality with findings suggesting that the causal link is only one directional from valence to free will (study 6). Taken together these findings support the activation of the notion of free will when there is need for accountability in a negative action or outcome.

Finally, chapter 4 examined the consequences of the belief in free will. Three studies found the belief in free will as an important predictor of academic performance in an undergraduate course (study 1), of job performance in an online labour market (study 2), and of socio-economic performance on a national level (study 3). Furthermore, the belief in free will also moderated the well-established positive relationship between self-control and performance (studies 1 and 2). The effects of the belief in free will held even when controlling for well-established predictors of performance - self efficacy, autonomy and self control (study 2). These findings clearly demonstrated that although the belief in free will is an abstract philosophical view of the world it has real life implications with strong predictive powers for performance, both for the individual and for society.

Contributions

The thesis offers several important contributions for the literature for several domains - social psychology, experimental philosophy and management. The thesis presented the following research questions - (1) How is the concept of choice related to and affect the belief in free will? (2) How does the link between free will and accountability affect attributions of free will? (3) What are the behavioral implications of the belief in free will for outcomes and performance? These questions were addressed by the different chapters as detailed below.

First, chapter 1 provided a comprehensive review of the current literature in social psychology and experimental philosophy regarding the concept of free will and the construct of the belief in free will. Although there have been empirical studies aiming to establish the construct of the belief in free will by building a scale to measure the construct and testing for construct validity, these studies have not directly addressed the conceptual and empirical differentiation of the belief in free will construct from other similar constructs in the literature. The conceptual review and the pretest in chapter 1 clearly establish the belief in

free will as a unique construct, also clarifying conceptual differences and the links with the other related constructs and empirically testing for the strength of their relationships.

Chapter 2 answers the first research question and examines the cognition of the belief in free will to follow on work in experimental philosophy and social psychology arguing for the importance of examining laypersons' understanding of free will and understanding its antecedents. The theorized conceptual link between free will and choice was the basis for an empirical demonstration that the belief in free will affects choice related attitudes and that the belief in free will can be activated by the recall of and the engagement in making choices.

Chapter 3 answers the second research question regarding the free will and accountability link by looking at free will attributions depending on the need for accountability triggered by context valence. The findings add to a growing literature regarding agency attributions to agents, demonstrating the importance of context and the cognition underlying concepts of agency in laypersons' minds.

Chapter 4 answers the third research question examining the link between the belief in free will and performance outcomes, also looking at the interaction with self-control. The belief in free will is a construct mostly unfamiliar in the management literature and the findings of this chapter demonstrate its importance in the prediction of positive outcomes for both self and society. The interaction with self-control suggests that the well-established relationship between self-control and positive outcomes is affected by the belief in free will, proposing new paradigms that combine beliefs and traits/abilities in the prediction of outcomes.

Together, all three chapters make important contributions to the literature, providing a clearer account of the concepts of choice and accountability underlying the folk cognition of the belief in free will and establishing the belief in free will as a powerful predictor for positive outcomes. The belief in free will predicts decision making in choice situation, the

concept of free will is activated in attributions of accountability, and the belief in free will predicts real everyday life performance outcomes.

Directions for management

The field of management makes assumptions regarding agency and agents' free will, but these assumptions are rarely theorized on and tested and the representation of those notions in the organizational context has mostly been overlooked. Through this thesis I was hoping to convince researchers that the belief in free will is a construct deserving of more attention, both in theorizing and in empirical investigations.

Building on roots in experimental philosophy and social psychology, the management literature can extend and expand the discussion regarding free will in applied settings and the organizational context. Below I describe several suggested directions for future research looking at free will in organizational settings.

For the individual, joining an organization can be viewed as an agreement based on free will. A contract between an employee and an organization may be conceptualized as the 'sale of free will'. In a work contract, the agent essentially puts a cost on applying own free will for the benefit of the organization, and also accepting organizational rules that serve as personal constraints - working hours, uniforms, receiving orders from superiors, etc. We should seek a better understanding of how people view their own free will upon organizational entry and how they regard the contractual exchange of their own free will in exchange for organizational membership and monetary rewards and benefits.

For organizational members, the belief in free will may influence many aspects of organizational life - their perceptions of their own role, their coworkers, their employers, their tasks, etc. This thesis has taken a first step in showing that the belief in free will is predictive of task performance very broadly, and further research is needed to address the more specific types of organizational performance, such as organizational citizenship behavior and

managerial abilities. Though in this thesis, it would seem that the belief in free will is mostly positive and beneficial in terms of outcomes and the disbelief in free will much less so, previous literature in management suggests that there are two sides to every coin and that an person-environment interaction is more likely. Quite possibly, the belief in free will would be more beneficial in contexts where free will is valued and where initiative, proactiveness, responsibility and motivation are important factors for success, while the disbelief in free will may be more beneficial in contexts that require systematic inquiry, conformity, and the respect of norms and authority. Following this line of reasoning, both organizational and national cultures may serve as moderators of the effects of the belief in free will.

Looking beyond the individual level, the concept of free will can be extended to groups and organizations. This direction raises a number of interesting research questions - when is a group attributed free will? What does the attribution of free will to a group depend on? Is there a trade-off between the perception of free will for a group and the free will of its members? In the organizational context, a group can refer to a team, a department, an organization, or a population of organizations. Answering those questions can shed light on important assumptions in leading theories in the field. In the management literature, there are core differences in the philosophical views different domains hold regarding the level of free will that an organization has. For example, some theories in organizational theory, such as institutional theory (e.g. DiMaggio and Powell, 1983), mainly view the organization as having little free will with action mostly driven by conformity to external pressures. Organizational ecology (e.g. Freeman & Hannan, 1983) is an extreme example looking at populations of organizations investigating births and deaths of organizations with very little regard to decisions taken on a single focal organizational actor. On the other hand, many of the strategy theories make implicit assumptions about the organization or its leaders as having agency and the ability to decide the organizational course of action. Agency theory

(e.g. Eisenhardt, 1989) and the behavioral theory of the firm (e.g. Cyert & March,1963) are two dominant theories that assume organizational actors are decision makers acting on goals and incentives. A better understanding of free will attributions to organizations and organizational actors and theorizing on free will on different levels of the organization can bring new insights to the field and possibly help integrate what may appear as conflicting or incoherent views of organizational life.

Lastly, chapter 4 highlights the belief in free will as an important predictor, explaining variance in performance beyond other well-established measures in management - self-control, self-efficacy and autonomy. Recently, the organizational behavior literature has recognized that some of the key constructs in management can be grouped together into what is referred to as 'core self-evaluations' or 'positive self views' (Judge & Bono, 2001 ; Judge, 2009) which generally lead to a multitude of positive outcomes. This thesis argues that the elements in core self-evaluations are different from yet meaningfully related to the belief in free will, and further research is needed to examine the exact associations and possible causal link between the two. Possibly, the belief in free will can either serve as an antecedent or an enabler of core self-evaluations, or it could be a missing element in the this latent construct.

Directions for future research

In this thesis and the current literature on the belief in free will the general view regarding this belief is positive - those who believe in free will cheat less (Vohs & Schooler, 2008), are less aggressive and more helping (Baumeister, Masicampo, & DeWall, 2009), learn better from own mistakes and misdeeds (Stillman & Baumeister, 2010), have a stronger self-efficacy (Baumeister & Brewer, 2012), stronger motivation for success (Stillman et al., 2010), and stronger perceptions of self-autonomy (Kane, 2002). Some studies have also reported less positive outcomes such as higher need for retribution and punishment of wrongdoings (Clark et al., 2014; Shariff et al., 2014), but even these are not entirely negative

and have a role in a functioning society. In this thesis, those who believe in free will tend to have more positive attitudes towards choice and decision making and enjoy higher performance. Yet, does the believe in free will always lead to positive outcomes for self and society?

The reported findings above seem to fall into two main categories that support two views of the function of free will. The one is that free will is meant for social functioning such that those who believe in free will care about accountability and responsibility and are therefore less likely to engage in actions that violate social norms (Kant, 1788 ; Nietzsche, 1886). Using that view, the belief in free will is an essential tool for human beings as cultural animals living in coexistence with others, or - put simply - that 'free will is for following rules' (Baumeister, 2008a). Animals have the inherent need to behave selfishly but free will enables the person to override the self in order to consider long terms goals and postpone own selfish urges and needs (Baumeister, 2008b ; Baumeister & Monroe, 2014). The other view is that free will is 'only worth having if it enables the person to get what he or she wants (Dennett, 2003). Using that view, those who believe in free will would have a stronger drive to pursue own goals for personal succeed as well as the ability to act more effectively in that direction. In this case, the belief in free will can lead to actions that are more self-centered rather than social, with possible negative consequences for society. Future research could aim to contrast the two views and possibly reach an integrated theory combining these views.

Above we discussed possible moderators regarding the effects of the belief in free will. Of these moderators, the role of culture and norms seems especially important. Though there are studies comparing the belief in free will cross-culturally (Sarkissian et al., 2010), to my knowledge there is no research examining the possibly different understandings that people hold regarding what the belief in free will is and investigate how such differences impact the role that the belief in free will plays in people's lives. Chapter 2 discusses the link

between free will and choice and chapter 3 discusses the link between free will and accountability, yet research on choice and accountability has revealed significant cultural differences regarding those two concepts. For example, choices and actions are perceived different by Americans and Indians (Savani, Markus, Naidu, Kumar, & Berlia, 2010), such that American society which emphasizes self-agency tends to construe own actions as choices while Indian society tends to construe actions involving interactions with others as choices. Therefore, though the concept of choice exists in both cultures the sociocultral environment gives choice a different meaning so that choice is manifested in people's minds in a different way. It is likely, then, that the belief in free will would be affected by similar moderators.

Practical implications

The three chapters offer a variety of practical implications for managers. Most importantly, chapter 4 demonstrates that the belief in free will has real implications for performance outcomes. Chapter 2 also establishes the belief in free will as predictive of choice related attitudes. The accumulating research on the belief in free will suggests that those who believe in free will are more likely to assume responsibility for own actions, are more driven to make choices, and have a stronger motivation for action and hence more proactive and less conforming. On the other hand, those who disbelieve in free will do not learn from own failures, tend to conform to the norm, are more passive, and shy away from choices and decisions. Therefore, the assessment of an employee's agentic beliefs can serve as a predictor for an employee's future performance and may be taken into account when making hiring decisions, but more importantly - it suggests that managers may need to adjust their managerial style to match the employee's beliefs and assign work that would better match their beliefs (Dweck, 2006 ; Heslin & VandeWalle, 2008). For example, managers may empower those who believe in free will by assigning tasks that involve more responsibility, choices and decision making, while those who disbelieve in free will may

benefit from a clearer and more specific managerial style that well-defines tasks and boundaries.

Chapter 3 also suggests that managers should be careful of the inherent bias in attributions of will to others. A negative context (or outcome) leads to stronger attributions of free will while than a positive one, regardless of the person's intent or actual action. One of the suggested reasons for this biased attributions is the need to attribute blame. The implications are that negative outcomes in the organizational context may drive a wrong attribution of will. For example, an employee might be wrongly perceived as the cause of a negative outcome hence leading to undeserved punishment or the employee may be perceived as inconsequential in a case of a positive outcome therefore possibly leading to awarding less praise or reward than deserved.

Implications for science

In Chapter 1 I began the introduction to the free will literature by overviewing the philosophical discussion regarding free will - does free will exist? can free will co-exist with determinism? can free will be studied using scientific tools? is a scientific theory of free will at all possible?

The recent growth in studies regarding free will in scientific literature extend beyond philosophy into the domains of experimental philosophy, social and cognitive psychology, neuroscience, and biology. This thesis follows the social-cognitive and experimental philosophy direction in examining the concept of free will in laypersons, how people think about free will, what attributions they make regarding having free will and the exploration of the cognition and consequences of their belief or disbelief in free will. The theory and findings in this thesis make no assumptions regarding whether free will exists or not, yet chapters 2 and 3 in the thesis may add to the ongoing free will debate.

Chapter 2 links the concept of free will to choice. While this link may seem intuitive and perhaps even tautological, a close examination of previous literature suggests that most of the discussion regarding free will does not consider such a link. Traditionally, the debate regarding free will referred to free will as involving a dualistic soul or supernatural entity, or a possible exemption from causation (Bargh, 2008 ; Cashmore, 2010). Yet, the recent effort for a scientific pursuit of free will and the exploration of the manifestation of the concept of free will in laypersons allows for a clearer link between free will and choice and an emphasis on agency thereby allowing the integration of the concept of free will in other scientific theory. It also means that scientists who embrace casualty and determinism in their scientific pursuit need not fear the concept of free will and that they are now able to embrace the concept and embed it within their deterministic models.

Chapter 3 adds to another literature examining the inner workings of free will attributions. The findings in this chapter highlight the link between accountability and free will and the related social functioning role that encompasses free will in society as related to the attribution of blame. Other recent findings regarding free will builds on Kantian and Nietzschian philosophical claims regarding the origin of free will beliefs as an enabler of coexistence with others as to enable Gods (or their earthly representatives) to punish sinners and to enable modern societies to hold people responsible for their wrongdoings. The definition and understanding of what free will is could and should be accompanied by the understanding of its impact on the cognition of the individual and the importance of this concept to the group.

Limitations

The studies in this thesis are not without limitations. Below I extend the limitations sections of each chapter and summarize some of the main issues and suggest directions for future research.

First, the samples of individual level cognition and behavior in this thesis are exclusively from two samples - undergraduate students in Hong Kong and online samples recruited using Amazon Mechanical Turk mainly from India and the United States. This raises a number of related concerns regarding generalizability to other cultures and to field settings. To try and minimize such concerns, each chapter included conceptual replications using empirical investigations from both samples complimented by a national level analysis of archival data, and the use of these samples in chapter 4 resembled 'field research' in the sense that the students were examined for being students (academic performance) and MTurk workers were examined for being workers (job performance). Yet, both samples are self-selected samples and do not represent the general population, such that students represent a relatively well-off highly educated population with a relatively strong motivation for success, while the MTurk workers represents people who have chosen to work using a platform that allows for high independence and autonomy with relatively less structure. Therefore, both populations might represent those with relatively higher belief in free will compared to the general population, and therefore some of the effects regarding cognition in chapters 2 and 3 might not be as strong if examined in other settings. Future studies may attempt to extend these findings to other settings and examine the possible moderating factors of the base-line belief in free will and other cross-cultural and demographic differences.

Second, the assessment of the belief in free will throughout has been using self-reported scales. Although this is a typical way to assess beliefs (Wyer & Albarracín, 2005) it does suffer from limitations of possible social-desirability as well as issues regarding differences in scale use. Future studies may examine alternative ways to assess this belief. One possible direction is offered by chapters 2 and 3 showing the inherent link between choice, the capacity to have done otherwise and the belief in free will, such that a behavioral

assessment of one's perceptions and decision making when facing choices of varying constraints may serve as a proxy indicator of one's beliefs in free will.

While chapters 2 and 3 offer an experimental investigation, chapter 4 relies on correlational design thereby denying any causal inferences. Quite possibly, those who perform better come to endorse the belief in free will more strongly. Future research may experimentally manipulate the belief in free will and self control (through ego depletion) to observe changes in behavior in a follow-up task.

Conclusion

Fourteen empirical studies examine the the folk cognition of the concept of free will and demonstrate the belief in free will as a powerful predictor for positive choice attitudes and performance outcomes.

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Tables

Table 1
Summary of views on free will and determinism

	Free will exists	Free will does not exist
Determinism is true	Compatibilists	Hard determinists
Determinism is false	Libertarians	Hard incompatibilists

Note : Hard determinists, Libertarians and Hard incompatibilists are all Incompatibilists

Table 2
Pretest : Correlations and reliability

	FWD general FW	FWD self FW	FAD+ FW	Alphas
FWD general FW	1			0.78
FWD self FW	.82***	1		0.70
FAD+ FW	.63***	.49***	1	0.69
FAD+ unpredictability	.02	-.13	.22*	0.73
FAD+ scientific determinism	.07	-.02	.31**	0.74
FAD+ fatalistic determinism	-.46***	-.58***	-.15	0.84
Self-control	.39**	.49***	.41***	0.81
Locus of control	.16	.22*	.15	NA
Personal control	.48***	.57***	.39***	0.78
Perceived mastery	.45***	.47***	.45***	0.80
Perceived Constraints	-.34**	-.46***	-.15	0.88
Ess kind of person	-.10	-.15	-.14	0.65
Ess moral	-.02	-.13	-.07	0.69
Ess intelligence	-.10	-.25*	.02	0.72
Ess race	.16	.03	.00	0.30
Self-efficacy	.37***	.46***	.45***	0.81
Self-esteem	.50***	.50***	.49***	0.85

Note : ***. $p < .001$; **. $p < 0.01$; *. $p < 0.05$

Table 3
CFA: Belief in FW and other constructs

Free will with...	Two Chi	One Chi	Diff Chi	Sig?
Self-Control	450.97	501.27	50.30	$p < .001$
Self-Efficacy	223.25	274.92	51.97	$p < .001$
Self Esteem	362.91	436.95	74.04	$p < .001$
Locus of Control	253.72	267.68	13.96	$p < .001$

Note: Two-chi indicates the chi-square of a model with two different factors. One-chi indicated chi-square of a model with one single factor. Diff-chi is the difference in chi-square between the two models. Sig? indicates the level of significant for Diff-chi given that df=1

Table 4

Study 1 correlations table

	1	2	3	4
1 - Belief in self free will	(.72)			
2 - Choice associated with freedom	.25*	-		
3 - Preference for choice	.26**	.00	(.60)	
4 - Perceived ability to choose	.38***	.11	.17	(.54)
Age	-.02	.03	.12	-.24*
Gender [a]	-.08	.01	.01	-.13

Note. [a] Gender is dummy coded (0 = male, 1 = female) ; * $p<.05$; ** $p<.01$; *** $p<.001$.

Alpha coefficients are presented on the diagonal.

Table 5

Study 2 correlations table

	1	2	3	4	5	6	7	8	9	10	11	12
1 - FWD general	(.84)											
2 - FWD self	.82***	(.75)										
3 - FAD+ FW	.76***	.58***	(.87)									
4 - FAD+ determinism	-.12	-.14	.00	(.68)								
5 - FAD+ fatalism	-.35**	-.51***	.06	.27*	(.91)							
6 - Unpredictability	-.16	-.24	-.10	.29*	.45**	(.80)						
7 - N of alternatives	-.09	-.15	-.14	-.01	.03	.13	-					
8 - Importance	.09	-.01	.34**	-.06	.25*	.00	.00	-				
9 - Difficulty	-.27*	-.34**	-.15	.21	.19	.04	.16	.00	-			
10 - Enjoyment	.17	.06	.33**	-.03	.12	-.08	.00	.50**	.19	-		
11 - Satisfaction	.27*	.29*	.24	-.10	-.24	-.14	.10	.27*	-.38**	.27*	-	
12 - Is a choice?	.56***	.51***	.49***	-.10	-.26*	-.08	-.02	.18	-.32**	.08	.40**	-
Age	.00	-.17	-.17	-.18	-.02	-.11	.25	-.04	-.10	.01	-.06	-.11
Gender [a]	-.10	.05	.01	-.10	.02	-.19	.10	.17	-.13	.00	.11	.15

Note. [a] Gender is dummy coded (0 = male, 1 = female) ; * $p<.05$; ** $p<.01$; *** $p<.001$.

Alpha coefficients are presented on the diagonal.

Table 6

Experiment 5 - Means report for perceived freedom of will

	6 lives	60 lives	600 lives	Overall
Negative	4.82 (1.59)	4.88 (1.34)	4.27 (1.46)	4.65 (1.47)
Positive	4.40 (1.78)	4.78 (1.40)	3.60 (1.26)	4.27 (1.55)
Overall	4.60 (1.69)	4.83 (1.35)	3.94 (1.39)	4.46 (1.52)

Table 7

Experiment 6 correlations table

	Perceived free will	Moral accountability	Perceived guilt
Perceived free will	1		
Moral accountability	.48***	1	
Perceived guilt	.19†	.14	1
Perceived valence	-.25*	-.27*	-.25*

Table 8

Study 1 correlations table

	M	SD	Self control	Belief in free will	Mid term exam	Final exam	Participation	Final course score
Self control	2.87	.49	(.77)					
Belief in free will	3.50	.44	.19***	(.71)				
Mid term exam [a]	0	1	.01	.15***	(-)			
Final exam [a]	0	1	.09*	.05	.51***	(-)		
Participation [a]	0	1	.08*	.05	.37***	.39**	(-)	
Final course score [a]	0	1	.09*	.08*	.72***	.79**	.73***	(-)
Age	18.90	.80	-.02	-.02	.08	-.02	.01	.01
Gender [b]	-	-	-.01	-.02	.04	.09*	-.02	.05
From Mainland China	-	-	.02	-.01	.14***	.10*	.13**	.15***
From Hong Kong	-	-	-.10*	-.19***	-.08*	-.06	-.10*	-.09*
Not from HK or China	-	-	.10*	.27***	-.04	-.03	-.01	-.04

Note. [a] Performance scores were standardized for each class session. [b] Gender is dummy coded (0 = male, 1 = female) ; * $p < .05$; ** $p < .01$; *** $p < .001$; Alpha coefficients are presented on the diagonal.

Table 9

Study 1 - Hierarchal linear regression table

Predictor	Step 1	Step 2-FW	Step 2-SC	Step 3	Step 4
Control variables					
Age	-.02	-.02	-.02	-.02	-.02
Gender	.04	.04	.04	.04	.04
Mainland China student	.15***	.15***	.15***	.15***	.15***
International student	-.02	-.04	-.03	-.05	-.06
Key predictors					
Belief in free will (BFW)	-	.10*	-	.08†	.09*
Self control (SC)	-	-	.09*	.08†	.06
BFW x SC	-	-	-	-	.08*
ΔR^2	.03**	.01*	.01*	.01†	.01*
F	3.97**	4.24**	4.22**	4.16***	4.20***

Note. $N = 614$. Standard coefficients are shown. † $p < .1$; * $p < .05$; ** $p < .01$; *** $p < .001$

Table 10

Study 2 correlations table and reliabilities

	M	SD	1	2	3	4	5	6	7	8
1 - Approval rate	93.93	4.81	(-)							
2 - Performance scale	3.94	.81	.20**	(.82)						
3 - Self control	3.48	.61	.15*	.20**	(.78)					
4 - FW self FWD	3.68	.53	.27***	.32***	.29***	(.80)				
5 - FW general FWD	3.71	.48	.29***	.31***	.22**	.76***	(.69)			
6 - FW FAD+	3.87	.58	.10	.33***	.20**	.56***	.73***	(.76)		
7 - Job self efficacy	5.88	.89	.25***	.46***	.36***	.40***	.37***	.37***	(.78)	
8 - Job autonomy	5.59	.94	.17*	.35***	.22**	.41***	.39***	.39***	.62***	(.76)
Age	31.80	11.09	.24***	.12	.31***	.27***	.22**	.13*	.19**	.14*
Gender[a]	-	-	.16*	.09	.22**	.09	.08	.01	.14*	.18**

Note. [a] Gender is dummy coded (0 = male, 1 = female) ; * $p < .05$; ** $p < .01$; *** $p < .001$.

Alpha coefficients are presented on the diagonal.

Table 11

Study 2 regression table

	Without autonomy / self-efficacy				With autonomy / self-efficacy			
	Approval Rate		Performance scale		Approval Rate		Performance scale	
Predictor	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β
Step	.08***		.02†		.08***		.02†	
Age		.23**		.12†		.23**		.12†
Gender [a]		.15*		.09		.15*		.09
Step					.04*		.20***	
Job autonomy						-.01		.09
Job self-efficacy						.20*		.40***
Step	.00		.02*		.00		.00	
Trait self-control		.06		.16*		-.01		.02
Step	.04**		.08***		.02*		.02*	
Belief in FW		.21**		.29***		.17*		.16*
Step	.03*		.02*		.02*		.01	
Interaction		-.17*		-.13*		-.15*		-.07
Total R^2	.15		.13		.16		.24	

Note. $N = 212$ [a] Gender is dummy coded (0 = male, 1 = female) ; † p .< 10 , * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 12

Study 3 correlations table and reliabilities

	M	SD	2	3	4	5	6
1 - National FW1	7.04	.72	.70***	.42**	.34*	.35*	.24†
2 - National FW2	6.34	1.10		.49**	.46**	.06	.21
3 - Per capita GDP(log)	8.77	1.57			.96***	-.34*	.39**
4 - Labor productivity(log)	10.21	1.06				-.28†	.30*
5 - Gini coefficient	38.06	8.38					-.15
6 - Political freedom	1.61	.69					

Note. † p .< 10 , * p < .05 , ** p < .01 , *** p < .001.

Table 13

Study 3 regression table

	First FW item				Second FW item			
	PPP		Productivity		PPP		Productivity	
Predictor	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β
Step	.22**		.15*		.28**		.19*	
Gini coefficient		-.28*		-.25†		-.26†		-.23
Political freedom		.33*		.27†		.42**		.34*
Step	.20***		.19**		.17*		.18**	
Belief in FW		.50***		.49**		.43**		.43**
Total R^2	.42		.34		.45		.38	

Note.; † p .< 10 , * p < .05 , ** p < .01 , *** p< .001.

Table 14
Thesis studies summary and findings

Ch.	St.	N	Sample	IV1	IV2	DV	Details	Contributions
1	Pre	83	MTurk	BFW	-	Various scales	Correlations and confirmatory factor analysis	BFW empirically distinct yet related to other constructs
2	1	98	Students	BFW	-	Choice associations + attitudes	Scale - perceived ability, liking *Stephens, Fryberg, and Markus (2011)* association task	BFW->(choice=freedom) BFW->ability to choose BFW->liking for choice
2	2	63	MTurk-US	BFW	-	Actions as choices, attitudes	Recall 4 scenarios, rate difficult/enjoyment/satisfaction/action-as-choice	BFW->less difficulty to choose->higher satisfaction BFW->see actions as choices
2	3	114	MTurk	Choice Activation	-	BFW	Recall of actions versus choices from the previous day. *Savani & Rattan (2012)*	Choice->higher BFW Choice->lower BDeterminism
2	4	186	MTurk	Choice Activation	-	BFW	Choosing versus ranking products. Five conditions - high/low/rating/describe/control *Vohs et al. (2008)*	Different manipulation Degree of choice Control condition

Ch.	St.	N	Sample	IV1	IV2	DV	Details	Contributions
3	1	212	Students	Self / Other	Action valence	FW attribution	Recalled interaction FW attributions Coding alternatives	Negative->higher FW Negative->more alternatives
3	2	204	MTurk	Self / Other	Outcome valence	FW attribution	Asian Disease scenario, high risk option: manipulating outcome *Tversky & Kahneman (1981)*	1. Ruling out intent 2. Fixed situation between conditions
3	3	210	MTurk	Self / Other	Framing valence	FW attribution	Asian Disease scenario, low risk option: manipulating framing *Tversky & Kahneman (1981)*	1. Addressing # of deaths confound 2. Fixed situation + outcome
3	4	208	MTurk	Self / Other	Action valence	FW attribution	Prisoner's dilemma: interaction, manipulating action. *Rapoport & Chammah (1965)*	1. Fixed situation – personal implications
3	5	178	Students	Positive / Negative framing	# of deaths 6 / 60 / 600	FW attribution	Same as study #3 ; Mediators: Responsibility / Regret / Good-bad *Shimizu & Udagawa, 2011*	1. Extent of actions 2. Mechanism
3	6	79	Students	Degree of FW		Valence	Mediators : Responsibility / Regret / Good-bad *Woolfolk, Doris & Darley (2006)*	Testing reverse causality

Ch.	St.	N	Sample	IV1	IV2	DV	Details	Contributions
4	1	614	Students	BFW	Self Control	Academic performance	Two time-lagged periods MGMT undergraduate course performance	Actual performance, naturalistic environment Interaction with self-control Mediation of Choice attitudes
4	2	218	MTurk	BFW	Self Control	Job Performance	Amazon MTurk Reject/Accept ratio Various scales	Job performance / Satisfaction Online labour market Controlling for autonomy/efficacy
4	3	14,529	World Values Survey	BFW		Job satisfaction Socioeconomic performance	Individual level - job satisfaction Country level - GDP-PP and workforce productivity	BFW->higher job satisfaction BFW->higher country performance
Overall	14	2,467 16,997	6 Student 8 MTurk 1 Archive					

Figures

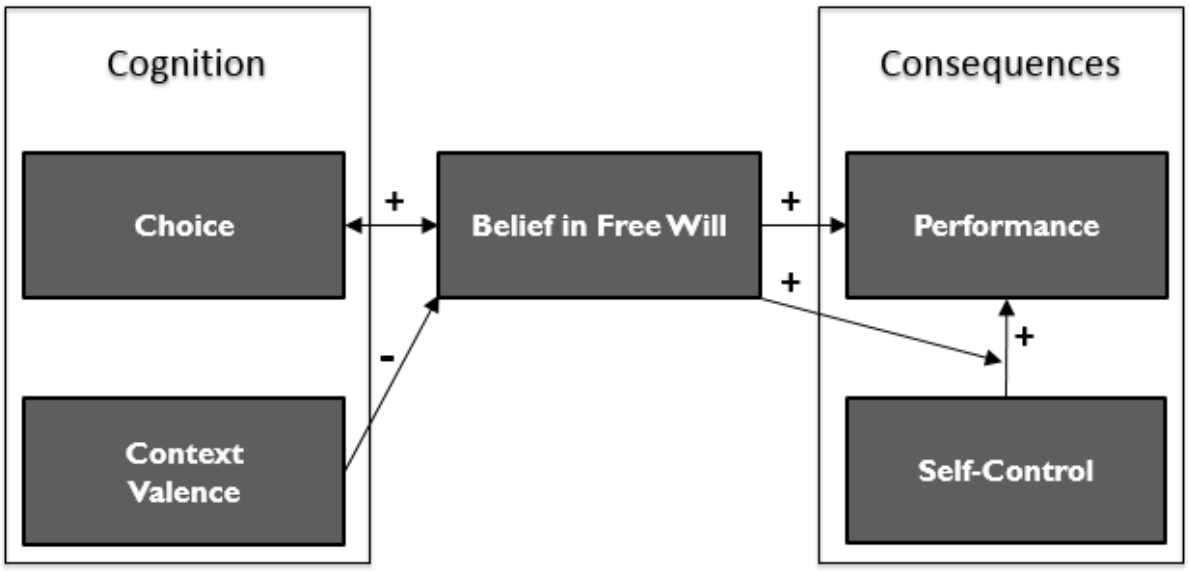

Figure 1. Thesis framework

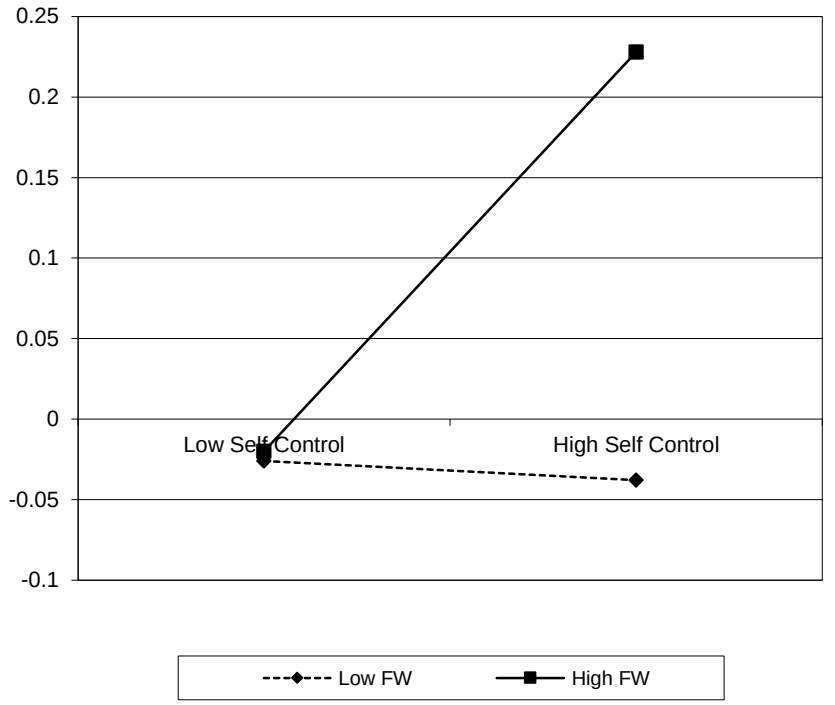

Figure 2. Study 1: Final course standardized score: Self-control and belief in free will interaction plot.

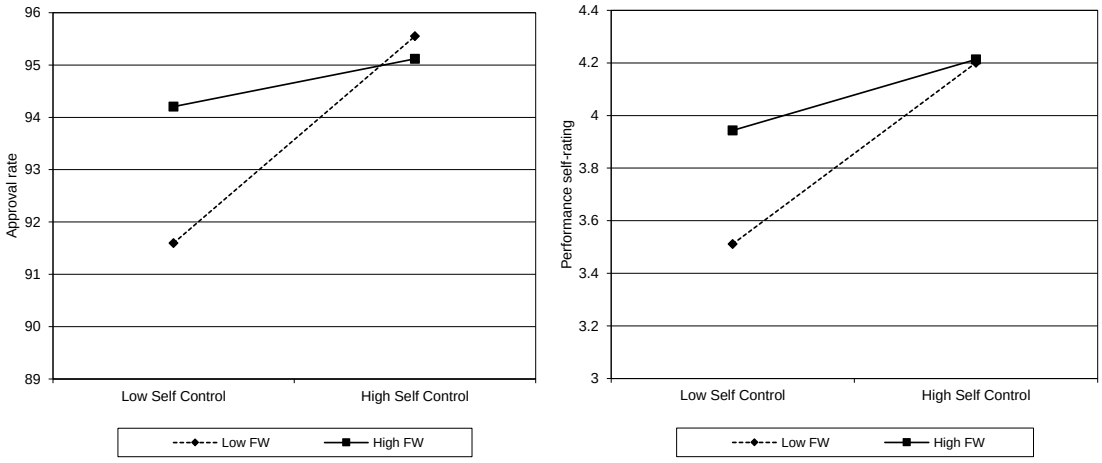

Figure 3. Study 2 self-control and belief in free will interaction plots

Appendix A

Following below are all the scales and manipulations for the studies in the thesis (R indicated a reversed item).

Scales used in Chapter 1 pretest

- Free will : FWD (Rakos et al. 2008) and FAD+ (Paulhus & Carrey, 2011) – see below
- Self control : Tangney, Baumeister & Boone, 2004 – see below
- Locus of control : Rotter (1966)
- Personal control : Paulhus & Van Selst (1990)
- Perceived mastery & perceived constraints : Lachman and Weaver (1998)
- Essentialism : Dweck (1999) & Chao, Hong, & Chui (2013)
- Self efficacy : Judge, Locke, Durham, & Kluger (1998)
- Self esteem : Rosenberg (1965)

Free Will Scale – FWD subscale (Rakos et al. 2008)

Self:

1. I am in charge of the decisions I make.
2. I actively choose what to do from among the options I have.
3. I am in charge of my actions even when my life's circumstances are difficult.
4. My decisions are influenced by a higher power. (R)
5. I have free will even when my choices are limited by external circumstances.
6. I decide what action to take in a particular situation.
7. My choices are limited because they fit into a larger plan. (R)
8. I have free will.

General:

1. Each person's decisions are guided by a larger plan. (R)
2. Human beings actively choose their actions and are responsible for the consequences of those actions
3. Free will is a basic part of human nature.
4. A person must accept responsibility for his or her choice of action.
5. Life's experiences cannot eliminate a person's free will.
6. A person is to blame for making bad choices.
7. A person should receive appropriate punishment for choosing to engage in bad or harmful behaviors.
8. A person who makes a poor decision should experience the consequences of that decision.
9. People have free will regardless of wealth or life circumstances.
10. A person's choices are limited by a higher power's plan for him or her. (R)
11. A person is accountable for the decisions he or she makes.
12. Free will is part of the human spirit.
13. A person is responsible for his or her actions even if his or her childhood has been difficult.
14. A person always has choices and therefore should be punished for making choices that harm others.

Free Will Scale – FAD+ (Paulhus & Carrey, 2011)

Free will

1. People have complete control over the decisions they make.
2. People must take full responsibility for any bad choices they make.
3. People can overcome any obstacles if they truly want to.
4. Criminals are totally responsible for the bad things they do.
5. People have complete free will.
6. People are always at fault for their bad behavior.
7. Strength of mind can always overcome the body's desires.

Scientific Determinism

1. People's biological makeup determines their talents and personality.
2. Psychologists and psychiatrists will eventually figure out all human behavior.
3. Your genes determine your future.
4. Science has shown how your past environment created your current intelligence and personality.
5. As with other animals, human behavior always follows the laws of nature.
6. Parents' character will determine the character of their children.
7. Childhood environment will determine your success as an adult.

Fatalistic Determinism

1. I believe that the future has already been determined by fate.
2. No matter how hard you try, you can't change your destiny.
3. Fate already has a plan for everyone.
4. Whatever will be, will be – there's not much you can do about it.
5. Whether people like it or not, mysterious forces seem to move their lives.

Unpredictability

1. Chance events seem to be the major cause of human history.
2. No one can predict what will happen in this world.
3. Life seems unpredictable - just like throwing dice or flipping a coin.
4. People are unpredictable.
5. Life is hard to predict because it is almost totally random.
6. Luck plays a big role in people's lives.
7. What happens to people is a matter of chance.
8. People's futures cannot be predicted.

Self Control Scale (Tangney, Baumeister & Boone, 2004)

1. I am good at resisting temptation.
2. I have a hard time breaking bad habits. (R)
3. I am lazy. (R)
4. I say inappropriate things. (R)
5. I do certain things that are bad for me, if they are fun. (R)
6. I refuse things that are bad for me.
7. I wish I had more self-discipline. (R)
8. People would say that I have iron self- discipline.
9. Pleasure and fun sometimes keep me from getting work done. (R)
10. I have trouble concentrating.(R)
11. I am able to work effectively toward long-term goals.
12. Sometimes I can't stop myself from doing something, even if I know it is wrong. (R)
13. I often act without thinking through all the alternatives. (R)

Locus of Control - Rotter (1966)

Please choose one choice (a or b) for each :

1. a. Children get into trouble because their patents punish them too much.
1. b. The trouble with most children nowadays is that their parents are too easy with them.
2. a. Many of the unhappy things in people's lives are partly due to bad luck.
2. b. People's misfortunes result from the mistakes they make.
3. a. One of the major reasons why we have wars is because people don't take enough interest in politics.
3. b. There will always be wars, no matter how hard people try to prevent them.
4. a. In the long run people get the respect they deserve in this world.
4. b. Unfortunately, an individual's worth often passes unrecognized no matter how hard he tries.
5. a. The idea that teachers are unfair to students is nonsense.
5. b. Most students don't realize the extent to which their grades are influenced by accidental happenings.
6. a. Without the right breaks, one cannot be an effective leader.
6. b. Capable people who fail to become leaders have not taken advantage of their opportunities.
7. a. No matter how hard you try, some people just don't like you.
7. b. People who can't get others to like them don't understand how to get along with others.
8. a. Heredity plays the major role in determining one's personality.
8. b. It is one's experiences in life which determine what they're like.
9. a. I have often found that what is going to happen will happen.
9. b. Trusting fate has never turned out as well for me as making a decision to take a definite course of action.
10. a. In the case of the well prepared student there is rarely, if ever, such a thing as an unfair test.
10. b. Many times, exam questions tend to be so unrelated to course work that studying is really useless.
11. a. Becoming a success is a matter of hard work, luck has little or nothing to do with it.
11. b. Getting a good job depends mainly on being in the right place at the right time.
12. a. The average citizen can have an influence in government decisions.
12. b. This world is run by the few people in power, and there is not much the little guy can do about it.
13. a. When I make plans, I am almost certain that I can make them work.
13. b. It is not always wise to plan too far ahead because many things turn out to be a matter of good or bad fortune anyhow.

Personal Control - Paulhus & Van Selst (1990)

1. I can usually achieve what I want when I work hard for it
2. Once I make plans I am almost certain to make them work
3. I prefer games involving some luck over games of pure skill (R)
4. I can learn almost anything if I set my mind to it
5. My major accomplishments are entirely due to my hard work and ability
6. I usually do not set goals because I have a hard time following through on them (R)
7. Bad luck has sometimes prevented me from achieving things (R)
8. Almost anything is possible for me if I really want it
9. Most of what will happen in my career is beyond my control (R)
10. I find it pointless to keep working on something that is too difficult for me (R)

Perceived mastery & perceived constraints : Lachman and Weaver (1998)

Mastery

1. I can do just about anything I really set my mind to
2. When I really want to do something, I usually find a way to succeed at it
3. Whether or not I am able to get what I want is in my own hands
4. What happens to me in the future mostly depends on me

Constraints

1. Other people determine most of what I can and cannot do
2. There is little I can do to change many of the important things in my life
3. I often feel helpless in dealing with the problems of life
4. What happens in my life is often beyond my control
5. There are many things that interfere with what I want to do.
6. I have little control over the things that happen to me
7. There is really no way I can solve all the problems I have
8. I sometimes feel I am being pushed around in my life

Self esteem - Rosenberg (1965)

1. I feel that I am a person of worth, at least on an equal basis with others.
2. I feel that I have a number of good qualities.
3. All in all, I am inclined to feel that I am a failure. (R)
4. I am able to do things as well as most other people.
5. I feel that I do not have much to be proud of. (R)
6. I take a positive attitude toward myself.
7. On the whole, I am satisfied with myself.
8. I wish I could have more respect for myself. (R)
9. I certainly feel useless at times. (R)
10. At times I think I am no good at all. (R)

Self efficacy - Judge, Locke, Durham, & Kluger (1998)

1. I am strong enough to overcome life's struggles.
2. At root, I am a weak person. (R)
3. I can handle the situations that life brings.
4. I usually feel that I am an unsuccessful person. (R)
5. I often feel that there is nothing that I can do well. (R)
6. I feel competent to deal effectively with the real world.
7. I often feel like a failure. (R)
8. I usually feel I can handle the typical problems that come up in life.

Essentialism – Kind of person - Dweck (1999)

1. The kind of person people is, is something very basic about them, and it can't be changed very much.
2. People can do things differently, but the important parts of who they are can't really be changed.
3. Everyone is a certain kind of person, and there is not much that they can do to really change that.
4. As much as I hate to admit it, you can't teach an old dog new tricks. People can't really change their deepest attributes.

5. Everyone, no matter who they are, can significantly change their basic characteristics. (R)
6. People can substantially change the kind of person they are. (R)
7. No matter what kind of person someone is, they can always change very much. (R)
8. People can change even their most basic qualities. (R)

Essentialism – Race - Chao, Hong, & Chui (2013)

1. To a large extent, a person's race biologically determines his or her abilities and traits.
2. Although a person can adapt to different cultures, it is hard if not impossible to change the biological dispositions of a person's race.
3. How a person is like (e.g., his or her abilities, traits) is deeply ingrained in his or her racial dispositions. It cannot be changed much.
4. A person's race is something very basic about them and it can't be changed much.
5. Races are just arbitrary categories and can be changed if necessary. (R)
6. Racial categories are constructed totally for economic, political and social reasons. If the socio-political situation changes, the racial categories will change as well. (R)
7. Race does not have an inherent static basis, and can be changed. (R)
8. Racial categories are fluid, malleable constructs. (R)

Essentialism – Morality - Dweck (1999)

1. A person’s moral character is something very basic about them and it can’t be changed much.
2. Whether or not a person is responsible and sincere is deeply ingrained in his or her moral character. It cannot be changed much.
3. As the saying goes, it is easier to move a mountain than to change one’s character. It is undeniable that people can’t really change their deepest character.
4. There is not much that can be done to change a person’s moral traits (e.g., conscientiousness, uprightness, honesty).
5. People can change their moral character substantially. (R)
6. When it is necessary, a person’s moral character can be changed. (R)
7. No matter what a person's moral character is like, it can be totally changed. (R)
8. Anyone's moral character can be changed. (R)

Essentialism – Intelligence - Dweck (1999)

1. You have a certain amount of intelligence and you really can't do much to change it.
2. Your intelligence is something about you that you can't change very much.
3. You can learn new things, but you can't really change your basic intelligence.

Attention checks

1. Two dollars are worth more than five hundred cents (R)
2. Balls are round
3. If in the same week, Tuesday comes before Monday (R)
4. One hundred is more than fifty
5. One kilometer is shorter than two hundred meters (R)
6. The color of grass is blue (R)
7. I am answering a questionnaire
8. I am not human (R)
9. I have wings (R)
10. I can breathe

Appendix B

This thesis uses Amazon Mechanical Turk (or MTurk) in several studies. This appendix will offer a quick overview of MTurk, explain the use of the platform in this thesis and attempt to address possible concerns that may arise. In chapters 2 and 3 MTurk is used as a platform for data collection, while in chapter 4 MTurk is examined as a labour market (see in-depth discussion about that use in the methods section of chapter 4).

MTurk is a relatively new open online labor market that connects between employers and employees around the world, with hundreds of thousands of users from over a 100 countries seeking or offering work on the platform. Well-defined tasks are offered by "requesters", and "workers" that match the criteria set by the requester can choose to work on those tasks. A task could be anything from elaborate proofreading to website scanning, and more recently - surveys and experiments by behavioral scientists. To run a survey or an experiment online a researcher would usually setup an online survey on tools like SurveyMonkey or Qualtrics and post the link to the survey on the task asking the workers to type in a unique code that would be given to them once the survey or the experiment is completed.

Workers' performance is tracked and observed. Workers' tasks are evaluated by the requesters and their performance on the task determines – (1) whether they get paid or not on the current task, and (2) whether they may qualify for future tasks. A requester can reject a task, thereby denying payment from a worker if the work completed by worker is considered below the defined terms in the task. An overall task acceptance/rejection rate is calculated for each worker and called an "approval rate" which gives requesters an indication of the worker's performance and requester can define in each task the minimum approval rate needed for a worker to qualify for undertaking the task. Requesters can also define the number of tasks a worker must have already completed successfully. More recently, MTurk

also introduced a feature called “Skilled Workers” who are honored by the system for their high-quality work.

In recent years, a growing number of behavioral science articles have evaluated MTurk as a platform for experiments, with generally positive reviews. Buhrmester, Kwang, and Gosling (2011) conclude that data obtained in psychological experiments using MTurk is atleast as reliable as more traditional methods, offering quick and easy data collection using an inexpensive and diverse sample. Mason and Suri (2011) conclude that MTurk is a valid useful tool for behavioral scientists. Paolacci, Chandler, and Ipeirotis (2010) address concerns about MTurk to compare MTurk results to other methods and conclude MTurk to be a valid tool for social scientists studying judgment and decision making. Horton, Rand, and Zeckhauser (2010) argue that online economics studies using MTurk as just as valid as other means – both internally and externally, and that MTurk studies offer several important advantages over more traditional methods. Shapiro, Chandler, and Mueller (2013) see MTurk as an innovative tool for studying real life phenomenon in clinical psychology. Many other research fields offer similar enthusiasm about the potential of MTurk as a scientific tool (Casler, Bickel, & Hackett, 2013 ; Rand, 2012). Studies employing MTurk have been published on Science (Gervais & Norenzayan, 2012), Proceedings of the National Academy of Sciences in the United States (Piff et al., 2012), Journal of Personality and Social Psychology (Alter, Oppenheimer, & Zemla, 2010), Psychological Science (Berman & Small, 2012) and many other highly reputable journals.

Despite the overall positive attitudes regarding MTurk the articles above also point out important issues when running scientific work on MTurk – short attention span, multi-tasking, etc. Over the years I have become well acquainted with those issues and have taken several measures to address those. It is important to point out that I employ the exact same measures with student samples as I consider those equally likely to suffer from these issues.

The measures employed in this thesis are:

1. Attention checks using decoy questions in randomized positions throughout the questionnaire to check that workers are paying attention (see Appendix A for a list of decoys, both positive and negative directions).
2. When giving scenarios, a comprehension quiz is presented that workers must pass before proceeding to answer questions about the scenario.
3. When possible, more than one manipulation check is included with opposite direction of answer scales.
4. Timers check for unrealistically fast form submissions.
5. Workers are asked at the end of the survey – (1) how serious/honest they were answering the questionnaire, (2) English proficiency level. Where possible, short English proficiency test is added.
6. All surveys include a funneling section.
7. Typically, participation in the tasks is limited to workers with 95%+ approval rate who have already completed more than 50 tasks (this used to be the default in MTurk tasks).

For a detailed overview of the use of Amazon Mechanical Turk please visit : http://mgto.org/running-experiments-with-amazon-mechanical-turk/

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