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**An evolutionary perspective of poor self-control: Self-control deficits associated  
with social power displays and strategic kin altruism**

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## Abstract

The present research explored whether self-control deficits promote behaviors that may enhance Darwinian fitness, and examined the mechanisms by which these adaptive behaviors emerge. Chapter 1 provides a comprehensive review of the self-regulation literature, evaluates previously proposed explanations for self-control failures, and details the costs and benefits of poor self-control. Chapter 2 introduces my *social enhancement model of self-control deficits*, in which I propose that the array of disinhibited behaviors adopted by people with low self-control may serve as signals of high social power. The model draws on research from self-regulation and social power literatures to provide a framework and testable predictions for future research. Chapter 3 includes three empirical studies that test the social enhancement model outlined in Chapter 2. Results showed that participants depleted of their self-control display behaviors associated with high social power, namely disinhibition and positive self-presentations (Study 1). Additionally, dating profiles manipulated to display low self-control were perceived as more powerful than high self-control profiles, and perceived self-control was found to negatively predict perceived social power (Study 2). Finally, during live, face-to-face interactions, perceived impulsivity and perceived disinhibition were found to predict increased perceptions of power amongst both conversation participants and independent observers (Study 3). Together, the results of Studies 1 to 3 suggest that a reduced capacity to regulate one's behavior effectively may function to signal power in social contexts.

Chapter 4 includes two studies that examine whether low self-control is associated with heroically intervening in situations where a family member is being threatened. Results showed that people depleted of their self-control, compared to non-depleted people, were more likely to help a family member whose life was threatened in a hypothetical scenario. However, depletion had no effect on helping non-family members facing the same threatening situation (Study 4). When people were asked about their past behavior, low trait self-control predicted stepping into arguments more often when a family member was threatened, but there was no relationship between self-control and intervening in arguments involving non-family members. The effect of self-control on altruism towards family was mediated by the stronger emotional reactions experienced by people with lower self-control (Study 5). The results of Studies 4 and 5 suggest that low self-control facilitates emotion-driven behaviors that may improve the survival chances of genetic relatives.

Chapter 5 provides a discussion of the findings, their theoretical implications, and suggests directions for future research. In sum, the present research provides the first evidence that reduced behavioral control may contribute positively to inclusive fitness by promoting the ascension of social hierarchies (Studies 1 to 3) and the protection of kin from physical threats (Studies 4 and 5).

### **Declaration by author**

This thesis *is composed of my original work, and contains* no material previously published or written by another person except where due reference has been made in the text. I have clearly stated the contribution by others to jointly-authored works that I have included in my thesis.

I have clearly stated the contribution of others to my thesis as a whole, including statistical assistance, survey design, data analysis, significant technical procedures, professional editorial advice, and any other original research work used or reported in my thesis. The content of my thesis is the result of work I have carried out since the commencement of my research higher degree candidature and does not include a substantial part of work that has been submitted *to qualify for the award of any* other degree or diploma in any university or other tertiary institution. I have clearly stated which parts of my thesis, if any, have been submitted to qualify for another award.

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### Publications during candidature

- McIntyre, J. C.**, Constable, M. D., & Barlow, F. K. (2015). Property and prejudice: How racial attitudes and social-evaluative concerns shape property appraisals. *European Journal of Social Psychology*. doi: 10.1002/ejsp.2121
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- McIntyre, J. C.**, Barlow, F. K., & Hayward, L. E. (2014). Stronger sexual desires only predict bold romantic intentions and reported infidelity when self-control is low. *Australian Journal of Psychology*. doi: 10.1111/ajpy.12073
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### **Contributions by others to the thesis**

My primary advisor, Dr. Fiona Barlow, provided guidance on theory, study design, and data analysis. Dr. Barlow also reviewed and commented on the thesis and both associated manuscripts. My secondary advisor, Professor Bill von Hippel, provided guidance on theory and study design. Professor von Hippel also reviewed and commented on the thesis and the manuscript incorporated into Chapter 3. My collaborator from The University of Melbourne, Dr. Maria Abou Abdallah, assisted with the design of Studies 4 and 5. Dr. Abou Abdallah also provided comments and edited the manuscript associated with Studies 4 and 5.

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Self-control, Ego depletion, Self-regulation, Social power, Kin altruism

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## Table of Contents

<b>List of figures and tables</b> .....	11
<b>Chapter 1: Introduction and literature review</b> .....	12
Self-control definitions and terms.....	13
The depletion and restoration of self-regulatory resources.....	14
Examining the glucose hypothesis.....	16
The benefits of high self-control and costs of low self-control.....	18
Conclusions.....	19
<b>Chapter 2: The Social Enhancement Model of self-control deficits</b> .....	20
Self-enhancement.....	21
Assertiveness in difficult social situations .....	21
Aggression.....	22
Displaying social power.....	23
Comparing the Social Enhancement Model to other related models.....	25
Summary of the Social Enhancement Model.....	26
<b>Chapter 3: Testing the Social Enhancement Model</b> .....	27
Study 1.....	27
Study 2.....	30
Study 3.....	32
<b>Chapter 4: Self-control deficits and inclusive fitness: An examination of the mechanisms and specificity of impulsive altruism</b> .....	40
Introduction.....	40
High-cost altruism.....	41
Self-control and altruism.....	42
Emotional reactivity.....	43
Study 4.....	43
Study 5.....	47
<b>Chapter 5: Discussion</b> .....	53
Summary of findings.....	53
Implications and future directions.....	53
Self-control and social power.....	53
Self-control and high-cost altruism.....	54
Why might it be beneficial to feel depleted so rapidly? .....	55

Limitations..... 57

Concluding remarks..... 59

**References**..... 60

**List of figures and tables**

Table 1	Multilevel model analyses predicting partner perceptions of social power in Study 3.....	36
Figure 1	High-cost altruism as a function of self-control and target conditions. Error bars represent standard errors of the means.....	46

## Chapter 1: Introduction and literature review

Inabilities to suppress, control, and inhibit inappropriate and antisocial behavior lies at the core of many societal ills. Criminal behavior, narcissism, infidelity, and violence have all been linked to poor self-control (Love, 2006; Piquero, MacDonald, Dobrin, Daigle, & Cullen, 2005; Vohs, Baumeister, & Ciarocco, 2005; Wright, Caspi, Moffitt, & Silva, 1999). Little attention, however, has been paid to potential benefits of self-control deficits that may have influenced the evolutionary trajectory of the human self-control system. Notwithstanding evidence that tendencies associated with poor self-control lead to undesirable social behaviors, it is possible that these same behaviors may enhance fitness, in spite of their distasteful and potentially damaging qualities. By examining self-control deficits through an evolutionary lens, the present thesis provides novel insights into how poor self-control might influence behavior in a manner that contributes positively to fitness outcomes.

Possessing high self-control is associated with myriad positive life outcomes, including superior academic performance, better social skills, and less pathology. Conversely, people who are unable to regulate their behavior effectively are susceptible to drug and alcohol abuse, unhealthy dietary habits, and emotional instability (Tangney, Baumeister, & Boone, 2004). Despite these clear benefits of high self-control, people seem to “run out” of self-control rapidly. In fact, during a typical self-control experiment, substantive self-control deficits emerge after resisting a temptation or inhibiting a conditioned response for as little as five minutes. Reduced self-control following one or more attempts at self-control exertion is referred to as *ego depletion* (Baumeister, Bratslavsky, Muraven, & Tice, 1998). Ego depletion remains an enigmatic phenomenon, in part because it occurs independently of people’s physical self-control capabilities. For example, external interventions such as receiving a gift or watching a comical movie can attenuate the deleterious effects of self-control exertion on subsequent task performance (Tice, Baumeister, Shmueli, & Muraven, 2007). In addition, suggestions that depletion is the result of exhausting a physical resource (e.g., glucose) have been strongly refuted (Kurzban, 2009; Molden et al., 2012). Thus, it seems that humans possess a self-regulatory system that is prone to rapid deficits that occur in the absence of any known biological cause. *Why* our self-regulatory system functions in such a manner is yet to be fully understood.

Two recent theoretical papers have proposed models that attempt to answer this question. Inzlicht and Schmeichel (2012) propose a *process model of ego depletion*, which asserts that exerting self-control causes shifts in attention and motivation that undermine future self-regulation attempts. The model posits that people run out of self-control because during self-control exertion, attention shifts towards immediate reward and desire gratification. In turn, then, motivation to

persist with one's current task that may not offer immediate rewards is reduced. The process model provides a plausible proximal mechanism for self-control failures. While we do not test this theory directly, the present thesis provides a model that is compatible with the process model, but instead focusses on cognitive processes (e.g., enhanced emotional reactivity) and behavioural outcomes (e.g., kin altruism) that are relevant to fitness outcomes, and thus, elucidates distal causes of self-control failures.

In Chapter 2, I also compare my theoretical framework to the *opportunity cost model of depletion* proposed by Kurzban, Duckworth, Kable, and Myers (2013). Kurzban and colleagues propose that ego depletion is the subjective fatigue experienced when the costs associated with a task outweigh the opportunity for reward. Indeed, the general concept that self-control attempts incur costs is consistent with my adaptive explanation for depletion effects. I argue, however, that my model accounts for critical depletion findings that are not adequately explained by the opportunity cost model. For example, in later chapters, I make the case that the present thesis provides an explanation for why people still feel depleted after switching self-control tasks.

In the present thesis, I propose that self-control deficits are associated with adaptive behaviors that provide benefits to individuals and their genetic relatives. Specifically, I examine whether low self-control promotes behavioral displays of social power. Second, I test the proposition that people with low self-control are more likely to help family members, but not friends or acquaintances, in threatening situations. Moreover, in each of the above domains I elucidate the distinct but related mechanisms that underpin the relationship between self-control deficits and their respective adaptive outcomes.

### **Self-control definitions and terms**

In order to achieve long-term goals, resisting short-term desires is often necessary. Taking your boss's sandwich to satisfy hunger pangs may be an excellent short-term strategy that will bring immediate rewards, but will likely interfere with your long-term career prospects. The decision to forgo short-term gains to achieve more rewarding long-term goals forms the basis of most definitions of *self-control*. (Baumeister & Alquist, 2009) define self-control as “a process by which individuals bring themselves in-line with their goals and standards. It encompasses efforts by individuals to alter their thoughts, feelings, and behaviors”. This definition of self-control guides the present discussion.

Acts of self-control are the end result of a series of interconnected processes referred to as *self-regulation*. According to (Baumeister & Vohs, 2007), self-regulation consists of four distinct components, the first of which is the adoption of *standards* that set parameters for acceptable and unacceptable behavior (e.g., “I will not steal”). Clearly defined standards are necessary for the

second component of self-regulation: *monitoring*. Monitoring involves the constant comparison of the self to the adopted standard. If the standard is not met, then self-regulatory processes initiate behavioral change, which brings the self back in line with the standard. The third key component of self-regulation is *motivation*, as one needs sufficient motivation to achieve the standard and self-regulate effectively. The last component of self-regulation is *self-regulatory strength*, also known as willpower. Self-regulatory strength is the component that appears to be depleted by self-control attempts; a phenomenon known as ego depletion.

The current thesis defines low self-control in relation to the distribution of self-control amongst the general population. That is, I do not argue that my theorising extends to people with clinically low levels of self-control or severely impaired executive function. Rather, low self-control is operationalised as temporary lapses in self-control following brief self-control attempts (i.e., ego depletion) or possessing a consistent tendency to give in to immediate desires and a reduced capacity to persist on effortful tasks (i.e., low dispositional self-control).

### **The depletion and restoration of self-regulatory resources**

Ego depletion (or depletion) was first demonstrated empirically by (Baumeister, et al., 1998). During experimental sessions, participants were asked to either refrain from eating freshly baked cookies (self-control condition), refrain from eating radishes (no self-control condition), or were not presented with any food at all (control condition). Participants who refrained from eating cookies persisted for significantly less time on a subsequent unsolvable cognitive task compared to participants in the “radishes” or control condition. Baumeister and colleagues’ finding suggested that people who resisted eating cookies had fewer ‘self-control resources’ remaining, which in turn resulted in lower levels of persistence.

Subsequent research has shown that depletion typically follows any type of self-control exertion. For example, it has been demonstrated that participants asked to suppress or conceal emotions while watching either very funny or very sad movies perform worse on subsequent cognitive tasks compared to participants who are allowed to express emotions freely (i.e., laugh or cry; see Baumeister et al., 1998). Ego depletion via emotion suppression has also been shown to result in physical endurance deficits, and thought suppression (e.g., not thinking about white bears) has been associated with impaired persistence and reduced emotion suppression ability (Muraven, Tice, & Baumeister, 1998). Taken together, the above findings suggest that the ability to control one’s behavior is diminished by previous acts of self-control, and that these effects generalise to a variety of self-control outcomes.

Previously, the self-control deficits and feelings of mental effort following self-control exertion observed in the laboratory had been attributed to the depletion of a limited resource.

Indeed, it has been argued that in the same way a muscle becomes fatigued from continuous use, self-control exertion depleted some kind of “energy” reserve, which resulted in diminished self-control performance (Baumeister, 2002a; Schmeichel & Baumeister, 2004). Self-control could then only return to pre-depletion levels after a period of rest or a replenishment intervention, such as reading an inspirational story or affirming core values (Martijn et al., 2007; Schmeichel & Vohs, 2009). Recent evidence, however, conflicts with a resource account, and suggests that willpower *is* available regardless of whether self-control has previously been exerted.

For example, personal beliefs about self-control have been found to influence patterns of ego depletion. After exerting self-control on a complicated stimulus detection task, people who believe self-control is a *limited* resource perform significantly worse on the Stroop task (which requires people to inhibit their dominant response) compared to people who believe self-control resources are *unlimited* (Job, Dweck, & Walton, 2010). This belief in unlimited willpower also tends to buffer people against procrastination and unhealthy eating when stressed. Job et al.’s (2010) findings demonstrate that the extent to which people become depleted depends on whether they believe that they are likely to be depleted in the first place. Other studies have indicated that participants’ perceptions of how depleted they are following a self-control task predict subsequent self-control performance, irrespective of whether they have been allocated to a depletion or control condition (Clarkson, Hirt, Jia, & Alexander, 2010). Thus, *perceptions* of available self-control “resources” may be more important predictors of self-control performance than actual self-control capacity.

As a body of work, research on personal theories of willpower suggests that the degree to which people become depleted depends on their beliefs about self-control processes and perceptions of mental exhaustion. Nevertheless, it is not only perceptions and beliefs that can attenuate or enhance depletion effects. Intrinsic motivation, for example, appears to temper ego depletion. Past research has shown that people given performance-contingent rewards for completing self-control tasks perform worse than participants given non-contingent rewards (Muraven, Rosman, & Gagné, 2007). Thus, people motivated by intrinsic rewards, such as helping the experimenter or assisting in scientific discovery, are less susceptible to becoming depleted.

Positive social interactions appear to have similar restorative effects. In one study, when depleted participants were presented with a surprise gift, subsequent task performance did not differ from non-depleted participants (Tice, et al., 2007). Likewise, having a helpful experimenter reduces the negative effects of depletion on task performance (Muraven, Gagné, & Rosman, 2008). Past research therefore suggests that positive social interactions may offset depletion, while negative or cold social interactions may accelerate depletion. Considered together, such findings highlight a

disconnect between the material availability of self-control resources and the intrapsychic experience of self-control exhaustion.

The notion that helpful experimenters, surprise gifts, funny movies, and beliefs that willpower is unlimited attenuate depletion suggests that the consequences of ego depletion are due to psychological processes rather than physical capacity constraints. However, it has been argued that self-control deficits are the result of glucose metabolization in the brain following self-control exertion (Gailliot & Baumeister, 2007a; Gailliot et al., 2007). Thus, there are two competing explanations regarding why feelings of mental effort and performance deficits emerge so quickly following self-control exertion. The first is that self-control is beneficial to survival and/or reproduction, but is energetically costly and so can only be performed for short periods of time before that energy (i.e., glucose or some other physical resource) runs out. According to this explanation, self-control is the human analogue to a cheetah's speed, in that it is critical for survival but so costly that it can only be used during brief bursts of energy. The second (and I argue, more likely) explanation is that people have the physical resources to exert self-control for long-periods of time, but there are survival and/or reproductive benefits associated with experiencing mental fatigue and consequently desisting in self-control efforts. Below, I examine the first proposition – that depletion is a process of physical deterioration.

### **Examining the glucose hypothesis**

An appealing explanation for self-control deficits is that the brain requires additional energy to complete tasks that require self-control, and that the depletion of these energy stores reduces task performance. Two models have suggested that glucose is a critical resource that is either depleted or redistributed by self-control exertion (Beedie & Lane, 2011; Gailliot & Baumeister, 2007a; Gailliot, et al., 2007). Although glucose is not the only physical resource that could be depleted by self-control, no other candidates seem likely given the current body of literature, and no reasonable argument has been made for an alternative physical explanation. Thus, I focus here on glucose models of physical ego depletion.

In a paper that argued for a glucose account of depletion, (Gailliot & Baumeister, 2007a) reported that acts of self-control reduced levels of blood glucose, and that drinking glucose eliminated any effects of depletion on task performance. It was posited by the authors that self-control exertion used up glucose stores in the brain, which in turn left people unable to self-regulate at pre-depletion levels. Reanalysis of this data by (Kurzban, 2009), however, revealed that (1) across studies there were no statistical differences in glucose levels following self-control exertion, (2) that glucose reductions due to self-control tasks were not evident in non-fasting participants, and (3) that the methodology does not account for peripheral changes in blood glucose levels.



Kurzban's analyses cast serious doubt over the proposition that ego depletion is a consequence of glucose deficits in the brain.

Research on brain metabolism suggests that the claim glucose is depleted during self-regulation has, at best, mixed support. In line with a glucose explanation for depletion, (Scholey, Harper, & Kennedy, 2001) found that completing a mathematical task for five minutes resulted in significant decreases in blood glucose compared to control participants who completed a simple button pressing task. The study also found that consuming glucose significantly improved cognitive performance, which is consistent with glucose depletion models of self-control. In a similar vein, (Fairclough & Houston, 2004) reported significant reductions in blood-glucose after thirty minutes of incongruent stroop task trials compared to a control group who completed simpler congruent trials, indicating that highly demanding cognitive tasks may deplete glucose in the bloodstream. Notably, however, blood glucose differences in Fairclough and Houston's study took somewhere between fifteen and thirty minutes to emerge, while depletion effects have been reported to occur after as little as three minutes (Hagger, Wood, Stiff, & Chatzisarantis, 2010).

Substantial evidence conflicts with the above findings and suggests that a glucose model of ego depletion is improbable. (Marcora, Staiano, & Manning, 2009), for example, failed to find any glucose deficits following a cognitive task of similar length to Fairclough and Houston's (2004) task, with the authors concluding that "blood glucose levels were not sensitive to cognitive effort". A review paper found no consistent evidence that task performance deficits were associated with glucose-related declines following food deprivation (Leigh Gibson & Green, 2002); while more recent evidence indicates that glucose need only be present in a person's mouth for it to have a restorative effect (Hagger & Chatzisarantis, 2013; Molden, et al., 2012). Thus, it is unlikely that performance boosts observed in people who consume a sugary drink following a self-control task are related to metabolic uptake of glucose in the brain.

Inconsistent findings from research on brain metabolism together with evidence suggesting that positive experiences and glucose 'mouth-washing' attenuate depletion effects suggest that the consumption of glucose by the brain during self-control tasks is not the primary cause of self-control failures. Furthermore, while glucose ingestion may be associated with improved cognitive task performance, this effect might be explained by the restorative effects of positive experience associated with sugary beverages. Thus, the proposition that glucose represents the key resource depleted or redistributed during self-regulation seems unlikely given that several studies investigating this link fail to find any glucose fluctuations following depletion tasks. I therefore argue that the most parsimonious interpretation to emerge from the current body of literature is that

ego depletion is a function of psychological processes, such as beliefs, motivations, and affective states, rather than a process of glucose expenditure or redistribution.

If self-control resources do not physically run out, and people show self-control deficits after minimal self-control effort, it raises the possibility that humans have evolved a self-regulation system that operates inefficiently. In short, our self-control system does not fully utilise the physical resources at its disposal, and instead rapidly induces feelings of subjective fatigue that are accompanied by performance decrements. It is therefore possible that there are undiscovered benefits of poor self-control that have shaped this psychological impediment to effective self-regulation. Although few studies have identified specific adaptive advantages of self-control deficits, there may in fact be highly beneficial processes and outcomes associated with low self-control. The current body of literature, however, has largely focused on the benefits of maintaining high self-control.

### **The benefits of high self-control and costs of low self-control**

The overwhelming consensus in the field of self-regulation is that the ability to self-regulate effectively is beneficial in terms of life outcomes and daily functioning. Indeed, a large body of work suggests that higher levels of self-control are associated with positive life outcomes, and that poor self-control is associated with negative life outcomes. High self-control has been found to predict better academic performance and interpersonal skills, and lower levels of binge eating and alcohol abuse (Tangney, et al., 2004). In addition, young children who are better able to delay gratification by forgoing immediate rewards to attain greater long-term rewards tend to become more socially competent and academically successful adolescents than their peers with less behavioral restraint (Mischel, Shoda, & Rodriguez, 1989). People with higher self-control also tend to show a positivity bias when confronted with their own mortality, which may contribute to their ongoing happiness and positive life outcomes (Kelley, Tang, & Schmeichel, 2014).

In terms of the costs of impaired self-control, a common theme to emerge is that when people have less self-control, basic limbic drives have a greater influence over behavior. For example, depleted people behave more aggressively (Denson, von Hippel, Kemp, & Teo, 2010; DeWall, Baumeister, Stillman, & Gailliot, 2007; Stucke & Baumeister, 2006) and become worse at controlling their emotions (Muraven, et al., 1998), both of which can be socially costly. People who are aggressive can be ostracized or subject to retaliatory aggression, and people who are overly emotional can be viewed as unstable, and by extension, an unreliable friend or social ally. Both low dispositional self-control and depletion have been found to be associated with a range of disinhibited sexual behaviors, including increased infidelity, less contraception use, greater promiscuity, and romantic behavior guided by sexual desire (Gailliot & Baumeister, 2007b; Love,

2006; McIntyre, Barlow, & Hayward, 2014; Wills, Gibbons, Gerrard, Murry, & Brody, 2003). Again, all of these behaviors have the potential to be socially costly. Infidelity and sexual promiscuity can lead to relationship dissolution, social stigma, and reduced desirability as a long-term partner. Additionally, inadequate use of birth-control can lead to unwanted pregnancy. Together these data suggest that self-control deficits are associated with maladaptive behaviors that can reduce one's desirability as a romantic or coalition partner, and leave one open to social marginalization and acts of retaliatory aggression. Becoming rapidly depleted therefore has the potential to be detrimental to both survival and reproductive goals.

### **Conclusions**

Self-control encompasses a range of motivations and strategies that assist in guiding behavior towards positive long-term outcomes. Early research suggested that self-control failures were the result of exhausting a finite physical resource, which rendered people unable to regulate their behavior effectively. More recent evidence, however, suggests that self-control failures are more likely to be the result of psychological processes that influence social decision-making and inhibitory control. Here, I propose that some important benefits of low self-control have been overlooked in the current body of literature, and that self-control deficits may promote behaviors that enhance social functioning and inclusive fitness. In the following chapter, I outline how self-control failures may provide social benefits by promoting displays of social power.

## Chapter 2: The social enhancement model of self-control deficits

According to an evolutionary approach to psychology, many of the traits and characteristics evident in modern humans exist because members of our species who possessed those traits were more successful than others in propagating their genes through reproduction (Barkow, Cosmides, & Tooby, 1992). Thus, a self-control system that is adaptive is more likely to propagate through a species than one that is maladaptive. The literature reviewed above suggests that a) self-control deficits are associated with a range of apparently negative life outcomes, and b) self-control is not a limited physical resource, but rather is limited by psychological processes. If self-control is beneficial and unlimited, but *feels* limited, I suggest that additional information is needed to make sense of self-control processes. Accordingly, I propose that self-control deficits are associated with adaptive benefits that balance or outweigh the costs of maintaining high self-control.

Specifically, I suggest that possessing continuously high self-control, while advantageous in many ways, may result in more timid and restricted behaviors during social interactions. These behaviors may in turn display less desirable qualities to potential mates or allies. Although self-control is important in achieving some survival and reproductive outcomes (e.g., maintaining friendships by restraining socially inappropriate behavior, or resisting the temptation to take more than one's share of limited food supplies), impulsivity may also be beneficial in many contexts. It has been suggested that impulsive tendencies can be functional when rapid, error-prone processing is used in situations where such decision making is optimal (e.g., contributing to fast-paced conversations). In contrast, dysfunctional decision making is characterised by equally fast and error-prone processing in situations where slower processing is optimal (e.g., deciding which career to pursue), but is not utilised due to cognitive or environmental constraints (Dickman, 1990). Social situations represent one domain where impulsive decision-making may be optimal because, as I propose, such decision-making is linked to positive social appraisals.

Here, I argue that impulsive decision-making that flows through to impulsive behavioural displays is associated with greater perceptions of social standing, and that the beneficial outcomes associated with self-control deficits may counter the well-known costs of impulsive behavior. In the following sections, I detail the first proposition of my thesis: that low self-control gives rise to an array of behaviors that are signals of high social power. People with high social power tend to exert greater influence over others, and do so by controlling the allocation of material (e.g., food or money) or social (e.g., friendship or information) resources. I discuss evidence suggesting that low self-control is associated with self-enhancement, direct communication, displays of physical fitness and dominance, and behavioral disinhibition; all of which are hallmarks of high social power.

Critically, I propose that the disinhibited behavior exhibited by people with low self-control will be perceived by others as reflecting high social power.

### **Self-enhancement**

Distinguishing one's self from the crowd is important to achieving romantic success for both men and women (Hornsey, Wellauer, McIntyre, & Barlow, 2015). Past research suggests that ego depletion leads people to make more narcissistic (i.e., egotistical, vain, and conceited) self-descriptions as a result of reduced concern about acting in a socially desirable manner (Vohs, et al., 2005). Narcissism, while representing a potentially negative personality quality, can be functional insofar as it assists in ascending social hierarchies through accomplishments rather than affiliations (Robins, Tracy, & Shaver, 2001). In addition, narcissism is correlated with desirable qualities such as strong leadership and high self-esteem (Ackerman et al., 2010). Thus, possessing narcissistic tendencies can signal sought-after qualities in a mate or ally.

One important caveat to this suggestion, however, is that the social benefits associated with narcissism may only be evident over short time frames. For example, it has been demonstrated that people who score high on narcissism make better first impressions and are viewed as more competent. However, after several weeks of regular interactions, more narcissistic participants tended to be rated more negatively by peers and acquaintances (Paulhus, 1998). Similarly, (Robins & Beer, 2001) found that self-enhancement, a trait characteristic of narcissists, was associated with more positive self-attributions and more positive affect in the short-term. Longitudinal analyses, however, revealed negative long-term outcomes such as lower self-esteem and greater academic disengagement as narcissism increased.

These data point to the possibility that increases in narcissistic tendencies brought about by ego depletion may be beneficial to depleted individuals, at least in terms of the first impression that they make on new acquaintances. While this may present a problem for people with chronically low self-control, because the effects of depletion are not long lasting, the potential negative long-term consequences of narcissism are unlikely to be borne by depleted individuals. Thus, depletion may confer a momentary social advantage insofar as people who are depleted ignore the opinions of others (i.e., reduced social desirability), adopt more grandiose views of themselves, and act in a more confident and competent manner. These displays then in turn give the impression of being a high-quality mate or valuable social ally (see von Hippel & Trivers, 2011).

### **Assertiveness in difficult social situations**

Making a good first impression is important when attempting to attract mates or acquire friends, and communicating in a relaxed and confident manner is necessary to capitalise on a positive initial impression. Sometimes, however, people who suppress their inappropriate behavior

in difficult circumstances in order to make a good impression may actually thwart their own social success and appear unfriendly (Norton, Sommers, Apfelbaum, Pura, & Ariely, 2006). In an elegant demonstration of this effect, (Apfelbaum & Sommers, 2009) had White participants discuss racial diversity with a Black confederate posing as a reporter. Note that both White and Black Americans typically have high levels of anxiety when interacting with each other, and would prefer to have more interracial friends but fear rejection (Shelton & Richeson, 2005). Thus, an interracial interaction represents a difficult social situation that has the potential to induce contrived and over-controlled behaviour in order to compensate for racial biases (Shelton, Richeson, Salvatore, & Trawalter, 2005; McIntyre, Constable, & Barlow, 2015).

In their study, Apfelbaum and Sommers had the White participants take part in the discussion after completing either a depleting or a non-depleting task. They found that depleted participants enjoyed the interaction with the Black confederate more, gave more direct responses to questions, and appeared less inhibited compared to non-depleted participants. In addition, Black coders rated depleted participants as less prejudiced than non-depleted participants. The findings suggest that depletion can facilitate the positive handling of social interactions between previously unacquainted people by making them less inhibited and more direct with their communication. This effect may be particularly marked in difficult social situations that induce anxiety, such as interracial discussions about racial diversity. I suggest that such effects might also emerge in other anxiety-inducing social contexts, such as conversing with a desirable potential romantic partner or a new acquaintance. In these situations, less inhibited, more direct behavior may be viewed as an indicator of confidence, competence, and relaxation. Thus, self-control deficits may facilitate romantic relationships and coalition building by inducing disinhibited, confident, and direct communication.

### **Aggression**

Aggression is another means by which men in particular can display their physical prowess and social dominance. Men typically display higher levels of aggression than women, and such behavior is linked to mating goals. Priming men with a mating motive, for example, causes them to exhibit more aggressive behavior. This effect disappears, however, if dominance over a rival has already been established (Ainsworth & Maner, 2012). Men are also more aggressive when there is a shortage of available women (Pellegrini, 2004), and sexual jealousy has been identified as the most commonly reported antecedent for spousal battery (Daly, Wilson, & Weghorst, 1982). Thus, aggression may be used as a strategy to gain access to mates, establish dominance over rivals, and discourage acts of infidelity.

Acquiring resources is another common antecedent of aggression. Robberies are often accompanied by threats of aggression, and acquiring land and/or power has been the motivation behind the majority of the world's wars. (Buss & Duntley, 2006) suggest that aggression can deter potential attackers from attempting to forcibly take one's resources due to the high potential costs of hostile acts against an aggressive counterpart. Thus, aggression can be beneficial in terms of acquiring resources from others and preventing one's own resources from being taken.

Several studies have suggested that when people are depleted they behave more aggressively when provoked, for example, by administering stronger noise blasts, serving more hot sauce, and giving harsher performance evaluations compared to non-depleted participants (Denson, et al., 2010; DeWall, et al., 2007; Stucke & Baumeister, 2006). Responding to provocation in an aggressive manner can help preserve one's social status by signalling to potential rivals that hostile acts will not be tolerated. Thus, because people with compromised self-control are more likely to respond to provocation in an assertive and aggressive manner, they may deter potential attackers from attempting to steal resources, and attract potential partners or allies by maintaining high social status.

### **Displaying social power**

The research that I have presented thus far paints a picture of the depleted individual as aggressive, self-enhancing, and forthright. These factors represent indirect indicators of power, but do not provide evidence of a direct link between self-control failures and perceptions of social standing. In the present section, I suggest that a self-control system prone to failure may evolve, in part, because the disinhibited tendencies associated with poor self-control are reliable indicators of high social power. While previous studies have suggested that power can lead to reduced behavioural control (Ent, Baumeister, & Vonasch, 2012), I argue that reduced behavioural control can lead to increased perceptions of power. Thus, low self-control may promote behavioural displays that enhance social and mating success.

A core component of this argument is that displaying high social power should result in overall fitness benefits. Consistent with this argument, evolutionary models of social power suggest that people of high status tend to have greater reproductive success. Higher status animals are less likely to die of predation or starvation, and leave more viable offspring across a range of species compared to animals lower down the social hierarchy (see Cummins, 2005). In human populations, men benefit from higher social status by appearing more attractive to women. Men depicted driving a high status vehicle (e.g., Bentley Continental), for example, are perceived as more attractive than men driving a lower status vehicle, such as a Ford Fiesta (Dunn & Searle, 2010). Thus, high-status men have a better chance of out-competing other men for mates. More powerful people are also

evaluated more positively by observers, are viewed as more competent, and are more likely to be the centre of attention (see Brauer & Bourhis, 2006). As a result, high power people should be perceived as favorable social allies. Behaving in a manner that signals high social power may therefore assist in fostering friendships and alliances, as well as sexual relationships. As highlighted above, a substantial body of literature suggests that disinhibited, aggressive, direct, and approach-oriented behaviors are all indicative of high social power (Brauer & Bourhis, 2006; Keltner, Gruenfeld, & Anderson, 2003). Below, I detail further evidence from each of these domains suggesting that the behaviors induced by depletion may *also* be reliable signals of high social power.

High power people tend to engage in more approach behavior, such as entering the personal space of others or initiating physical contact. For example, in a military setting, superiors are more willing to encroach on the personal space of subordinates than vice-versa (Dean, Willis, & Hewitt, 1975). People primed with high status are also more likely to take action to modify their environment compared to people primed with low status (Galinsky, Gruenfeld, & Magee, 2003). Further to this, people who engage in approach behaviors, such as non-reciprocated touching, are perceived as higher status, more assertive, and warmer than non-touchers (Major & Heslin, 1982). Because depletion increases approach motivation and approach behavior (Schmeichel, Harmon-Jones, & Harmon-Jones, 2010), depleted people may be perceived as higher status than non-depleted people because of their bold, approach-oriented tendencies.

Another characteristic of high power is a lack of behavioral inhibition. People placed in a position of power (i.e., control over the allocation experimental points) during an opposite-sex interaction tend to flirt in a more disinhibited manner than people given equal power (Keltner et al., 2003). In addition, messages delivered in a high-power style (i.e., confident and without hesitations) are rated more positively (i.e., trustworthy, confident, and knowledgeable) and are more likely to be believed compared to low power messages, i.e., unsure and including hesitations (Holtgraves & Lasky, 1999). Similarly, low power people are more likely to inhibit their feelings and opinions (Berdahl & Martorana, 2006), and speak in a more reserved manner (Keltner, Young, Heerey, Oemig, & Monarch, 1998). These findings suggest that the direct communication styles adopted by people following depletion (Apfelbaum & Sommers, 2009) may be interpreted by others as indicators of high social power.

Disinhibited behavior can also take on inappropriate and antisocial forms. A meta-analysis examining predictors of teasing found that high status individuals are more likely to tease low status individuals in a hostile manner; something which is not reciprocated by low status people (Keltner, Capps, Kring, Young, & Heerey, 2001). Likewise, within relationships, the person who is the least



committed to the relationship (and thus the most powerful) is more likely to bully their partner by making threats or becoming violent (Howard, Blumstein, & Schwartz, 1986). These findings suggest that although it is not without costs, the insolent behavior exhibited by depleted people (Denson et al., 2010; DeWall et al., 2007; Stuck & Baumeister, 2006) may be a signal of high social power.

As a body of work, the social power literature suggests that high power people are less inhibited, more aggressive, more direct, and more approach-oriented compared to low power people. In addition, the self-control literature suggests that people with depleted or low trait self-control display these very characteristics. To the degree, then, that people with low self-control engage in disinhibited behaviors, they may also be perceived as possessing high social power. One could then make the prediction that possessing lower trait self-control and greater disinhibition would predict being perceived as more powerful.

### **Comparing the Social Enhancement Model to other related models**

Several models have been proposed to explain ego depletion effects, some of which I have addressed in previous sections. Although a thorough review of all depletion explanations and models is beyond the scope of this thesis, in the present section I briefly discuss my proposal in the context of two recently suggested frameworks: (Inzlicht & Schmeichel, 2012) *process model of depletion*, and Kurzban et al.'s (2013) *opportunity cost model of depletion*.

The *process model of depletion* (Inzlicht & Schmeichel, 2012) posits that performance deficits observed in dual-task experiments represent a shift in motivation and attention following initial self-regulatory efforts. The model suggests that people who are depleted divert their attention away from behavioral control and toward immediate gratification, resulting in behavior driven by impulses and sensitivity to reward. This view is not inconsistent with my proposed model, insofar as depletion allows people to act on their desires, state their wishes, lash out at adversaries, and seek casual sex. Indeed, as I have noted, attentional shifts toward satisfying basic urges to have sex, behave aggressively, or speak candidly could facilitate social and reproductive goals by providing direct and indirect reproductive benefits. Attentional shifts toward immediate gratification, therefore, may be a precursor for the disinhibited behavior that signals high social power and facilitates mate procurement. Thus, the process model of depletion might represent a proximal cause of disinhibition following depletion, which in turn leads to power displays that enhance fitness.

The *opportunity cost model of depletion* (Kurzban, et al., 2013) suggests that the costs associated with task continuation determine whether subjective feelings of fatigue are experienced during self-control attempts. When the costs are too high, the task feels effortful and is therefore

more likely to be discontinued in favour of more useful tasks. My model has parallels with this idea insofar as depletion may manifest due to the costs associated with continuing self-control. In my model, however, the costs refer to the social and reproductive costs of maintaining consistently high (or consistently low) self-control rather than the specific opportunity costs associated with completing individual tasks. Thus, my model views depletion as a phenomenon that induces feelings of effort in order to promote behaviors that are disinhibited and consequently more beneficial in social contexts.

The opportunity cost model of depletion suggests that depletion occurs when tasks provide high costs and little opportunity. However, this proposition would suggest that self-control should be restored when a new task with new opportunities and costs is undertaken. However, as data from dual-task experiments show, depletion occurs even when a second self-control task (e.g., grip strength) is substantially different from the first (e.g., anagram task). The social enhancement model accommodates the fact that switching tasks does not restore self-control; namely, because the resulting disinhibition is predicted to signal social power across a range of contexts and tasks as detailed above.

### **Summary of the Social Enhancement Model**

Running out of self-control can result in highly problematic outcomes, but low self-control may also be associated with behaviors that provide social benefits by signalling positive personal attributes. People who are depleted engage in a range of disinhibited behaviors that mirror the behaviors of people in high power positions. Ego depletion might therefore be the ideal catalyst for the bold, unashamed, and disinhibited behavior that is associated with perceptions of higher social status. The Social Enhancement model considers findings from a variety of domains in an overarching explanation for rapid self-control deficits that are decoupled from any physical basis. The model provides a novel evolutionary perspective from which to examine self-control deficits and provides testable predictions for empirical research. These predictions will be detailed and tested in the following chapter.

### Chapter 3: Testing the Social Enhancement Model

Friedrich Nietzsche once stated that “He who cannot obey himself will be commanded”. Perhaps accordingly, we want people who we choose as leaders to possess high self-control (Ciulla, 2004). Yet people who rise to powerful positions often do not act in controlled ways. In fact, they are often less likely to exert behavioral control; spilling crumbs while eating and blurting out whatever is on their mind (Holtgraves & Lasky, 1999; Keltner, et al., 2003). While it is established that power can lead people to relax their self-discipline, it is as yet unknown whether people can rise to power because, and not in spite of, their lack of restraint.

Successful business leaders often cite a risk-tolerant attitude towards decision-making as a key driver of their success. Business mogul Richard Branson, for example, reports making an assessment within 30 seconds of hearing a business proposal and suggests that this impulsive decision-making has been a key factor in his rise to power (Branson, 2011). Australian mining magnate and now politician, Clive Palmer, has built his political image and election campaigns on the back of impulsive behaviour; storming out of radio interviews and blurting out unfounded conspiracy theories on national television are a common occurrence for the leader who is regularly described as erratic and impulsive by reporters. This string of uncontrolled outbursts by Palmer led to a respectable primary vote of 5.5% in his party’s first foray into federal politics (ABC, 2013).

Interestingly, experiments testing the causal relationship between low self-control and high social power have not yet been conducted. In the following studies, I examine the relationship between self-control and social power using correlational, experimental, and observational procedures.

#### Study 1

Study 1 tested whether low self-control was associated with disinhibition by having depleted and non-depleted participants write self-descriptions. Previous research indicates that depletion promotes inappropriate self-disclosure (Vohs, et al., 2005), suggesting that depleted participants might be less inhibited when asked to describe themselves. As discussed in Chapter 2, powerful people tend to be less socially inhibited, which results in aggressive and inappropriate outbursts, greater opinion sharing, and less inhibited styles of communication. Drawing on this literature, I operationalised social disinhibition as an increased propensity to share information in a personal profile. I predicted that possessing lower self-control would be associated with greater social disinhibition.

Further, I wanted to analyse the content of people’s descriptions to determine whether depleted people disclose information that may lead to perceptions that they are more powerful. People with high social power tend to possess a positivity bias. They display more positive

emotions, are more optimistic about their future, and score higher on measures of narcissism compared to people with lower power (Carroll, 1987; Galinsky, et al., 2003; Joubert, 1998; Keltner, et al., 2003). Powerful people also tend to hold more grandiose views of themselves and thus project positive self-presentations (Glad, 2002). Consequently, self-disclosures may be indicative of social power if they are disinhibited (as measured by the extent of self-disclosure) and biased towards positive self-descriptors.

## Method

**Participants.** Seventy-eight students recruited from various sites around an Australian university campus participated in the study in return for a candy bar. Thirty-nine participants identified as female, 38 as male, and 1 participant did not identify as either male or female. Ages ranged from 17 to 58 years,  $M_{\text{age}} = 22.65$ ,  $SD_{\text{age}} = 6.58$ .

**Procedure.** First, participants completed a task adapted from previous research as a method of inducing ego depletion (Baumeister, et al., 1998; Job, et al., 2010; Tice, et al., 2007). Specifically, all participants were given a paragraph of text and were instructed to cross out every *e* in the paragraph. Next, half of the participants (control condition) were randomly assigned to continue crossing out every *e* in a second paragraph. The remaining participants (depletion condition) were also presented with a second paragraph of text, but were asked to follow a complex rule that required crossing out every *e*, except for those *e*'s that were within two letters of any vowel.

After completing the *e* crossing task, participants were asked to write a self-description in the space provided. The space was 11 blank lines on an A4 sheet of paper. Participants were informed that they could include any information except for potentially identifying information, such as their name or address.

To assess the type of information being conveyed in the profiles, a coder who was blind to conditions counted the number of words written in each profile, and the number of positive and negative descriptors used in each profile. The categories of positive descriptors included: personality traits (e.g., I am funny), physical appearance (e.g. I have beautiful eyes), skills (e.g., I play the guitar), and likes (e.g. I like romantic comedies). Categories of negative descriptors included: personality traits (e.g., I am socially awkward), physical appearance (e.g. I don't like my nose), skill weaknesses (e.g., I am terrible at sports), and dislikes (e.g., I don't like tomatoes).

## Results

**Disinhibition.** An independent-groups t-test revealed that participants in the depletion condition wrote significantly more words ( $M = 25.92$ ,  $SD = 20.41$ ) than participants in the control condition,  $M = 16.67$ ,  $SD = 15.20$ ,  $t(72) = -2.20$ ,  $p = .031$ ,  $d = -.51$ ,  $M_{\text{diff}}$  95% CI [-17.63,-.879].

**Positive self-disclosures.** A series of ANCOVAs, controlling for number of words written, were conducted to determine if the content of profiles differed between depletion and control conditions. In relation to positive profile descriptors, depleted participants mentioned significantly more skills ( $M = .87$ ,  $SD = 1.26$ ) than participants in the control condition ( $M = .28$ ,  $SD = .70$ ),  $F(1,71) = 4.07$ ,  $p = .048$ ,  $\eta_p^2 = .05$ ,  $M_{diff}$  95% CI [-.98, -.01]. Depleted participants also mentioned significantly more activities or objects that they liked ( $M = .58$ ,  $SD = .50$ ) compared to participants in the control condition ( $M = .25$ ,  $SD = .44$ ),  $F(1,71) = 4.21$ ,  $p = .044$ ,  $\eta_p^2 = .06$ ,  $M_{diff}$  95% CI [-.38, -.01]. There was no difference in the number of positive physical attributes mentioned by depleted ( $M = .08$ ,  $SD = .27$ ) and control participants ( $M = .08$ ,  $SD = .28$ ;  $F(1,71) = .01$ ,  $p = .928$ ,  $\eta_p^2 = .00$ ,  $M_{diff}$  95% CI [-.13, .14]), nor was there any difference in the number of positive personality attributes mentioned by depleted ( $M = .34$ ,  $SD = .67$ ) and control participants,  $M = .64$ ,  $SD = 1.10$ ;  $F(1,71) = 1.84$ ,  $p = .179$ ,  $\eta_p^2 = .03$ ,  $M_{diff}$  95% CI [-.14, .73].

**Negative self-disclosures.** When assessing negative profile descriptors, there was no difference between the number of dislikes mentioned by depleted ( $M = .05$ ,  $SD = .23$ ) and control participants ( $M = .03$ ,  $SD = .17$ ),  $F(1,71) = .06$ ,  $p = .808$ ,  $\eta_p^2 = .00$ ,  $M_{diff}$  95% CI [-.11, .08]. Depleted participants did, however, mention significantly fewer negative physical descriptors ( $M = .00$ ,  $SD = .00$ ) compared to control participants ( $M = .06$ ,  $SD = .23$ ),  $F(1,71) = 3.99$ ,  $p = .0496$ ,  $\eta_p^2 = .05$ ,  $M_{diff}$  95% CI [.0001, .15]. The number of negative personality traits mentioned did not differ between depletion ( $M = .16$ ,  $SD = .55$ ) and control conditions ( $M = .17$ ,  $SD = .61$ ),  $F(1,71) = .13$ ,  $p = .724$ ,  $\eta_p^2 = .00$ ,  $M_{diff}$  95% CI [-.23, .33]. Only one skill weakness was mentioned by any participant. This participant belonged to the control condition.

## Discussion

Results of Study 1 revealed that depleted participants adopted disinhibited communication styles as demonstrated by their tendency to write longer self-descriptions. Further, the information disclosed by depleted participants was more likely to be biased towards positive (i.e., skills and ‘likes’) than negative (i.e., physical shortcomings) self-descriptors. Consistent with past research (Vohs, et al., 2005), the findings suggest that depletion leads to greater self-disclosure. However, the results also highlight the possibility that changes in communication styles following depletion may be adaptive signals of social power rather than maladaptive signals of indecorum. First, because disinhibited communication is a signal of social power (Berdahl & Martorana, 2006; Holtgraves & Lasky, 1999; Keltner, et al., 1998), and second, because depletion led to the disclosure of more positive self attributes, which is consistent with the behavior of high-power people (Glad, 2002).

## Study 2

Study 1 revealed that people with impaired self-control behave in a manner consistent with having social power: they were less inhibited and more positive when asked to write a self-description. It does not necessarily follow, however, that people with low self-control are actually *seen* as socially powerful by others. In Study 2 I tested whether or not this was the case by creating dating profiles that were manipulated to display low or high self-control. In addition, because attractive people are often afforded more positive attributes, including social power (Frevert & Walker, 2014), I examined whether any possible effect of low self-control manifested among both attractive and unattractive individuals. If self-control in and of itself was indicative of power, then the relationship between self-control and social power should emerge independently of attractiveness. In line with my theorising and the results of Study 1, I predicted that low self-control dating profiles would be rated as more powerful than high self-control profiles. Further, I expected that the relationship between self-control and social power would be unaffected by attractiveness of the target.

### Method

**Participants.** The sample consisted of 275 USA residents who were recruited through the Amazon Mechanical Turk website. Participants were reimbursed with 50 cents for the 5-10 minute survey. There were 157 women and 118 men with a mean age of 32.90 years ( $SD = 12.53$ ). Listwise deletion was used to account for missing values in each analysis for this study and all subsequent studies in this chapter.

**Design and procedure.** Participants were asked to view a fictitious dating profile manipulated to indicate that the person in the profile possessed either low or high self-control. The profile descriptions emphasised characteristics known to be indicative of self-control capacity, including impulsivity (Baumeister, 2002b; Hofmann, Friese, & Strack, 2009), disinhibited communication (Apfelbaum & Sommers, 2009; Vohs, et al., 2005), and a focus on the present rather than the future (Mischel, Ebbesen, & Raskoff Zeiss, 1972). The photo that accompanied the profile was either unattractive, average, or attractive based on independent pre-ratings. Participants viewed other-gender profiles and were randomly allocated to one of the six profile conditions. Thus, the study employed a 2 (gender: male vs. female) x 2 (target self-control: low vs. high) x 3 (target attractiveness: unattractive vs. average vs. attractive) between-subjects design.

**Low self-control profile description.** *“I am a spontaneous person and I don’t like following a schedule. I say whatever is on my mind and I am easily distracted. Life is too short to worry about the future so I am always living in the moment. Message me if you want to know more!”*

**High self-control profile description.** “I am a well organised person and I like to plan things ahead of time. I think before I speak and I am not easily distracted. Life is a long journey and I am always prepared for what the future may bring. Message me if you want to know more!”

**Measures.** Participants rated their level of agreement with eight statements related to social power perceptions. Two of the statements related specifically to social situations (“I think this person would be dominant in social situations” and “I think this person would be forceful in social situations”), while the remaining six items were personal descriptors associated with high social power (I would describe the person in the profile as: “influential”, “powerful”, “warm” (reverse scored), “a risk-taker” “a trendsetter” and “a leader” (see Brauer & Bourhis, 2006; Keltner, et al., 2003). Responses were given on a 7-point scale ranging from 1 = *strongly disagree* to 7 = *strongly agree*. All items were averaged to form a reliable measure of social power,  $\alpha = .73$ . Participants also completed single items related to the extent to which they agreed the target was attractive (1 = *strongly disagree*, 7 = *strongly agree*) and the level of the target’s self-control (1 = *low self-control*, 9 = *high self-control*).

## Results

**Manipulation checks.** An independent groups t-test confirmed that the low self-control profile was perceived as having significantly less self-control ( $M = 3.73$ ,  $SD = 2.05$ ) compared to the high self-control profile ( $M = 6.70$ ,  $SD = 1.84$ )  $t(269) = -12.59$ ,  $p < .001$ ,  $d = -2.00$ ,  $M_{diff}$  95% CI [-3.41, -2.49]. A one-way between-subjects ANOVA revealed a significant main effect of attractiveness for both the female ( $F(2,109) = 28.43$ ,  $p < .001$ ) and male profiles,  $F(2,146) = 62.62$ ,  $p < .001$ . Attractive targets were rated as more attractive than the average targets, which in turn were rated as more attractive than unattractive targets, all  $M_{diffs} > .79$ , all  $ps < .05$ , all CIs  $> 0$ . Participants did not differ in their attractiveness ratings of the low and high self-control profiles,  $t(269) = -1.44$ ,  $p = .150$ ,  $M_{diff}$  95% CI [-.75, .12].

**Self-control and attractiveness manipulation.** A 2 (low vs. high self-control) x 2 (male vs. female) x 3 (unattractive vs. average vs. attractive) between-subjects ANOVA was conducted to examine the effects of target self-control, gender, and target attractiveness on perceived social power. No main effect emerged for gender on perceived social power,  $F(1,261) = .46$ ,  $p = .497$ ,  $\eta_p^2 = .05$ . There was, however, a main effect of target attractiveness,  $F(2,261) = 11.01$ ,  $p < .001$ . Follow-up analyses with Bonferroni adjustment revealed that the attractive target was rated as possessing significantly more social power than the average target ( $M_{diff} = .38$ ,  $SE = .12$ ,  $p = .005$ , 95% CI [.09, .66]) and the unattractive target  $M_{diff} = .55$ ,  $SE = .12$ ,  $p < .001$ , 95% CI [.26, .84]. No differences in social power ratings were observed between the average and unattractive target,  $M_{diff} = .17$ ,  $SE = .12$ ,  $p = .432$ , 95% CI [-.11, .46]. Critically, there was a main effect of target self-control

on perceived social power,  $F(1,261) = 24.35, p < .001, \eta_p^2 = .09$ . The low self-control target was rated as significantly more powerful ( $M = 4.27, SD = .82$ ) than the high self-control target,  $M = 3.78, SD = .87, M_{diff} = .48, SE = .10, p < .001, 95\% CI [.29, .67]$ . Self-control did not interact with gender or attractiveness, and there was no three-way interaction between self-control condition, attractiveness condition, and gender (all  $F$ s  $< 1.40$ , all  $p$ s  $> .306$ , all CIs included zero).

**Self-control and attractiveness perceptions.** Next, a hierarchical regression was performed to test whether participants' ratings of self-control and attractiveness were related to their ratings of social power. After mean centering, perceived self-control, perceived attractiveness, and gender (-1 = female profile, 1 = male profile) were entered at Block 1. Two-way interactions between predictors were entered at Block 2, and the three-way interaction between predictors was entered at Block 3. The model was significant at Block 1 ( $R^2_{adj.} = .14, R^2_{ch.} = .15, F_{change}(3,267) = 16.17, p < .001$ ). Both perceived self-control ( $B = -.07, p = .001, 95\% CI [-.11, -.03]$ ) and perceived attractiveness ( $B = .18, p < .001, 95\% CI [.13, .24]$ ) predicted perceived social power. Specifically, higher perceived attractiveness was associated with higher perceived social power, and lower perceived self-control was associated with higher perceived social power. The two way interactions entered at Block 2 ( $R^2_{adj.} = .14, R^2_{ch.} = .01, F_{change}(3,264) = .70, p = .556$ ), and the three-way interactions entered at Block 3 ( $R^2_{adj.} = .15, R^2_{ch.} = .01, F_{change}(1,263) = 2.12, p = .146$ ) did not significantly contribute to the model predicting social power.

## Discussion

The results of Study 2 supported my hypothesis that dating profiles manipulated to display low self-control would be perceived as more socially powerful than high self-control profiles. Moreover, as expected, perceptions of self-control were predictive of social power insofar as profiles perceived as possessing lower self-control were perceived as possessing more social power. Both effects were found to be consistent across gender and attractiveness of the target. The findings converge with those of Study 1 to suggest that people with poor self-control may be perceived as more powerful.

## Study 3

The findings thus far suggest that people with lower self-control communicate in a disinhibited and self-enhancing manner (Study 1), and are also perceived as more socially powerful (Study 2). Questions remain, however, regarding whether these effects emerge during face-to-face social interactions, and whether the power-displaying effects of low self-control are apparent to outside observers. It is also unclear whether the power-signalling qualities of low self-control extend to same-gender interactions or whether they are limited to dating contexts as examined in



Study 2. In Study 3, I tested whether less controlled behavior was associated with increased perceptions of social power during a social interaction with a same-gender partner.

To examine these questions, participants were asked to play an “ice-breaker” game with another participant that involved asking and answering a series of questions. Participants then rated each other on perceived impulsivity, disinhibition, and power. I predicted that participants who were perceived as more impulsive and less inhibited by their partner during the game would be perceived as more powerful. In addition, independent observers viewed and rated videos of the interaction to determine whether the predicted power-signalling qualities of impulsivity and disinhibition would be apparent to outside observers.

## Method

**Participants.** One hundred and sixty-two undergraduates completed the study in return for introductory psychology course credit. The mean age of the sample was 19.52 years ( $SD = 3.84$ ) and 50% of participants identified as female. The majority of participants were from Caucasian (61.1%) or Asian (30.2%) ethnic backgrounds.

**Procedure.** Participants were tested in same-gender dyads. After reading the information sheet, they completed a “communication game” followed immediately by a post-interaction survey, which included self and partner ratings of social power and disinhibition during the communication game, along with filler items to disguise the research question. The communication game was video recorded, but all other tasks were completed with the video camera switched off. Participants were informed when the video was switched on and off. After completing all tasks and surveys participants were debriefed and thanked<sup>1</sup>.

**Communication game.** Participants were informed that they would play a game that involved asking and answering a series of questions with their partner. Each participant was given a sheet with five questions chosen from the “fast friends” game (Aron, Melinat, Aron, Vallone, & Bator, 1997; Page-Gould, Mendoza-Denton, & Tropp, 2008). Questions were selected that encouraged extended answers (e.g., “Would you like to be famous? Why or why not?” and “What is the worst job that you could think of having, and why is it the worst?”). I created two sets of questions and each participant was randomly allocated to one question set so that no participant would ask the same question that they answered. Question orders were counterbalanced to be asked

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<sup>1</sup>A personality questionnaire was also included that addressed a different research question. This survey was counterbalanced to be administered either at the beginning or end of the laboratory session.

in either standard (Q1 to Q5) or reverse order (Q5 to Q1)<sup>2</sup>.

**Post-interaction survey.**

***Disinhibition, inhibition, and impulsivity perceptions.*** Three single-items were included to assess people's perceived level of self-control during the communication game. Participants were asked to indicate the extent to which their partner was "disinhibited", "inhibited", and "impulsive" during the communication game. Participants also rated themselves on the same dimensions. Response options ranged from 1 = *strongly disagree* to 7 = *strongly agree*. Correlations between the three items for both self and partner were low (all  $r$ s < .25), so each item was assessed as a separate predictor.

***Social power perceptions.***

***Social power scale.*** Participants rated their level of agreement with nine items designed to be specific to the communication game that participants had just completed (e.g., "During the communication game the other participant was powerful" and "I felt she had higher social status than me"). Response options range from 1 = *strongly disagree* to 7 = *strongly agree*. Items were averaged separately for self ( $\alpha = .76$ ) and partner ( $\alpha = .76$ ) ratings of social power.

***Power-relevant traits scale.*** As a second measure of partner-rated social power, I adapted the power-relevant traits scale (Smith, Wigboldus, & Dijksterhuis, 2008) to refer to the communication game that participants had just completed. The scale consisted of seven bipolar items anchored at each end by a trait (e.g., "During the communication game, to what extent would you say the other participant was: 1 = *submissive* to 9 = *dominant*" and "1 = *unassertive* to 9 = *assertive*"). I also added an item related directly to power ("During the communication game, to what extent would you say the other participant was: 1 = *weak* to 9 = *powerful*") to create an 8-item scale,  $\alpha = .87$ . The power-relevant traits scale and the social power scale were moderately correlated ( $r(162) = .64, p < .001$ ), suggesting that my novel social power scale was a valid measure of social power.

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<sup>2</sup> The instruction sheet also included a manipulation of disinhibition where each participant was given written instructions to answer the questions in either a disinhibited manner, an inhibited manner, or were not given any instructions at all. Each dyad included a "no instruction" condition such that interactions consisted of either no instruction/inhibited or no instruction/disinhibited participant combinations. Multilevel model analyses revealed that the disinhibition manipulation had no effect on partner-rated perceptions of disinhibition, inhibition, or impulsivity (all  $p$ s > .243, all CIs included 0), suggesting that the manipulation was unsuccessful. Further, the manipulation did not affect partner-rated social power or partner-rated power-relevant traits (both  $p$ s > .207, both CIs included 0).

*Video observations.* Two independent coders (1 male, 1 female) who were blind to the research questions rated each participant on their level of disinhibition. Response options ranged from 1 = *inhibited* to 7 = *disinhibited* (intraclass correlation coefficient = .49). In addition, the coders rated each participant on the 8-item power-relevant traits scale detailed above (intraclass correlation coefficient = .67).

## Results

Data obtained from interactions between two participants can be conceptualised as multilevel in nature because each participant is nested within an interaction dyad. These data structures are most appropriately analysed through multilevel modelling (MLM; Raudenbush & Bryk, 2002). I conducted a series of separate MLM analyses for each predictor to examine whether disinhibition, inhibition, and impulsivity predicted perceptions of social power amongst conversation partners and independent observers. Predictors were entered into each model as a fixed effect and dyad was entered as a random effect.

**Partner perceptions of disinhibition and impulsivity predicting perceived power.** As shown in Table 1, there was a significant positive relationship between partner-rated disinhibition and partner-rated social power. As predicted, being perceived as more disinhibited was associated with being perceived as more powerful. However, partner-rated disinhibition was unrelated to the power-relevant traits scale. Inhibition was significantly negatively associated with the power-relevant traits scale and marginally associated with the social power scale. Consistent with predictions, being perceived as more inhibited was linked with being perceived as less powerful. Also as expected, there was a positive relationship between impulsivity and both measures of partner-rated social power. Participants who were perceived as more impulsive were also perceived as more powerful by their partner.

**Self-perceptions of disinhibition and impulsivity predicting perceived power.** Also displayed in Table 1, there was a significant positive relationship between self-rated disinhibition and both measures of partner-rated social power. Participants who felt more disinhibited during the interaction were perceived as more powerful by their partner. A significant negative association emerged between inhibition and partner-rated power-relevant traits. Participants who perceived themselves as more inhibited during the interaction were rated as possessing less social power by their partner. There was, however, no significant relationship between self-rated inhibition and the partner-rated social power scale. Finally, self-rated impulsivity was unrelated to partner-rated social power and partner-rated power-relevant traits.

Table 1.

*Multilevel model analyses predicting partner perceptions of social power in Study 3.*

	Partner-rated social power				Partner-rated power-relevant traits			
	$\gamma$	<i>SE</i>	95% CI lower	95% CI upper	$\gamma$	<i>SE</i>	95% CI lower	95% CI upper
<i>Partner-rated</i>								
disinhibition	.12**	.04	.03	.20	.05	.05	-.06	.15
inhibition	-.08†	.05	-.17	.01	-.20***	.06	-.31	-.09
impulsivity	.15***	.04	.07	.23	.21***	.05	.12	.30
<i>Self-rated</i>								
disinhibition	.11*	.04	.03	.20	.11*	.05	.01	.21
inhibition	-.02	.05	-.11	.07	-.13*	.06	-.24	-.02
impulsivity	.06	.04	-.02	.13	.07	.04	-.02	.16

Notes: †  $p < .10$ ; \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ ;  $\gamma$  = unstandardized coefficient.

**Observer perceptions of disinhibition, impulsivity, and power.** I assessed whether disinhibition predicted perceptions of social power among people observing interactions between participants. Observer ratings of social power were positively associated with both partner-rated social power scales (social power scale:  $\gamma = .52$ ,  $SE = .12$ ,  $p < .001$ , 95% CI [.29,.76]; power-relevant traits scale:  $\gamma = .56$ ,  $SE = .09$ ,  $p < .001$ , 95% CI [.38,.75]). There was a significant positive relationship between observer-rated disinhibition and observer-rated social power. Increased perceptions of disinhibition were associated with greater perceptions of power among observers,  $\gamma = .76$ ,  $SE = .04$ ,  $p < .001$ , 95% CI [.69,.83]. In addition, self-rated inhibition was negatively associated with observer perceptions of power,  $\gamma = -.16$ ,  $SE = .07$ ,  $p = .034$ , 95% CI [-.31,-.01]. Participants who felt less inhibited during the interaction were rated as more powerful by observers. Partner-rated impulsivity was positively related to observer perceptions of power  $\gamma = .23$ ,  $SE = .06$ ,  $p < .001$ , 95% CI [.10,.36]. Participants rated as more impulsive by their partner were rated as more

powerful by observers. No other significant effects emerged in relation to self or partner perceptions of disinhibition predicting observer-rated power.

## **Discussion**

Study 3 examined whether disinhibition was a signal of social power in face-to-face interactions. Across the majority of my indicators of disinhibition and social power there was a consistent pattern of results suggesting that people who appeared disinhibited during the interaction were perceived as more powerful by their conversation partner and by observers. Further, I found that this effect extended to several self-rated indices of disinhibition. The results suggest that people who appear to others as less inhibited *and* feel less inhibited during interactions are perceived as more socially powerful.

The findings extend those of Study 2 by demonstrating that the disinhibited communication styles adopted by people with low self-control may serve to signal high social power to conversation partners and people observing the conversation. I also replicated the results of Study 2, which showed that dating profiles manipulated to indicate more impulsive and disinhibited tendencies were perceived as more powerful. Critically, however, I extend this finding to perceptions of people during live social interactions.

### **General Discussion**

Given the numerous analogues between the behavior of people with low self-control and people with high social power, I hypothesized that the disinhibited behavior adopted by people with low self-control would be interpreted as a signal of social power. Study 1 found that people depleted of their self-control displayed behaviors indicative of high social power (i.e., disinhibition and positive self-disclosure). Study 2 demonstrated that dating profiles manipulated to display low self-control were perceived as more powerful than high self-control profiles, and that self-control perceptions negatively predicted social power perceptions. Study 3 indicated that people who acted in an uncontrolled manner (i.e., were more disinhibited, less inhibited, and more impulsive) during a live, face-to-face interaction were perceived as more powerful by their conversation partner and by independent observers. Taken together, the results suggest that the disinhibited tendencies adopted by people with acute or chronically low self-control may be perceived as indicators of social power.

Previous studies have shown that social power influences self-control. When a task is worthy of a powerful person's effort, power induces better self-regulation. However, if a task is less important, power leads to reduced regulatory effort (DeWall, Baumeister, Mead, & Vohs, 2011). The current research examines the reverse pathway; showing that reduced self-control may lead people to be perceived as powerful in social situations. Presumably this reversed attribution is a

product of the fact that people have learned in their social lives that powerful individuals often act in disinhibited ways (Brauer & Bourhis, 2006; Galinsky, et al., 2003; Keltner, et al., 2003).

Consequently, poor self-control may be interpreted as a signal of high social power.

The results of Studies 1 to 3 are consistent with those of (Van Kleef, Homan, Finkenauer, Gündemir, & Stamkou, 2011) who found that people who violate social norms are perceived as more powerful. The present work extends these findings by identifying low self-control and disinhibition as predictors of power perceptions, and thus offers a potential explanation for why people who violate norms are perceived as more powerful. Moreover, the results suggest that inappropriate behavior or norm violations such as those examined by Van Kleef and colleagues (e.g., stealing and littering) are not a prerequisite for signalling power. Instead, the results indicate that less controlled behavior can signal social power even during polite conversation or in online dating contexts.

Possessing low self-control has traditionally been considered maladaptive and socially costly. Increasingly, however, we are gaining an understanding of the social benefits associated with more impulsive and disinhibited dispositions. Indeed, (Zabelina, Robinson, & Anicha, 2007) note evidence of self-control trade-offs: people with high self-control are perceived as possessing more consistent personalities at the expense of being perceived as less spontaneous and extraverted. Similarly, people with low self-control may be at greater risk of being perceived as overly chatty or as disclosing too much personal information. However, my work suggests that these disinhibited behaviors may also elicit benefits such as being perceived as more powerful by a conversation partner or observer. These benefits might partly offset the costs of low self-control and help explain why self-control is so important and yet so easily depleted.

The present findings provide convergent evidence that low self-control serves to signal high social power. However, my findings also raise new questions that require further investigation. For example, it is unclear whether low self-control can be sustained as a signal of social power over longer time frames, or whether the social benefits of poor self-control are constrained to immediate appraisals. Indeed, research on narcissism suggests that people who adopt grandiose views of themselves form good first impressions; however, those positive initial appraisals wane over time (Paulhus, 1998; Robins & Beer, 2001). Longitudinal studies that examine how power perceptions of people with low self-control change over time from their first meeting would assist in evaluating the long-term stability of low self-control as a power signal.

It would also be beneficial to determine whether people with low self-control are perceived as socially powerful to the extent that they reap the benefits of such power: influencing others, attracting romantic partners, securing allies, and controlling resources. Studies that analyse how

disinhibited behavioral displays influence election outcomes, investment decisions, and social influence would be of particular interest.

Future studies should also consider the boundary conditions of disinhibited power signalling. While the present studies examined the relationship between self-control and social power in varied situations (i.e., online dating contexts, same-sex interpersonal interactions, and constructing personal profiles), it is possible that the observed results may not extend to other contexts and other types of disinhibited displays. For example, overweight political candidates are less likely to receive votes compared to their rivals in the normal weight range (Roehling, Roehling, & Pichler, 2007), which may stem from attributing a lack of discipline to overweight candidates. Thus, although disinhibited eating is associated with increases in immediate perceptions of power (Keltner, et al., 2003), indicators of poor dietary restraint over many years could stifle the acquisition of power.

Extremely low levels of behavioural control may also be associated with reduced perceptions of power. People who display impulsive, criminal behaviours such as illicit drug use and violent aggression may be perceived as lower status. In addition, people who disclose too much personal or negative information may be seen as less powerful. Thus, self-control and social power may have a quadratic relationship, such that low self-control begins to signal lower power after a particular threshold where disclosures become highly inappropriate or self-deprecating. Studies that examine the effects of severe depletion or clinically low dispositional self-control would assist in answering this question.

## **Conclusions**

When people lack self-control they may be perceived as unworthy of trust, employment, or political office. Ironically, however, people in high power positions are those most likely to shed their inhibitions and behave in an uncontrolled manner. I therefore suggested that people with low self-control might actually show signs of power through their disinhibited tendencies. The results indicate that people with lower self-control are more disinhibited, and that these disinhibited tendencies are perceived as markers of social power. Possessing low self-control may carry with it the risk of being perceived as aggressive, rude, or inappropriate, but also the benefits of perceived social power. Thus, in contrast to Nietzsche's assumption, he who cannot obey himself may in fact command others, rather than be commanded.

## **Chapter 4: Self-control deficits and inclusive fitness: An examination of the mechanisms and specificity of impulsive altruism**

Data from Chapter 3 supported the prediction that low self-control is associated with behaviors that signal high social power. Further, the results suggested that it was increases in disinhibited behavior amongst low self-control people that produced a power-signalling effect. While people can increase the likelihood of their genes being passed on to future generations by ascending social hierarchies and improving their own reproductive opportunities in this way, fitness can also be enhanced by ensuring that copies of one's genes are passed on by genetic relatives. *Inclusive fitness* refers to the ability of an organism to transfer genes to future generations by influencing the reproductive success and survival of the organism and its genetic relatives. Indeed, because genes drive the evolution of a species and people share a high proportion of genes with their family (in particular, their immediate family), increasing the chances of a family member surviving and/or reproducing in turn increases the likelihood of shared genes being passed on. Therefore, a psychological mechanism that increases one's tendency to help family members in situations where their survival is at risk may be particularly advantageous to one's inclusive fitness. Moreover, should such altruistic effects be targeted exclusively towards family members, this would provide evidence for a functional property of the mechanism.

In Chapter 4, I continue to examine how self-control failures provide functional benefits, but I examine this question through the lens of kin selection. Kin selection refers to evolutionary strategies that enhance the reproductive success of genetic relatives, even if this incurs a cost to individual survival. One behavioural strategy that may improve kin survival is referred to as kin altruism, which involves a general tendency to assist family members, even if the altruistic act carries a personal cost (Hamilton, 1964). Here, I argue that in addition to providing personal benefits such as displaying social power, low self-control may also foster behaviours that improve the survival of genetic relatives, and thus, enhance inclusive fitness. Specifically, I suggest that fast, impulsive reactions to threats towards kin will be tailored to favor altruistic rather than selfish responses. In Studies 4 and 5, I investigate whether self-control deficits are associated with helping family members in highly dangerous (high-cost) situations, but not with helping friends, acquaintances, or strangers in the same situation. Further, I investigate the mechanisms underpinning the relationship between low self-control and high-cost altruism towards family members.

### **Introduction**

Self-control failures are typically associated with impulsive, selfish behaviors that are driven by basic urges for reward or relief, such as eating fast food, having sex, or sleeping in when one



should be working (Friese, Hofmann, & Wanke, 2008; Gailliot & Baumeister, 2007b; Hofmann, Vohs, & Baumeister, 2012; McIntyre, et al., 2014). However, it is unknown whether such egocentrism is limited to concern for one's self, or whether the selfishness associated with low self-control extends to concern for close family members. Close family members, at the genetic level at least, are part of the self. Accordingly, I speculate that low self-control results in behaviors that *appear* unselfish, but are actually selfish insofar as they are targeted at protecting genetic relatives from threats. Moreover, I propose that the tendency for people with low self-control to protect family members from threats is the result of ineffective emotion regulation during highly volatile situations. In short, people who are unable to regulate their emotions effectively (i.e., those with low self-control) should experience more intense emotional reactions to threats towards family members, and heroically intervene as a result. In Studies 4 and 5 I investigate whether the impact of self-control failures on heroic altruism is dependent on the relationship one has with the beneficiary of the altruistic intervention. Further, I examine the mechanisms by which low self-control might promote selective altruism in threatening situations.

### **High-cost altruism**

Altruism is important to societal functioning and promotes community and individual well-being. Some altruistic acts, however, are hostile and involve great personal risk and potential harm to others. This riskier, more aggressive form of altruism is referred to as *high-cost altruism*. One example of high-cost altruism is that of a soldier going to war. A soldier goes to war with the aim of benefitting other ingroup members; however, a willingness to fight and to participate in violent conflict also places the soldier at a high risk of physical injury. Thus, the act of altruism carries with it the potential cost of death or physical injury. Acts of high-cost altruism are not restricted to such extreme examples, but are also perceived as likely to occur and are expected by victims in more commonplace conflicts, such as pub brawls and fights on a football field (Abou Abdallah, 2014).

Evidence from research on kin altruism indicates that kin are consistently more likely to be the recipients of high-cost altruism compared to friends and acquaintances (Kin Selection Theory: Curry, Roberts, & Dunbar, 2013; Hamilton, 1964; Stewart-Williams, 2007). In particular, close kin are favoured over distant kin in life-or-death situations (Burnstein, Crandall, & Kitayama, 1994). Evidence also suggests that people perceive high-cost altruism as more likely to occur for the benefit of kin than for friends or acquaintances (Burnstein et al., 1994), even during aggressive inter-group conflict (Abou Abdallah, 2014). Thus, behaving altruistically is more likely when helping benefits family survival.

While kinship has been shown to be a reliable predictor of high-cost altruism, little is known about the cognitive mechanisms that promote or impede altruistic responses in high-cost situations.

Indeed, it is unclear whether extreme acts of altruism towards family are the result of overriding basic drives for personal survival and safety (i.e., high self-control), or whether they are the product of more automatic and impulsive responses to imminent threats to genetic relatives (i.e. low self-control).

### **Self-Control and altruism**

Ego depletion has been shown to reduce low-cost altruism (e.g. letting someone stay at your house) unless a family member is involved, in which case, there is no reduction in helping (DeWall, Baumeister, Gailliot, & Maner, 2008). Depletion has also been shown to lead to increased low-cost altruism (e.g. doing more than their fair share of an embarrassing task) towards romantic partners (Righetti, Finkenauer, & Finkel, 2013). In the latter case, the authors speculated that helping a partner might actually constitute the path of least resistance (by avoiding domestic squabbling), and thus, people with low self-control were actually helping for selfish reasons. In high-cost situations, however, risks to personal safety loom large and behavior may therefore move towards self-protective tendencies. From an evolutionary perspective, however, adaptive behavior could conceivably involve prioritizing family members over one's own safety; thus, behavior may move towards tendencies that enhance the survival of close kin when there are imminent threats.

The current research focuses on *high-cost altruism*, which often carries with it a risk of conflict or harm. In this domain, the link between low self-control and altruism is clearer compared to findings on low-cost altruism. For example, depletion of self-control has been shown to promote hostility following provocation from a stranger (Denson, et al., 2010; DeWall, et al., 2007; Stucke & Baumeister, 2006). Moreover, recent findings suggest that people are more likely to engage in risky behaviors (Freeman & Muraven, 2010), and are more approach-oriented (Schmeichel, et al., 2010) when depleted. Accordingly, people with depleted self-control may be more likely to verbally or physically engage with people they perceive as threatening because of temporary increases in aggressive, risk-tolerant, and approach-oriented behavior. Consistent with this notion, if a threat is directed towards a family member, and people perceive family members as an extension of the self, similar reactions may emerge when a family member is being threatened.

In sum, people with lower self-control engage in a range of risky and aggressive behaviors. Thus, in situations where aggression is inherently linked to altruism, such as when stepping into a fight at a bar, low self-control may actually facilitate acts of altruism. This altruistic response, however, may be contingent upon whether the threat elicits an emotional response that is strong enough to actually induce an aggressive outburst.

## **Emotional reactivity**

One construct that may explain the proposed relationship between self-control and high-cost altruism is emotional reactivity. Indeed, emotional reactions have been suggested to be highly sensitive to cost/benefit analyses in the context of kin selection, and to motivate altruistic behavior towards kin and non-kin others (Trivers, 2002). That is, threats directed towards family members may actuate more intense emotional reactions compared to threats directed towards friends or strangers. These emotions may then lead to behavior motivated by a desire to reduce potential threats. In short, it is possible that the strength of people's emotional responses to a threat determines how they will respond in dangerous situations.

The self-regulation literature suggests that a primary function of self-control is to inhibit emotionally charged responses – whether these responses are aggressive, antisocial, or inappropriate. I therefore predict that people with low self-control will respond to threats towards family members more aggressively because they are unable to regulate their emotions. Conversely, in situations that evoke weaker emotional responses (e.g., when a friend or stranger is being threatened), self-control should be unrelated to high-cost altruism because emotion regulation is less necessary.

## **Study 4**

The aim of Study 4 was to examine the impact of ego depletion on both low- and high-cost forms of altruism towards kin and non-kin targets. First, consistent with notion that reactions to threats are sensitive to evolutionary cost/benefit trade-offs (Curry et al., 2013; Hamilton, 1964; Stewart-Williams, 2007; Trivers, 2002), I predicted that threats towards non-kin targets would elicit less altruism compared to kin targets. Second, I predicted that self-control would be unrelated to high-cost altruism in less emotionally intensive situations (i.e., when non-kin targets were threatened). In contrast, I predicted that depletion would induce high-cost altruism when a family member was being threatened. Finally, previous research has produced conflicting findings in relation to how depletion impacts low-cost altruism towards close others (see DeWall et al., 2008; Righetti et al., 2013). As such, no specific predictions were made in relation to low-cost altruism outcomes. To examine these predictions, I manipulated self-control with a depletion (or control) task and then assessed the impact of depletion on both high-cost and low-cost altruism in a highly threatening scenario involving either a family member or an acquaintance.

## **Method**

**Participants and design.** 121 participants from a large Australian university campus were recruited to complete the study in return for a candy bar. Sample size was estimated using G\*Power software (Faul, Erdfelder, Buchner, & Lang, 2009) predicting medium effect sizes (see Hagger, et

al., 2010). Potential participants were pre-screened to ensure that they had at least one sibling. Three participants later reported in the questionnaire that they had no siblings and were therefore excluded from analyses. This resulted in a final sample of 118 participants, including 47 men and 66 women (5 participants did not respond). The mean age of the sample was 23.15 years ( $SD = 4.98$ ). The study employed a 2 (self-control: depletion vs. control) x 2 (target: family vs. acquaintance) between-subjects design, and participants were randomly allocated to conditions. As less than 5% of the data were missing, listwise deletion was employed to account for missing values in each analysis.

**Materials and procedure.** To deplete participants of their self-control I administered a letter-crossing task adapted from previous research (Baumeister et al., 1998; Job et al., 2010; Tice et al., 2007). The task requires participants in the experimental condition to complete a difficult cognitive task, which involves inhibiting a previously learned response. Participants were provided with a sheet of paper that contained instructions and two paragraphs of text taken from an advanced statistics textbook. All participants were instructed to cross out every *e* in the first paragraph. For the second paragraph, participants were randomly assigned to continue crossing out every *e* (control condition) or were asked to follow a complex rule that required crossing out every *e*, except for those *es* that were within two letters of any vowel (depletion condition).

Following the self-control manipulation, participants read two scenarios related to a highly threatening situation involving either a sibling or an acquaintance. Because high-cost altruism places people in physical danger, hypothetical scenarios represent an ethical, low-cost, and controlled method by which to measure this construct (for the defence of using hypothetical scenarios in psychological research, see D. S. Wilson & O’Gorman, 2003). The first scenario involved the target (sibling or acquaintance) being held at gunpoint while withdrawing money from a cash machine. The second scenario involved the target being verbally threatened and pushed up against a wall at a bar. The person being threatened in the scenario was described as “someone you recognise from [your university]” or as “your sibling”. All other text was identical between target conditions. After reading each scenario, participants rated the extent to which they agreed that they would engage in various responses to the situation, which are described in the following sections. Finally, participants completed the Brief Self-Control scale and demographic items before being fully debriefed and thanked for their time.

### **Measures.**

**High-cost altruism.** Four items (2 in each scenario) assessed the likelihood that participants would approach and physically intervene in the situation; putting themselves in physical danger to protect their sibling/acquaintance (“Run to help [target]. You would pull [target] away from the

stranger and stand between them to attempt to verbally resolve the argument, possibly putting yourself at risk from the stranger;” and “You would become aggressive and violent towards the stranger and use force to get rid of the stranger so that you can protect [target], even though there would be a real danger to yourself in doing so”). Response options ranged from 1=*strongly disagree* to 7=*strongly agree*. All items were averaged to form a reliable scale,  $\alpha = .78$ .

**Low-cost altruism.** Two items (1 in each scenario) assessed the likelihood that participants would help the target but not become involved in the physical altercation (scenario 1: “Call the police” scenario 2: “Find a security guard and ask for help”). Response options ranged from 1 = *strongly disagree* to 7 = *strongly agree*. Both items were averaged together, with higher scores indicating higher levels of low-cost altruism,  $r = .44$ .

#### **Inaction.**

Two items (1 in each scenario) assessed the likelihood that participants would not help the target at all (“You would do nothing. You would not feel obligated to involve yourself and thus would avoid the conflict). Response options ranged from 1 = *strongly disagree* to 7 = *strongly agree*. Both items were averaged together, with higher scores indicating a greater likelihood of doing nothing,  $r = .47$ .

## **Results**

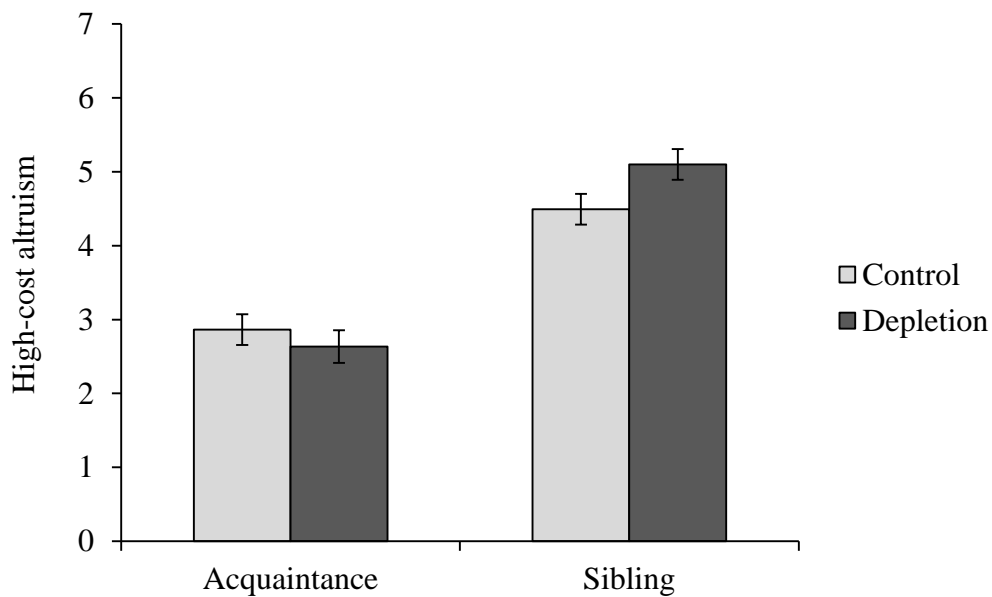
**Control variables.** The following results are reported without control variables. Note that simultaneously controlling for gender, ethnicity, and dispositional self-control did not affect the direction or the significance of the reported effects.

**High-cost altruism.** To assess the impact of self-control and target on *high-cost altruism* I conducted a 2 (self-control: depletion vs control) x 2 (target: family vs. acquaintance) between-subjects ANOVA. The only main effect to emerge was that of target  $F(1,114) = 89.65, p < .001, \eta_p^2 = .44, 95\% \text{ CI } [1.60, 2.44]$ . Participants reported that they were more likely to physically intervene when the person being threatened was a sibling ( $M = 4.79, SE = .15$ ) rather than an acquaintance,  $M = 2.77, SE = .16$ . This main effect was qualified by a significant interaction between self-control and target,  $F(1,114) = 4.26, p = .041, \eta_p^2 = .04, 95\% \text{ CI } [1.73 \text{ to } -.04]$ . As shown in Figure 1, depleted participants were more likely to physically intervene ( $M = 5.10, SE = .21$ ) compared to control participants ( $M = 4.49, SE = .21$ ) when a sibling was being threatened,  $M_{diff} = -.61, SE = .19, p = .042, 95\% \text{ CI } [-1.19, -.02]$ . However, there was no effect of self-control on high-cost altruism when an acquaintance was threatened,  $M_{diff} = -.277, SE = .31, p = .373, 95\% \text{ CI } [-.337, .890]$ .

**Low-cost altruism.** A 2(self-control) x 2(target) ANOVA on *low-cost altruism* revealed only a main effect of target,  $F(1,114) = 4.58, p = .034, \eta_p^2 = .04, 95\% \text{ CI } [-.92, -.04]$ . Participants were more likely to report assisting in a low-cost manner (i.e., by phoning the police or alerting a

security guard) when the target was an acquaintance ( $M = 6.29$ ,  $SE = .16$ ) than when the target was a sibling ( $M = 5.81$ ,  $SE = .15$ ). There was no interaction between self-control and target on low-cost altruism,  $F(1,114) = 1.09$ ,  $p = .300$ ,  $\eta_p^2 = .01$ , 95% CI [-1.35, .42].

**Inaction.** A 2(self-control) x 2(target) ANOVA on *inaction* also revealed only a main effect of target,  $F(1,114) = 4.58$ ,  $p = .034$ ,  $\eta_p^2 = .04$ , 95% CI [-.92, -.04]. Participants were more likely to indicate that they would do nothing when the target was an acquaintance ( $M = 2.10$ ,  $SE = .13$ ) compared to when the target was a sibling ( $M = 1.23$ ,  $SE = .13$ ). There was no interaction between self-control and target on inaction,  $F(1,114) = .11$ ,  $p = .741$ ,  $\eta_p^2 = .00$ , 95% CI [-.61, .86].



*Figure 1.* High-cost altruism as a function of self-control and target conditions. Error bars represent standard errors of the means.

## Discussion

Consistent with predictions, I found that people were more likely to engage in high-cost altruism when a family member was being threatened in a hypothetical scenario compared to when an acquaintance was threatened. This effect was moderated by self-control on measures of high-cost altruism, but not on low-cost altruism or inaction. Specifically, depleted people were more likely to put themselves at high risk to help family members than non-depleted people. Finally, there was no main effect of self-control on any of my measures of altruism. The findings suggest that when a family member is being threatened, impaired self-control may promote greater high-cost, but not low-cost, altruism. The results support previous work showing preferences for helping kin over non-kin targets in dangerous situations (Burnstein et al., 1994), and extend these findings by

highlighting the role of poor self-control in promoting altruism towards family in threatening situations.

One surprising effect emerged in Study 4: participants were more likely to help in a low-cost manner when the target was an acquaintance compared to when the target was a sibling. It is possible that altruism towards non-kin targets is underpinned by different motivations and cost/benefit trade-offs. Indeed, while altruism towards kin directly contributes to the survival of genetic relatives, altruism towards non-kin others may be more useful insofar as it has the potential to foster reciprocity. That is, assisting an acquaintance in a low-cost manner may result in that acquaintance providing assistance at a later time (Trivers, 1971). Given that family members are already motivated to behave altruistically towards kin (i.e., to protect copies of one's genes), encouraging reciprocal altruism among acquaintances in a manner that does not put one's survival at risk may represent an effective long-term altruism strategy.

### Study 5

In Study 5 I wanted to establish whether the predicted relationship between self-control and high-cost altruism was evident in behaviors outside of the laboratory. Moreover, I wanted to test whether the effect observed in Study 1 was due to more emotional responding among people with low self-control. To do this, I administered measures of self-control and emotional reactivity, as well as self-reported past engagement in high-cost altruism towards different targets. I tested the proposition that lower self-control would be associated with more instances of high-cost altruism, but only when the beneficiary of the altruistic intervention was a family member. Further, I predicted that the effect of self-control on high-cost altruism towards family would be mediated by increased emotional reactivity.

### Method

**Participants and procedure.** The online survey was completed by 210 USA residents recruited through Amazon's Mechanical Turk website. The sample size was estimated in line with recommendations for mediation models assuming small to medium effects (Fritz & MacKinnon, 2007). The sample consisted of 95 women and 108 men (7 did not specify their gender) whose ages ranged from 18 to 66 years ( $M_{\text{age}} = 34.03$ ,  $SD_{\text{age}} = 10.35$ ).

### Measures.

**Self-control.** The Brief Self-Control Scale (Tangney et al., 2004) is a 13-item measure that includes response options ranging from 1 = *not at all* to 5 = *very much*. Participants rated the extent to which each statement reflects how they perceive themselves. There were four positively scored items (e.g., 'I am good at resisting temptation') and nine negatively scored items (e.g., 'I have a hard time breaking bad habits'). Higher scores indicate greater levels of self-control,  $\alpha = .82$ .

**Emotional reactivity.** Emotional reactivity was assessed using the Emotional Reactivity Scale (ERS; Nock, Wedig, Holmberg, & Hooley, 2008). The ERS includes 21 items that are rated on a 5-point scale ranging from 0=*not at all like me* to 4=*completely like me*. People who score high on the ERS are particularly sensitive to emotional stimuli, experience emotions very intensely, and their emotions tend to be longer lasting. Example items include “Even the littlest things make me emotional” and “My emotions go from neutral to extreme in an instant”. Items were averaged together to form a reliable scale,  $\alpha = .96$ .

**High-cost altruism.** To gauge participants willingness to put themselves in potentially costly situations to assist different targets, I asked participants how many times they had “stepped in to physically fight back against someone who was physically threatening a [target]” and how many times they had “stepped in to argue back against someone who was arguing with a [target]?” in the past two years. All participants answered this question in relation to family member, friend, acquaintance, and stranger targets. Because the number of participants who reported stepping into fights on at least one occasion was extremely low: Family = 12(5.7%); Friend = 16(7.6%); Acquaintance = 7(3.3%); Stranger = 6 (2.9%), the variation in the sample was not sufficient to produce stable results. As such, I limited my analyses to the “stepping into arguments” item.

## Results

**Analyses and data screening.** As recommended for small samples, mediation was assessed via bootstrapping procedures (with 5000 resamples; see Preacher & Hayes, 2004). (Baron & Kenny, 1986) proposed that a direct relationship between the independent variable (IV) and dependent variable (DV) is a precondition for establishing mediation. More recently, however, it has been recommended that this step is not necessary (Shrout & Bolger, 2002). Thus, indirect effects were examined when the conditions of a significant IV-mediator relationship and a significant mediator-DV relationship were satisfied. As recommended by (Hayes, 2008), each dependent variable was analysed separately using the same random number seed in each bootstrapping procedure. Skewness statistics revealed that all dependent variables were positively skewed ( $\text{Skewness}/\text{SE} > 3$ ) so square root transformations were performed. The proposed IV (self-control) and mediator (emotional reactivity) were moderately correlated,  $r(203) = -.45, p < .001$ . Listwise deletion was used to account for missing values in each analysis.

**High-cost altruism towards family.** The direct effect ( $\text{DE} = .07, \text{SE} = .19, p = .707$ ) and the total effect ( $\text{TE} = -.12, \text{SE} = .17, p = .476$ ) of self-control on altruism towards family were non-significant. However, the direct effect of self-control on emotional reactivity was significant ( $\text{DE} = -.62, \text{SE} = .09, p < .001$ ), as was the direct effect of emotional reactivity on high-cost altruism towards family,  $\text{DE} = .32, \text{SE} = .14, p = .025$ . Specifically, lower self-control was associated with



higher emotional reactivity, and higher emotional reactivity was associated with more high-cost altruism towards family. Follow-up bias-corrected bootstrap confidence intervals revealed that the indirect effect of self-control on high-cost altruism towards family through emotional reactivity was significant,  $IE = -.20$ , 95% CI  $[-.45, -.03]$ . Note that the direct effect of self-control on emotional reactivity is identical for all subsequent analyses and will not be reported hereafter.

**High-cost altruism towards friends.** Both the direct effect ( $DE = -.09$ ,  $SE = .16$ ,  $p = .600$ ) and the total effect ( $TE = -.10$ ,  $SE = .15$ ,  $p = .505$ ) of self-control on high-cost altruism towards friends were non-significant. In addition, there was no significant direct effect of emotional reactivity on high-cost altruism towards friends ( $DE = .02$ ,  $SE = .12$ ,  $p = .877$ ), thus negating the need to test indirect effects.

**High-cost altruism towards acquaintances.** Again, the direct effect ( $DE = .01$ ,  $SE = .13$ ,  $p = .920$ ) and the total effect ( $TE = -.13$ ,  $SE = .12$ ,  $p = .270$ ) of self-control on high-cost altruism towards strangers were non-significant. The direct effect of emotional reactivity on high-cost altruism towards strangers was significant,  $DE = .24$ ,  $SE = .10$ ,  $p = .016$ . However, there was no significant indirect effect of self-control on high-cost altruism towards acquaintances through emotional reactivity,  $IE = -.14$ , 95% CI  $[-.42, .01]$ .

**High-cost altruism towards strangers.** There was no significant direct effect ( $DE = .09$ ,  $SE = .08$ ,  $p = .281$ ) or total effect ( $TE = .03$ ,  $SE = .07$ ,  $p = .686$ ) of self-control on high-cost altruism towards strangers. The direct effect of emotional reactivity on high-cost altruism towards strangers was not significant,  $DE = .10$ ,  $SE = .06$ ,  $p = .113$ . Therefore, as with friends and acquaintances, there was no indirect effect of self-control on high-cost altruism towards strangers through emotional reactivity.

## Discussion

The results of Studies 4 and 5 were consistent with my hypotheses insofar as there was a significant indirect effect of self-control on high-cost altruism through emotional reactivity, but only when the recipient of the altruistic act was a family member. Thus, people with lower dispositional self-control reported experiencing emotions more intensely, which in turn predicted greater altruism when a family member was in an argument. Self-control was unrelated to high-cost altruism, however, when friends, acquaintances or strangers were subjected to the same threatening situation.

An unexpected effect also emerged in Study 5: higher emotional reactivity was associated with more high-cost altruism towards acquaintances. Given that emotional reactivity is associated with empathy (Rueckert, Branch, & Doan, 2011), it is not entirely surprising that emotional reactions may be associated with altruism towards non-kin targets. If this is the case, it is unclear

why emotional reactivity did not predict high-cost altruism towards friends or strangers. More importantly for my key predictions, however, there was no direct association between self-control and high-cost altruism towards acquaintances, nor was there an indirect effect through emotional reactivity.

### **General Discussion**

Two studies examined the relationship between self-control and altruism in potentially costly situations. I found consistent support for my hypothesis that reduced self-control would be associated with a *greater* likelihood of high-cost altruism when the target of the threat was a family member (Studies 4 and 5). The tendency for low self-control to promote altruism towards family did not extend to low-cost altruism (Study 4). Further, the results suggest that people with low self-control are more likely to assist family members in threatening situations because they are more emotionally reactive (Study 5). The findings provide a robust test of the impact of self-control on high-cost altruism towards kin and non-kin others.

Low self-control is commonly assumed to be a maladaptive quality associated with criminal and inappropriate behavior. Indeed, previous research has largely focussed on the antisocial and selfish behaviors associated with low self-control (Denson et al., 2010; DeWall et al., 2008; Stucke & Baumeister, 2006). More recently, however, it has been shown that low self-control may be associated with more prosocial tendencies in close relationships (Righetti et al., 2013). The present data provides the first indication that low self-control is associated with increased high-cost altruism, and that this effect is exclusive to family members. I also provide evidence suggesting that the mechanism underlying the relationship between low self-control and high-cost altruism towards family is increased emotional reactivity. My findings therefore provide novel insights into the role of self-control in predicting high-cost forms of altruism, as opposed to more routine forms of altruism that embody relatively minor costs and benefits. Moreover, I demonstrate these effects across two studies using a combination of measures and procedures, which included self-reports of actual behavior, expected behavior in hypothetical situations, and manipulations of both self-control and target conditions.

### **Implications and future directions**

The present findings are consistent with past research by Righetti and colleagues (2013) showing that self-control failures promote altruism towards close others, but extends these findings to high-cost situations, provides evidence for the narrow specificity of the effect, and elucidates a potential mechanism of approach-orientated reactivity. Righetti and colleagues suggested that people with low self-control may make personal sacrifices because it requires less effort. For example, not helping a romantic partner may lead to interpersonal conflict, which may exact greater

costs and require more effort compared to helping. Instead, however, my results suggest that people with low self-control go to great effort to assist family members by intervening in highly threatening situations in the real world and in the laboratory. Thus, my results provide evidence *against* the notion that people with low self-control are inescapably driven by self-protective heuristics in situations requiring large self-sacrifices for close others. Rather, my results suggest that low self-control may promote potentially costly heuristics associated with the protection of kin.

DeWall et al., (2008) found that depletion had no impact on helping a family member who was struggling to pay rent in a hypothetical scenario. My results contrast with this finding insofar as I found increases in altruism towards family in highly threatening situations. It is possible that the null effect observed by DeWall and colleagues may be specific to low-cost forms of altruism, and that high-cost altruism may induce different cognitive and behavioral responses. Specifically, my findings suggest that the likelihood of high-cost altruism is associated with the genetic relatedness of the person being threatened, one's subsequent emotional response to the threatening situation, and one's capacity to override that emotional reaction. Although the present studies improve on past research by comparing a range of different targets (i.e., family, friends, acquaintances, and strangers), examination of situations evoking high and low threats towards the same target may help explain the contrasting effects observed in my findings and those of DeWall and colleagues.

Interestingly, the interaction between self-control and target did not emerge for the inaction variable in Study 4. Conceptually, inaction could be considered the reverse of high-cost altruism, and therefore one would expect less inaction among people with low self-control when a family member was in danger. Action and inaction, however, operate through different neural systems (Gray & McNaughton, 2000) and may therefore interact differently with self-control processes. For example, low self-control has been associated with activation of the Behavioral Approach System (BAS), but does not appear to influence the Behavioral Inhibition System (BIS; Schmeichel, et al., 2010). Consequently, inaction may be influenced to a lesser extent by self-control deficits than action. Further research examining the cognitive and neural mechanisms underpinning action and inaction among people with low self-control is required.

The results also have implications for evolutionary models of self-regulation and kin altruism. Evolutionary accounts of behavior suggest that self-interested tendencies extend to others who share genetic information (Dawkins, 2006). Thus, strategically intervening in situations where a genetic relative is in danger may confer a fitness advantage. The specificity of the relationship between low self-control and high-cost altruism towards family members found here may be indicative of a potential adaptive quality of self-control failures, which may be borne out in highly threatening situations.

**Concluding remarks**

Poor self-control has traditionally been conceptualised as maladaptive. Although poor self-control is associated with a range of potential costs (Tangney et al., 2004), evidence is emerging that low self-control may also provide benefits in certain situations (Apfelbaum & Sommers, 2009; Righetti, et al., 2013; Zabelina, et al., 2007). Here, I show that low self-control evokes altruistic responses in threatening situations involving family members. The exclusivity of this effect to family points to a potential adaptive advantage of low self-control that is driven by more emotional reactions to threatening situations involving kin. The present research increases our understanding of how and why people risk their own safety for others, and emphasises the need for greater examination of context-specific effects of self-control failures.

## Chapter 5: Discussion

### Summary of findings

In the present thesis I examined the role of low self-control in predicting adaptive social behavior, and the mechanisms underpinning the relationship between low self-control and positive fitness outcomes. I developed and tested a new *social enhancement model* of self-control deficits, which posited that low self-control functions to signal high social power. Self-control was also investigated in the context of inclusive fitness outcomes. Specifically, I tested whether self-control deficits were associated with helping family members, but not friends, acquaintances, or strangers in threatening situations.

Studies 1 to 3 investigated whether low self-control was a signal of high social power. Study 1 found that depletion was associated with disinhibition and positive self-presentations; both of which are known correlates of high social power. Study 2 found that dating profiles manipulated to display low self-control were perceived as more powerful than high self-control profiles. Lower perceived self-control of the profile targets was also found to be predictive of their higher perceived social power. Study 3 found a similar pattern of results during a live social interaction. Participants who were less inhibited and more impulsive during the interaction were perceived as more powerful by their conversation partner and by outside observers.

Studies 4 and 5 examined whether low self-control facilitated heroically intervening in situations where genetic relatives were in danger. Results indicated that depletion increased helping when a family member was physically threatened, but not when an acquaintance was subjected to the same threat. This effect was found to be the result of increased emotional reactivity among people with lower self-control, which in turn predicted people's reported altruistic responses towards family. Taken together, the present findings suggest that self-control deficits are associated with behaviors that promote displays of social power and acts of heroic altruism reserved exclusively for family members.

### Implications and future directions

**Self-control and social power.** Possessing social power is associated with a range of impulsive and disinhibited behaviors (Baumeister, 2002b; Denson, et al., 2010; DeWall, et al., 2007; Gailliot & Baumeister, 2007b; Hofmann & Friese, 2008; McIntyre, et al., 2014). I argued that because low self-control is also associated with disinhibition, it is plausible that people with low self-control will behave in a manner consistent with possessing power, and in turn be perceived as socially powerful. In line with this possibility, the present studies showed that people with lower self-control were less inhibited, and that social disinhibition predicted perceptions of social power. These findings are consistent with work demonstrating a link between low self-control and social

disinhibition (Vohs, et al., 2005), but extends these findings by demonstrating a potential social advantage of reduced inhibitory control. Indeed, previous discussions of self-control failures in social situations have largely framed social disinhibition and low self-control in terms of their potential social costs (Tangney, et al., 2004; Vohs, et al., 2005). Here, however, I provide evidence that a lack of self-control is a signal of high social status, and thus poor self-control may lead to beneficial outcomes such as climbing social hierarchies and attaining the material benefits associated with power.

The *social enhancement model of self-control deficits* outlined in Chapter 2 provides an explanation for the findings of Studies 1 to 3. Specifically, the plethora of disinhibited behaviors synonymous with poor self-control are also established markers of high social power (Brauer & Bourhis, 2006; Keltner, et al., 2003). Consequently, and as the present findings show, people with poor self-control are perceived as socially powerful. Thus, the seemingly maladaptive behaviors adopted by people with poor self-control (e.g. risk-taking, aggression, over-sharing personal information, sexual disinhibition) may actually be functional insofar as they signal social power. The present research is the first to establish a link between low self-control and high social power empirically, however further questions need to be answered. For example, examining whether poor self-control leads to more tangible power outcomes (e.g., wealth, mates, allies) is a necessary next step in solidifying the social enhancement model. Moreover, identifying the specific behaviors that most potently indicate power would be of interest to future research. Studies that manipulate personal profiles to reflect a range of disinhibited tendencies would assist in identifying such behaviors.

**Self-control and high-cost altruism.** In low-cost situations, poor self-control is associated with no change in helping behaviors towards family members and a reduction in helping towards strangers (DeWall, et al., 2008). The results of Studies 4 and 5 suggest that this pattern changes in high-risk situations, and that specific threats directed at family members elicit more altruistic responses when self-control is low. The effect was found to be underpinned by increases in emotional reactivity as self-control decreased, suggesting the people with low self-control are less able to inhibit their emotional reactions to threatening situations. The findings are consistent with research demonstrating that depletion increases approach motivation and aggression (Denson et al., 2010; DeWall et al., 2007; Stucke & Baumeister, 2006), but suggest that the relationship between self-control and approaching threats may be context-dependent. Specifically, the present results are indicative of a self-control system that is sensitive to external cues of threat, and in turn promotes behaviors that protect kin but not non-kin others from imminent threats. The tendency for people to become depleted easily may therefore be associated with improved survival of genetic relatives.

Of course, approaching dangerous situations also has the potential to incur fitness costs. There is little benefit in protecting a sibling from a physical threat if the altruistic behavior is ultimately fatal. However, if more than one sibling was in danger, then the fitness cost/benefit trade-offs start to favour altruism because siblings share roughly fifty percent of one's genes. As the exact risk of death to one's self and one's relatives was not specified or measured in Studies 4 and 5, no firm conclusions can be drawn regarding the effectiveness of the strategies adopted by people with low and depleted self-control. Further research is required to test whether altruistic strategies in high-risk situations involving family members maximize fitness outcomes. Experiments that include more fine-grained manipulations of genetic relatedness (e.g., child, sibling, parent, cousin) and altering the degree of physical danger would help to corroborate this suggestion.

### **Why might it be beneficial to feel depleted so rapidly?**

The notion that the subjective experience of self-control exhaustion may be explained by adaptive benefits that arise from depletion-induced behaviors raises the question of why one would run out of self-control at the precise moment when it is working at maximum capacity (i.e., when attempting to suppress an emotion or push through a difficult task). Intuitively, it might be assumed that people exert self-control when they need to the most, such as when survival or reproductive success depends on it. However, humans are notoriously poor at deciding when and how to regulate their behavior and make decisions. As discovered by Apfelbaum and Sommers (2009), people who were better able to control their behavior actually performed worse in a difficult social situation compared to people whose self-control was compromised. Similarly, people who rely on conscious processing to make evaluations of objects or people perform worse than people who make more intuitive judgments (Ambady, 2010; T. D. Wilson & Schooler, 1991). Thus, sometimes it is beneficial for the brain's executive regions, which are responsible for self-regulation, to move out of the way so that lower level brain processes can guide behavior. For example, being more emotionally reactive in threatening situations may enhance fitness outcomes more so than restraining emotions. Similarly, people might believe that behaving in a controlled manner will maximize social success. In reality, however, more disinhibited tendencies are associated with perceptions of greater social standing (Studies 1 to 3). Consequently, depletion may occur because people decide to exert self-control at precisely the times when it is *least* beneficial to their social or reproductive success – or perhaps when it is less helpful than behaving impulsively. Examining whether people can accurately assess *when* exerting behavioral control will be beneficial may help to verify the extent to which people misuse self-control. Further, testing whether people are more susceptible to depletion when the fitness payoffs of impulsivity are high may assist in determining the extent to which depletion is sensitive to cost/benefit trade-offs.

A second possibility is that people run-out of self-control because most self-control attempts compromise short-term fitness goals, even though they may enhance long-term goals. In this respect, the role of depletion may be to constantly promote disinhibition whenever inhibitory attempts are ongoing because disinhibition is highly beneficial to short-term success (e.g., mate attraction, displaying dominance, and protecting family from danger). This is in direct conflict to the self-regulation goal of bringing the self back in line with consciously imposed standards (Baumeister & Vohs, 2007), which are often associated with long-term goals (e.g., not offending people and valuing personal safety). It is possible that the long-term costs of poor self-control outweigh the benefits. However, the costs of poor self-control are often not realised over short time frames (e.g., heart disease from eating fatty foods) and the benefits of low self-control are often reaped immediately. Indeed, from an evolutionary perspective, short-term mating goals are more important to the reproductive success of an organism compared to long-term survival goals. Thus, a self-control system that shapes behaviour to facilitate short-term, mating-relevant goals may provide an overall fitness benefit.

For example, chipping away at a tedious task that will accrue resources and subsequent power over the long-term may ultimately prove to be a less successful mating strategy compared to being immediately perceived as powerful through one's disinhibited behavior (Studies 1 to 3). In line with this idea, past research suggests that the narcissistic qualities possessed by people with low self-control result in positive social evaluations initially, but negative evaluations over time (Paulhus, 1998; Robins, et al., 2001). As the present findings demonstrate, the power-signalling effects of low self-control emerge within five minutes of meeting someone for the first time (Study 3) or viewing a brief dating profile (Study 2). Thus, low self-control has the potential to produce immediate rewards, which, in terms of subsequent reproductive success, may outweigh the long-term benefits of constant inhibitory control.

A related point to consider is that individual differences in self-control may lead to divergent social strategies. It has been shown, for example, that people who evaluate decisions in terms of their short-term payoffs respond more selfishly in a cooperation task compared to people who make more long-term evaluations (Brede, 2013). Thus, people with poor self-control may adopt shorter time horizons and therefore act impulsively in social situations, while people with better self-control may maintain a long-term outlook and inhibit behaviors that may be socially risky (e.g., blurting out a controversial opinion). Consistent with this idea, it has been shown that low self-control is associated with a greater desire for immediate rewards (Seeley & Gardner, 2003). Thus, people with less self-control may focus their attention on achieving short-term social, mating, or financial goals. Higher self-control individuals, however, may possess more long-term strategies characterised by



discipline and emotional stability. This suggestion is congruous with Inzlicht and Schmeichel's (2012) process model of depletion, which proposes that people's attention shifts towards immediate desires when self-control is compromised. Therefore, people with low self-control may achieve social and reproductive success by focussing their behavior on immediate evolutionary-relevant desires, such as reproduction (McIntyre, et al., 2014), food (Friese, et al., 2008), kin survival (Studies 4 and 5), and ascending social hierarchies (Studies 1 to 3). Future studies examining how individual differences in self-control affect decision-making when fitness-relevant rewards are offered over short or long time frames may help to confirm this proposition.

The question of whether low self-control provides a net fitness benefit remains open. The present thesis lays groundwork for further investigation into this neglected area of self-regulation research, and highlights the need for researchers to pay greater attention to the potential benefits of low self-control. Here, I provide evidence for two previously undiscovered adaptive qualities of low self-control that may contribute positively to inclusive fitness. However, to afford more robust evidence for adaptation, future studies should examine whether the behavioural consequences of poor self-control I have identified here flow through to genuine fitness payoffs. Studies examining the differential reproductive success of people highly susceptible and less susceptible to depletion, and studies assessing the romantic success of people with low and high self-control would help determine whether there is a net fitness benefit associated with low self-control.

Here, I make the argument that low self-control assists in achieving goals that are highly relevant to inclusive fitness. It could be argued, however, that there is a tipping point at which low self-control ceases to promote adaptive behaviour. Specifically, behavioural responses may shift from promoting social success and facilitating calculated risks to promoting inappropriate social behaviour and recklessness in the face of danger. Given that the trends observed here were linear and significant in the predicted directions, it is unlikely that this tipping point is captured by general and student samples, as were recruited for the present studies. However, studies examining people diagnosed with impulse control disorders may yield differential effects, such that lower self-control may be associated with poor social performance and maladaptive risk-taking among this population.

### **Limitations**

There are some limitations to consider when interpreting the present research. First, several of the studies reported here relied on retrospective accounts of behavior and expected behavior in hypothetical situations. While these measures were complemented wherever practical with measures more representative of real-world behaviors (e.g., dating profile evaluation and face-to-face social interactions), it is important to replicate the present findings in laboratory and observational studies that rely less on self-report measures. For example, examining whether people

depleted of their self-control would be willing to receive mild electric shocks in order to protect their siblings from similar shocks may add further ecological validity to Studies 4 and 5.

It should also be noted that in the present thesis I adopted a relatively broad definition of self-control deficits. Specifically, no distinction was made between trait and state self-control. While the present research and several other studies suggest that people with low self-control and people depleted of their self-control adopt similar behaviors, it is possible that people who are susceptible to depletion and people with continuously poor self-control do not reap the same fitness payoffs. For example, it may be particularly beneficial to maintain high self-control during the day while completing important tasks, but become quickly depleted in the afternoon when social gatherings are more frequent and disinhibition is advantageous. However, it may not be particularly beneficial to be continuously impulsive and present-oriented at the expense of all long-term goals. Confirming whether susceptibility to depletion and low self-control lead to the same overall fitness outcomes would be beneficial for future research. Moreover, longitudinal studies assessing social and relationship success may assist in determining the costs and benefits of continually poor self-control.

It is also conceivable that the benefits of poor self-control depend on the interplay of dispositional self-control and ego depletion; although evidence regarding whether high trait self-control exacerbates or attenuates depletion effects is mixed (see DeWall, et al., 2007; Imhoff, Schmidt, & Gerstenberg, 2013). One possibility is that possessing typically high self-control but feeling the effects of depletion in specific situations (e.g., meeting a new person or seeing a sibling in danger) represents the ideal balance of control and disinhibition. While the findings from Studies 4 and 5 hint that the human self-control system may be sensitive to these social cues, further studies are required to examine the combination of dispositional and environmental factors that elicit highly adaptive behaviors. Studies that examine state and trait self-control, and manipulate the concurrent social environment (e.g., number of men and women present, social status of people present) may help assess whether the ability to control one's behaviour is influenced by social cues.

Finally, the disinhibition manipulation included in Study 3 (p. 31) did not impact on people's perceptions of disinhibition or social power. It is therefore unclear whether there is no causal relationship between disinhibition and perceived social power during face-to-face social interactions, or whether the manipulation was not sufficiently strong to influence people's behavior and subsequent partner perceptions. Although this study was complemented by the successful manipulation of self-control among dating profiles in Study 2, further research is required to substantiate a causal pathway between disinhibition and social power during live social interactions. Study 3 also included three single-item predictors (disinhibition, inhibition, and impulsivity). This

is not ideal because single-items can be statistically unstable and may not necessarily measure the construct of interest reliably. The use of multi-item measures of disinhibition is recommended for future studies. In addition, utilising a depletion manipulation rather than explicit instruction to behave in a disinhibited or inhibited manner may represent a more effective method to examine the relationship between self-control and power during live interactions.

### **Concluding remarks**

The present thesis examined the hypotheses that self-control deficits promote behaviors associated with social power displays and kin protection. The data provided support for both of these predictions. First, I found that low self-control was associated with disinhibited tendencies that signalled high power in social contexts. The effect was shown across multiple experimental paradigms including writing personal profiles, dating profile evaluation, and face-to-face social evaluations. Second, I found that low self-control was associated with protecting kin, but not non-kin others from physical threats. The effects emerged in experimental and correlation studies that examined past behavior and expected behavior in hypothetical scenarios.

The results identify two previously unexplored benefits of poor self-control and open up new avenues for future research. The *social enhancement model of self-control deficits* provides a potential overarching explanation for the array of disinhibited behaviors observed among people with low or depleted self-control. Further, the model encourages examination of the potential social advantages of self-control failures, and provides a framework for understanding how self-control deficits help to achieve social goals. The relationship between low self-control and high-cost altruism towards family points to the possibility that the human self-control system is tuned to maximize success at the level of the gene rather than the individual. In addition, the findings encourage future investigation into the context-specific effects of ego depletion in situations relevant to survival and reproductive goals.

Better self-control is often touted as the solution for many of life's problems and for many of society's ills. Thus, little attention has been paid to the potential benefits of self-control deficits, particularly from an evolutionary perspective. The present findings identify two pathways by which self-control failures lead to outcomes that may enhance inclusive fitness. While further research is required to confirm the propositions put forward here, the present thesis represents an important step in understanding how evolutionary pressures have shaped the human self-control system in previously unexplored ways.

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