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Cognitive Control and Socially Desirable Behavior: The Role of Interpersonal Impact

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### Abstract

Individuals' willingness to act in socially desirable ways, such as sharing resources with others and abiding by norms of ethical conduct, is a necessary condition of social life. The current research reconciles two seemingly contradicting sets of findings on the role of cognitive control in socially desirable behaviors. One set of findings suggests that people are tempted by self-serving impulses and have to rely on cognitive control overriding such impulses to act in socially desirable ways. Another set of findings suggests people are guided by other-regarding impulses and cognitive control is not necessary to motivate socially desirable behaviors. We provide a theoretical and empirical integration of these findings by identifying a key situational variable—the salience of interpersonal impact—that determines whether the dominant impulse is to behave in a self-serving or a socially desirable manner. We suggest that the dominant impulse is to behave in a socially desirable manner when the interpersonal impact of an action is salient, and that the dominant impulse is to behave in a self-serving manner when the interpersonal impact of an action is not salient. Consistent with this prediction, Studies 1–3 found that impairing participants' cognitive control led to less socially desirable behavior when interpersonal impact was not salient, but more socially desirable behavior when interpersonal impact was salient. Study 4 extended these findings by demonstrating that behaving in a socially desirable manner causes cognitive control impairment when interpersonal impact is not salient. But, when interpersonal impact is salient, behaving in a self-serving manner impairs cognitive control. We discuss the implications of our findings for understanding and managing socially desirable behaviors.

*Keywords:* socially desirable behavior; cognitive control; impulses; cheating; resource distributions.

### Cognitive Control and Socially Desirable Behavior: The Role of Interpersonal Impact

A commonly accepted truth about human nature is that people are inherently self-serving (Dawkins, 1976; Wright, 1994). At the same time, humans required an ability to suppress self-serving impulses and to behave in a socially desirable manner for their evolutionary success. Humans and their hominin ancestors lacked many physical adaptations that other species have but probably overcame these challenges through living in cooperative groups (Axelrod & Hamilton, 1981; Buss, 2008). Cooperation enabled humans to achieve better outcomes (e.g., hunting large game, defending themselves against predators, looking after their young) than they could have achieved through individual action. Living in cooperative groups led to norms of socially desirable behavior (Coleman, 1990; Ullmann-Margalit, 1977) that require individuals to suppress their self-serving impulses and act in an other-regarding manner instead (Haidt & Kesebir, 2010; Krebs, 2008). Many commentators, ranging from philosophers (e.g., Hobbes, 1651/1960; Rousseau, 1754/1984) to psychologists (Baumeister & Exline, 1999; Carver & Scheier, 1981), have written about the question of how individuals suppress their self-interest and act in a socially desirable manner.

An emerging body of research focuses on the role of cognitive control, the “ability to guide and adjust cognitive processes and behavior flexibly in accordance with one’s intentions and goals” (Cho, Konecky, & Carter, 2006, p. 19878) in socially desirable behaviors, reaching seemingly contradictory conclusions. One set of findings suggests that although people experience impulses to engage in self-serving behaviors, they use cognitive control to override impulses, enabling socially desirable ways (Baumeister, 2005; Baumeister & Exline, 1999, 2000). For example, studies find that impairing participants’ cognitive control leads to less socially desirable behaviors, such as cheating (Gino, Schweitzer, Mead, & Ariely, 2011; Mead, Baumeister, Gino, Schweitzer, & Ariely, 2009). Another set of findings suggests that socially desirable behavior is motivated by other-regarding impulses rather than cognitive control (de Waal, 2006; Greene & Paxton, 2009; Zhong, 2011). Some of this research finds that cognitive

control may actually override other-regarding impulses (Cornelissen, Dewitte, & Warlop, 2011; Zhong, 2011). For instance, Zhong (2011) found that promoting intuitive (rather than controlled) decision making leads to more socially desirable behavior (less deception and larger donations to a charity).

In this paper, we seek to integrate these two diverging sets of empirical findings on the role of cognitive control in socially desirable behavior. We do so by investigating how the *salience of interpersonal impact* determines the effect of cognitive control on socially desirable behaviors. We define the salience of interpersonal impact as a situational feature that signals to individuals that their actions might have negative effects on others (cf. Gino, Shu, & Bazerman, 2009; Jones, 1991). We draw on evolutionary research to suggest that the impulse to behave in a socially desirable manner likely evolved to regulate behavior in relatively personal situations (e.g., stealing someone's food), in which individuals' actions clearly had detrimental effects on another person (de Waal, 2006; Dunbar, 2010; Tooby & DeVore, 1987). If this is the case, other-regarding impulses should be activated in situations in which interpersonal impact is salient. Cognitive control might not be necessary to motivate socially desirable behavior in such situations. In contrast, in relatively impersonal situations (e.g., lying on one's tax report), in which the negative impact on another person is less salient, other-regarding impulses might not be activated and people will be tempted to behave self-servingly. In relatively impersonal situations, people may need cognitive control to override their self-serving impulses for socially desirable behavior to occur. We elaborate on this theory in subsequent sections and then describe four experiments that test our hypotheses.

Understanding when humans are impulsively self-serving and when they are other-regarding is important to organizations and their designers. Assumptions about whether and when humans are impulsively self-serving lead to choices about how to structure and configure institutional arrangements. The image of humans as being self-serving leads to the creation of workplaces where employees are subject to surveillance, excessive rules and tight contracts (Etzioni, 1988; Ghoshal & Moran, 1996; Schwartz, 1997). For example, based on their findings

that cognitively depleted individuals cheat more, Gino et al. (2011) concluded that “managers and organizations should focus on removing temptations, developing self-control, and monitoring individuals who are likely to be depleted” (p. 200). Our theoretical formulation, if supported, would lead to the suggestion that managers can reduce unethical and other self-serving behavior by making salient the impact that one’s actions have on others.

### **Cognitive Control, Impulses, and Socially Desirable Behavior**

Cognitive control is an evolutionarily recent ability for domain-general, controlled, and effortful thinking that is unique to humans (see Chaiken & Trope, 1999; Evans, 2008; Sherman et al., 2008, for reviews). Cognitive control allows people to override their impulses when impulses conflict with intentions and goals. For example, people often experience impulses to engage in behaviors that have momentary hedonic appeal (e.g., eating high-calorie food), but override these impulses using cognitive control to accomplish their goals (e.g., aesthetic or health-related goals).

Impulses refer to the tendency to act spontaneously and without deliberation (Carver, 2005). They are motivational impetuses belonging to an evolutionarily old, low-effort, and domain-specific psychological apparatus, often constituting an evolutionarily adaptive response to a specific environmental input. For instance, most people experience an impulse to flee when encountering a snake (Öhman & Mineka, 2001). Most impulses exist today because they produced fitness benefits over evolutionary history. Cognitive control, which evolved more recently, allows humans to behave contrary to their impulses. This is useful in situations where impulses cause behavior that is detrimental to one’s welfare. In the eating example given above, while it was adaptive for humans to eat high-calorie food indiscriminately throughout much of the evolutionary past, the evolved impulse to eat indiscriminately needs to be controlled in the modern world where meeting one’s energy budget is not a constant challenge. Cognitive control can serve to override an impulse that led to a functional response in humans’ evolutionary past but leads to negative consequences if acted on in the modern world.

Is socially desirable behavior in humans the result of impulses or cognitive control? Are humans impulsively self-serving, in which case cognitive control is needed for socially desirable

behavior? Or are they impulsively other-regarding, in which case cognitive control would not be necessary for socially desirable behavior? As we outline below, extant research leads to opposing conclusions about the role of impulses and cognitive control in socially desirable behaviors.

### **Cognitive Control Enables Socially Desirable Behavior**

One line of research suggests that cognitive control is essential for people's "capacity to stifle one's own self-serving impulses so as to engage in socially desirable behaviors" and "serves the purpose of maintaining membership in social groups" (Baumeister, DeWall, Ciarocco, & Twenge, 2005, p. 598). This view presumes that people are impulsively self-serving and need to exert cognitive control over their impulses to act in socially desirable ways (see also Dawkins, 1976; Wright, 1994). Cognitive control thus serves as "the moral muscle" (Baumeister & Exline, 1999, p. 1165) that motivates socially desirable behavior despite people's impulses to act in a self-serving manner.

To test this idea, researchers have made participants exert cognitive control (vs. not) on an unrelated task before giving participants an opportunity to engage in socially desirable behavior. The rationale is that participants who exert cognitive control in a prior task have less cognitive control available for the subsequent task (i.e., their cognitive control is impaired) and so are relatively less able to override their impulses (Baumeister, Bratslavsky, Muraven, & Tice, 1998). Behavior in the task that follows cognitive impairment is therefore more strongly guided by the impulse and is seen as evidence for the existence of that particular impulse. Using this paradigm, researchers find that people whose cognitive control is impaired engage in less socially desirable behavior, such as taking more resources by misrepresenting performance (Gino et al., 2011; Mead et al., 2009). The conclusion drawn from these studies is that people have an impulse to behave self-servingly. Cognitive control impairment reduces people's ability to override selfish impulses, leading to less socially desirable behavior.

### **Impulses Enable Socially Desirable Behavior**

Other research suggests that socially desirable behavior may be motivated by other-regarding impulses rather than by cognitive control. Humans and their hominin ancestors have

been living in cooperative groups for several millions of years (Dunbar & Shultz, 2007; Klein, 1989). Sophisticated cognitive capacities, such as cognitive control, are relatively recent developments (Diamond, 1992; Tattersall, 1997). It is unlikely that cognitive control played a major role in motivating socially desirable behavior during much of human history, given its late development in humans. The cause of socially desirable behavior that sustained cooperative groups is therefore more likely to have been primitive mechanisms in the form of impulses (de Waal, 2006; Haidt, 2007).

Indirect evidence for the claim that impulses, rather than cognitive control, can play a role in motivating socially desirable behavior can be found in the behavior of non-human primates, the animals phylogenetically closest to humans and their hominin ancestors (Harrison, 2010; Marks, 2003). Non-human primates lack sophisticated cognitive capacities (Povinelli, 2000; Tomasello, 1999), but are nevertheless known to benefit their group members at the expense of self-interest. Rhesus monkeys refuse to pull a chain delivering food if doing so causes another monkey to suffer an electric shock (thus voluntarily starving themselves for prolonged periods of time; Masserman, Wechkin, & Terris, 1964; Wechkin, Masserman, & Terris, 1964). Chimpanzees and capuchin monkeys demonstrate various other-regarding behaviors such as sharing food with fellow group members (Feistner & McGrew, 1989) and consoling victims of aggression (de Waal & Roosmalen, 1979). Most likely, other-regarding impulses rather than cognitive control motivate these behaviors (de Waal, 1997).

More direct evidence for the role of other regarding impulses in motivating socially desirable behavior comes from Zhong (2011), who showed that promoting intuitive (rather than deliberative and controlled) decision making leads to less deception of another participant and larger donations to a charity. Similarly, Cornelissen et al. (2011) found that some participants who had less cognitive resources behaved less selfishly in a dictator game compared to participants who had more cognitive resources. These results provide support for the idea that the dominant impulse was to engage in socially desirable behavior in the situations studied by these scholars. Finally, research on moral disengagement suggests that people need to override other-

regarding impulses using cognitive control to behave contrary to norms of socially desirable conduct (Aquino, Reed, Thau, & Freeman, 2007; Bandura, Barbaranelli, Caprara, & Pastorelli, 1996).

This is not to say that cognitive control *always* makes people behave more selfishly. The reason why cognitive control can lead to less socially desirable behavior is simply that cognitive control offers *the ability* to override what would otherwise have been an impulse-guided socially desirable behavior. When this ability is absent, for instance because cognitive control is impaired, people are less able to override their other-regarding impulse even if they would have wanted to do so. As Zhong (2011) notes, the “ethical dangers of deliberative decision making surface not because reason and deliberation will always lead to undesirable moral consequence but because they *can*” (p. 8). Taken together, the research we just described suggests that impulses, rather than being unvaryingly self-serving, may motivate socially desirable behavior in some circumstances.

### **Impulsively Self-Serving or Other-Regarding?**

The two sets of findings on socially desirable behavior lead to different conclusions about the roles of impulses and cognitive control in motivating socially desirable behavior. One set of findings suggests that people impulsively behave in a self-serving manner and that cognitive control impairment (which makes people less able to override self-serving impulses) leads to less socially desirable behavior (e.g., Gino et al., 2011; Mead et al., 2009; Muraven, Pogarsky, & Shmueli, 2006). The other set of findings suggests that people have the impulse to behave in an other-regarding manner and that cognitive control impairment (which makes them less able to override other-regarding impulses) leads to more socially desirable behavior (e.g., Cornelissen et al., 2011; Zhong, 2011).

We propose that the seemingly diverging findings can be explained by the fact that the two research streams focus on different situations. Research suggesting that people experience impulses to behave in a self-serving manner and that impairment of cognitive control leads to less socially desirable behavior (e.g., Gino et al., 2011; Mead et al., 2009; Muraven et al., 2006),

focused on relatively impersonal situations, in which participants' actions had no clear effect on others' welfare. For instance, Mead et al. (2009) gave participants an opportunity to earn additional funds by misrepresenting performance on a problem-solving task. Yet this behavior, although socially undesirable, had no apparent negative effect on other people. As we detail in the next section, other-regarding impulses might have developed primarily to motivate socially desirable behavior in situations in which one's actions have a clear impact on others.

Consequently, other-regarding impulses might not have been activated in this set of studies.

In contrast, research suggesting that people experience impulses to behave in an other-regarding manner, and that impairment of cognitive control should lead to more socially desirable behavior (e.g., Cornelissen et al., 2011; Zhong, 2011), focused on situations where it was clear that participants' actions affected others. For instance, Zhong (2011) gave participants an opportunity to deceive another participant to earn additional funds. Such situations make the impact on another person salient. These personal situations might be exactly the kind of situations in which other-regarding impulses are activated. In the next section, we discuss how and why this situational difference may explain the diverging conclusions reached by past research, and in doing so, elucidate fundamental aspects of human moral psychology.

### **The Role of the Salience of Interpersonal Impact**

Situations differ in how strongly they present cues that one's actions might have negative effects on others (Gino et al., 2009; Jones, 1991; Small & Loewenstein, 2003). In some situations, it is clear that a person or a group of people is likely to be affected by one's behavior. In others, it is not clear whether or how others are affected. We refer to this situational property as *the salience of interpersonal impact*. Take, for example, a person considering paying a bribe to secure a place for his or her child in a private school. This could result in someone else not getting a place in the school. However, the situation may or may not make this fact salient to the person considering paying the bribe. For instance, the school personnel might make it clear that only a fixed number of children are admitted each year, in which case the interpersonal impact becomes salient, or they might not mention this fact.

We argue that the salience of interpersonal impact will determine whether the dominant impulse is to behave in a self-serving or socially desirable manner. Our theory is based on considerations of the conditions and function of socially desirable behavior over human evolutionary history. The evolutionary success of humans is in large part due to their ability to function in cooperative groups (Axelrod & Hamilton, 1981; Buss, 2008). Socially desirable behavior is a fundamental requirement for cooperative group living (Haidt & Kesebir, 2010; Krebs, 2008). Because impulses were the primary motivational mechanism throughout most of human evolutionary history (Diamond, 1992; Tattersall, 1997), other-regarding impulses are likely to have been selected for because they facilitated social living, which in turn provided humans with the evolutionary benefit of cooperation. Yet, social living in humans occurred exclusively in the context of small groups, defined by close and repeated interactions (Dunbar, 2010; Tooby & DeVore, 1987). In such contexts, interpersonal impact is almost always salient. Selection would thus primarily have promoted other-regarding impulses to motivate behavior in situations in which actions have a salient impact on others (e.g., sharing food with others).

For the same reason, it is unlikely that natural selection shaped impulses motivating socially desirable behavior when interpersonal impact is not salient. Socially desirable actions that have no salient interpersonal impact (e.g., paying taxes) were unlikely to have existed in human ancestral environments where individuals lived in small groups (Dunbar, 2010; Tooby & DeVore, 1987). Such actions became necessary only relatively recently, as the size and complexity of the social world increased and selection pressure for the development of impulses motivating socially desirable actions that have no salient interpersonal impact unlikely existed. Whenever socially desirable behavior was not required for evolutionary success, natural selection shaped self-serving impulses because such impulses facilitated survival and reproduction (e.g., Dawkins, 1976; Hamilton, 1964a, 1964b).

Some prior research provides support for the view that the salience of interpersonal impact determines whether the dominant impulse is to behave in a more or less socially desirable manner. In the obedience experiments conducted by Milgram (1965), people became less willing

to inflict harm on another person as the impact of their actions on another person was made increasingly salient. Although there were no differences in the attributed level of pain across conditions, when the impact on the other person was not salient, “the victim's suffering possesses an abstract, remote quality for the subject. He is aware, but only in a conceptual sense, that his actions cause pain to another person; the fact is *apprehended, but not felt*” (Milgram, 1965, p. 63; emphasis added). Thus, interpersonal impact had to be salient to produce an impulsive aversion to the harmful behavior in the agent. This claim is consistent with research in moral psychology showing situations involving “personal” immoral actions (e.g., throwing people off a sinking lifeboat) engage emotion-related brain regions and cause impulse-driven reactions more strongly than do “impersonal” immoral actions (e.g., keeping money found in a lost wallet; Greene & Haidt, 2002; Greene, Nystrom, Engell, Darley, & Cohen, 2004; Greene, Sommerville, Nystrom, Darley, & Cohen, 2001). The idea that salient interpersonal impact elicits other-regarding impulses is also consistent with research on the identifiable victim effect (e.g., Jenni & Loewenstein, 1997; Nisbett & Ross, 1980; Schelling, 1968). This research shows people are willing to expend greater resources to save the lives of identified victims than to save equal numbers of unidentified or statistical victims because identified victims elicit greater levels of emotional distress (Kogut & Ritov, 2005).

The discussion above suggests that the salience of interpersonal impact activates the impulse to engage in socially desirable behavior. In situations in which interpersonal impact is salient, cognitive control impairment will make people less able to override the other-regarding impulse and may thus lead to more socially desirable behavior. When interpersonal impact is not salient, people's dominant impulse is to behave in a self-serving manner. In such situations, impairing individuals' cognitive control should lead to less socially desirable behavior, as their ability to override the impulse to behave in a self-serving manner will be weakened. We predict:

*Hypothesis 1:* The salience of interpersonal impact moderates the effect of cognitive control impairment on socially desirable behavior such that cognitive control impairment leads to *less* socially desirable behavior when a potential negative effect of one's behavior

on another person is not salient but it leads to *more* socially desirable behavior when a negative effect of one's behavior on another person is salient.

### **Overview of the Present Research**

We tested our theory in four experiments. We focused on situations in which individuals' self-interest was pitted against social norms of appropriate conduct: resource-distribution situations (Study 1) and situations that afford an opportunity to cheat (Study 2–4). In resource-distribution dilemmas, individuals have to decide how to divide resources between themselves and another participant. The self-serving behavior in such situations is to take as much as possible for oneself, but the socially desirable behavior is to take fewer resources. Similarly, in situations in which individuals have an opportunity to take more resources than they earned (i.e., to cheat), the self-serving response is to take as much as possible but the socially desirable response is to refrain from cheating.

Studies 1 and 2 tested Hypothesis 1 using an experimental design similar to the designs used in prior research on cognitive control and socially desirable behavior (Gino et al., 2011; Mead et al., 2009). We either impaired or did not impair participants' cognitive control by making them exert cognitive control on an initial task (Baumeister et al., 1998). We then examined participants' tendency to engage in socially desirable behavior in situations in which interpersonal impact either was salient or was not salient. If our theory is correct, this study design should result in an interaction between cognitive control impairment and salience of interpersonal impact such that cognitive control impairment leads to more socially desirable behavior when interpersonal impact is salient but less socially desirable behavior when it is not. Study 3 uses the same study design but extends previous studies by proposing and testing a hypothesis concerning the psychological process (perceived effect on others). Finally, in Study 4, we reverse the study design and test whether refraining (vs. not refraining) from unethical behavior expends cognitive control when interpersonal impact is (vs. is not) salient.

### Study 1

Study 1 tested our theory in the context of resource distribution decisions. Following a cognitive control impairment manipulation, we gave participants an opportunity to pay themselves for their work. We either told participants that their behavior would affect another participant (high salience of interpersonal impact) or omitted this information (low salience of interpersonal impact). We expected that cognitive control impairment would lead to less socially desirable decisions (taking more for oneself), when participants are not told their actions affect another person. When participants are told their actions affect another person, cognitive control impairment should lead to more socially desirable behavior (taking less for oneself).

#### Method

**Participants and procedure.** Participants were 101 students ( $M_{age} = 21.58$ ,  $SD_{age} = 0.53$ ; 59.41% female). They were told they would participate in a study on verbal abilities in return for a €5 show-up fee and an additional opportunity to earn up to €10. Participants were told that we were interested in the flexibility of essay-writing skills and that they would write an essay while conforming to specific task demands. They were randomly assigned to the conditions of a 2 (cognitive control: impaired vs. not impaired)  $\times$  2 (interpersonal impact: salient vs. not salient) between-subjects design. All participants first wrote an essay for 15 minutes. In reality, this task contained our cognitive control impairment manipulation, described below. Upon completion of this task, participants were given an opportunity to take additional resources of up to €10, ostensibly as an additional compensation for their work.

**Materials.** *Cognitive control manipulation* consisted of an overriding task (Schmeichel, 2007) shown to impair cognitive control (Masicampo & Baumeister, 2008). Participants wrote an essay about their daily life and were asked to avoid using either A and N (cognitive control impaired) or X and Y (cognitive control not impaired). They were provided with a list of suggested topics (e.g., “Your typical day,” “Your social life,” “Your hobbies,” etc.). This manipulation provided an intuitive connection between the task and the subsequent opportunity to take additional financial resources.

***Interpersonal impact manipulation and measure of socially desirable behavior.***

Following the cognitive control manipulation, participants were given an opportunity to award themselves extra pay from a €10 pot for their work on the essay. In the *interpersonal impact salient* condition, participants were told that another participant would be paid from the same pot. In the *interpersonal impact not salient* condition, this was omitted. The amounts taken by participants served as our dependent variable of socially desirable behavior. After deciding how much to pay themselves, participants were paid, debriefed, and dismissed.

**Results**

Amounts taken by participants were submitted to a 2 (cognitive control impairment)  $\times$  2 (interpersonal impact) ANOVA. As illustrated in Figure 1, the main effect for interpersonal impact was significant,  $F(1, 97) = 24.82, p < .001, \eta_p^2 = .204$ , such that participants took less when reminded that their actions would affect the other participant ( $M = 6.16\text{€}, SD = 1.53\text{€}$ ) than when they were not ( $M = 7.68\text{€}, SD = 1.62\text{€}$ ). The main effect of cognitive control impairment was not significant,  $F(1, 97) = 0.01, p = .99, \eta_p^2 < .001$ .

Importantly, the predicted interaction between cognitive control impairment and interpersonal impact was significant,  $F(1, 97) = 8.28, p = .005, \eta_p^2 = .079$ . Simple effects analysis found that cognitive control impairment made participants take more for themselves when interpersonal impact was not salient,  $F(1, 97) = 4.15, p = .044, \eta_p^2 = .041$  ( $M_{\text{impaired}} = 8.12\text{€}, SD_{\text{impaired}} = 1.90\text{€}; M_{\text{not impaired}} = 7.24\text{€}, SD_{\text{not impaired}} = 1.17\text{€}$ ). However, when interpersonal impact was salient, the effect reversed and cognitive control impairment made participants take significantly less money for themselves,  $F(1, 97) = 4.41, p = .038, \eta_p^2 = .044$  ( $M_{\text{impaired}} = 5.73\text{€}, SD_{\text{impaired}} = 1.00\text{€}; M_{\text{not impaired}} = 6.60\text{€}, SD_{\text{not impaired}} = 1.85\text{€}$ ).

[Insert Figure 1 about here]

**Discussion**

Study 1 supports Hypothesis 1. When interpersonal impact was not made salient, cognitive control impairment (which makes people less able to override impulses) made participants take more money for themselves. This suggests that individuals' dominant impulse

when interpersonal impact is not salient is to behave self-servingly. However, when interpersonal impact was salient, the effect reversed and cognitive control impairment made participants take less. This suggests that individuals' dominant impulse when interpersonal impact is salient is to behave in a socially desirable manner.

## Study 2

Study 2 was designed to test our theory using a different measure of socially desirable behavior. Because much prior research on the effect of cognitive control on socially desirable behavior focused on cheating (e.g., Gino et al., 2011; Mead et al., 2009; Muraven et al., 2006), we operationalized socially desirable behavior as participants' tendency to refrain from cheating in Study 2. Previous research showed that cognitive control impairment leads to more cheating (Gino et al., 2011; Mead et al., 2009), but this research focused on situations in which participants' behavior had no apparent negative effect on another person. In such situations, people are tempted by the impulse to behave self-servingly and cognitive control is necessary to override them. Thus, we also expected that when a negative effect of cheating was not made salient, cognitive control impairment would lead to more cheating. However, making salient a potential negative effect of one's actions on another person should make the dominant impulse to behave in an other-regarding manner, and cognitive control impairment (which makes people less able to override their dominant impulse) should lead to less cheating.

## Method

**Participants and procedure.** Participants were 94 undergraduate students ( $M_{age} = 19.97$ ,  $SD_{age} = 0.71$ ; 38.30% female). They were told they would be participating in a laboratory study on verbal and analytical abilities in return for a €5 show-up fee and an additional opportunity to earn up to €10 based on their performance in the study. We told participants that we were interested in how verbal and analytical abilities are related and that for this reason they would engage in the different tasks in sequence.

Participants were randomly assigned to the conditions of a 2 (cognitive control: impaired vs. not impaired)  $\times$  2 (interpersonal impact: salient vs. not salient) between-subjects design. They

were run individually and all materials were presented on the computer. Participants first wrote an essay for 10 minutes (the cognitive control manipulation). Ostensibly, this task tested their verbal abilities. Next, participants engaged in an analytical problem-solving task in which they could earn additional money for their performance. This task supposedly tested participants' analytical reasoning abilities. Participants were asked to pay themselves based on their performance on the analytical problem-solving task on their way out from a jar containing coins. We manipulated the salience of interpersonal impact by varying the content of the message placed above the jar. We measured how much participants overpaid themselves (took more than earned), which served as our measure of cheating.

**Materials.** *Cognitive control manipulation* was the same as in Study 1.

*Analytical problem-solving task.* This task consisted of 20 Raven's progressive matrices (Raven, 1965) presented on the computer. Participants were given three minutes to solve as many matrices as they could. They were told they would earn an extra €0.50 for each problem solved correctly. The computer automatically scored their performance and informed them how much extra money they had earned. This information remained clearly visible on the screen so as to minimize any confusion on participants' part as to the amount they were supposed to take.

*Interpersonal impact manipulation.* The computer instructed participants to pay themselves for their performance on the analytical problem-solving task from a jar on their way out. We positioned a large jar full of €0.50 coins close to the exit of the room. On the wall above the jar, we placed a sign that contained the interpersonal impact manipulation. In the *interpersonal impact not salient* condition, the sign read: "You are paid from the jar." This setup was similar to the conditions that participants faced in some of previous research on the effect of cognitive control on socially desirable behavior (e.g., Gino et al., 2011; Mead et al., 2009) in that participants' potential self-serving behavior (cheating) had no apparent negative effect on another person. In contrast, in the *interpersonal impact salient* condition, the sign above the jar read: "All participants are paid from this jar," thereby suggesting that taking too much could mean fewer resources for others.

After paying themselves, participants responded to a short post-study questionnaire that was placed next to the jar. Among several general questions about the study was the interpersonal impact manipulation check item: “When taking your payment, did you think that another participant would be paid from the same jar?” (1 = *definitely did not believe*; 7 = *definitely believed*).

**Measure of socially desirable behavior.** Unbeknownst to participants, for each participant the jar contained the same number of coins. After the participant left, the experimenter counted the coins left in the jar and noted how much the participant took. We subtracted the amount of money taken from the amount earned. In this way, we were able to measure cheating behavior. This measure served as our dependent variable of socially desirable behavior. No participant took less money than earned.

## Results

**Manipulation checks.** Salience of interpersonal impact was successfully manipulated. Participants in the interpersonal impact condition ( $M = 6.50$ ,  $SD = 0.62$ ) selected higher values than did participants in the no interpersonal impact condition ( $M = 5.00$ ,  $SD = 1.22$ ),  $t(92) = 7.45$ ,  $p < .001$ , when indicating whether they believed other participants would be paid from the jar.

**Hypothesis 1 test.** We conducted a 2 (cognitive control impairment)  $\times$  2 (interpersonal impact) ANOVA on the cheating scores. As illustrated in Figure 2, the main effect for interpersonal impact was significant,  $F(1, 90) = 60.87$ ,  $p < .001$ ,  $\eta_p^2 = .403$ , such that participants cheated less in the interpersonal impact condition ( $M = 0.35\text{€}$ ,  $SD = 0.48\text{€}$ ) than in the no interpersonal impact condition ( $M = 1.29\text{€}$ ,  $SD = 0.71\text{€}$ ). The main effect of cognitive control impairment was not significant,  $F(1, 90) = 2.15$ ,  $p = .146$ ,  $\eta_p^2 = .023$ .

Importantly, the predicted interaction between cognitive control impairment and interpersonal impact was significant,  $F(1, 90) = 7.04$ ,  $p = .009$ ,  $\eta_p^2 = .073$ . Simple effects analysis found that cognitive control impairment led to significantly more cheating when interpersonal impact was not salient,  $F(1, 90) = 8.68$ ,  $p = .004$ ,  $\eta_p^2 = .088$  ( $M_{\text{impaired}} = 1.54\text{€}$ ,  $SD_{\text{impaired}} = 0.78$ ;  $M_{\text{not impaired}} = 1.04\text{€}$ ,  $SD_{\text{not impaired}} = 0.55\text{€}$ ). However, when interpersonal impact was salient,

cognitive control impairment led to slightly (although not significantly) lower levels of cheating,  $F(1, 90) = 0.34, p = .559, \eta_p^2 = .004$  ( $M_{\text{impaired}} = 0.27\text{€}, SD_{\text{impaired}} = 0.46\text{€}; M_{\text{not impaired}} = 0.42\text{€}, SD_{\text{not impaired}} = 0.50\text{€}$ ).

[Insert Figure 2 about here]

## Discussion

Study 2 extended Study 1 by testing our theory in the context of cheating. We found that making interpersonal impact salient moderates the effect of cognitive control impairment on cheating. This finding provides additional support for the notion that the nature of impulses people experience (and therefore the role of cognitive control) differs significantly as a function of the salience of interpersonal impact. Specifically, when interpersonal impact was not salient, cognitive control impairment led to less socially desirable behavior (more cheating). However, unlike in Study 1, where we found that cognitive control impairment led to more socially desirable behavior when interpersonal impact was salient, this simple effect did not reach significance in Study 2.

One likely explanation for the non-significant simple effect is a floor effect. The mean levels of cheating were generally very low in this study, possibly because participants were concerned about being caught. The study design did not explicitly preclude that possibility. Thus, although cognitive control impairment led to somewhat lower levels of cheating in the interpersonal impact condition, an overall floor effect might have prevented us from finding a significant difference. A significant simple effect of cognitive control impairment in the interpersonal impact condition would have required the mean level of cheating to be even lower among participants whose cognitive control was impaired. Yet, the mean level of cheating in that condition was already close to zero ( $M = 0.27\text{€}, SD = 0.46\text{€}$ ) so a further reduction was unlikely. We sought to address this design limitation in subsequent studies.

## Study 3

In Study 3, we provide an additional test of our theory in the context of cheating, while extending previous studies in several ways. First, we used a different task through which we

measured participants' cheating behavior. The goal of the new task was to make it clearer to participants that any cheating on their part would not be detectable by researchers. We expected this task feature to increase levels of cheating (Cizek, 1999), thereby reducing the risk of a floor effect that likely occurred in Study 2. In addition, because Studies 1 and 2 were both conducted using undergraduate student samples, we sought to test our theory using a more representative sample in Study 3. We therefore recruited participants from a sample representative of the U.S. population.

Finally, in Study 3 our goal was to provide evidence regarding the psychological mechanism implied by our theory. Our theory suggests that the salience of interpersonal impact activates other-regarding impulses by directing people's focus on the impact of their actions on others. We have supported this prediction by showing that our manipulations of the salience of interpersonal impact moderates the effect of cognitive control impairment on socially desirable behavior in Studies 1 and 2. In Study 3, we measured participants' perceived effect on others to directly verify that the role of the salience of interpersonal impact occurs *because* people become more aware of the fact that their actions have consequences for others. If our theory is correct, perceived effect on others should mediate the moderating role of the salience of interpersonal impact in the effect of cognitive control impairment on socially desirable behaviors. Figure 3 depicts the implied mediational model (for other research using this analytical approach see, e.g., Grant & Berry, 2011; Pitesa & Thau, 2013). Specifically, our theory implies that an increased salience of interpersonal impact (our manipulation) should lead to a higher perceived effect on others. Perceived effect on others should, in turn, moderate the effect of cognitive control impairment, such that cognitive control impairment leads to more (less) socially desirable behavior when perceived effect on others is low (high). We predict:

*Hypothesis 2:* Perceived effect on others mediates the moderating role of the salience of interpersonal impact in the effect of cognitive control impairment on socially desirable behaviors.

[Insert Figure 3 about here]

## Method

**Participants and design.** We recruited 104 participants ( $M_{age} = 32.88$ ,  $SD_{age} = 10.35$ ; 54.81% female) through Amazon's Mechanical Turk, an online crowdsourcing mechanism with members representative of the U.S. population (Buhrmester, Kwang, & Gosling, 2011). They took part in an online experiment, ostensibly on verbal abilities, in exchange for \$1.00 and an opportunity to win a bonus payment of \$10. Participants were randomly assigned to conditions of a 2 (cognitive control: impaired vs. not impaired)  $\times$  2 (interpersonal impact: salient vs. not salient) between-subjects design.

**Procedure and materials.** After logging in, participants read that the study consisted of two tasks, the essay task and the anagram task, each testing a different verbal ability. This design ostensibly examined how different verbal abilities are related with one another.

**Cognitive control impairment manipulation.** The first task required participants to write an essay while avoiding using specific letters. In reality, this was our cognitive control manipulation, which was identical to the one used in Studies 1 and 2.

**Anagram task.** Next, participants were told they would be presented with ten anagrams (words in which the letters have been scrambled) and were told they would have to work out the original words.

**Interpersonal impact manipulation.** In the *interpersonal impact not salient* condition, participants were informed that they could win a bonus payment of \$10, depending on their performance on the anagram task. Thus, in this condition, misreporting the number of anagrams solved had no apparent negative implications other participants. In the *interpersonal impact salient* condition, we added: "All participants are hoping to win the same bonus. The more anagrams you solve, the higher your chances of winning the bonus and the lower the chances of other participants." This made it salient that misreporting the number of anagrams solved had potential negative implications for other participants.

**Mediator.** Following the interpersonal impact manipulation, participants were asked to respond to several questions, ostensibly to allow us to check whether they had understood what

they would have to do in the anagram task. First, several items checked the understanding of the task (e.g., “I have to use all the letters in the anagram to work out the original word,” “I can use each letter in the anagram only once,” etc.). These were followed by two items measuring perceived effect on others, our hypothesized mediating variable: “The more anagrams I report solved, the lower the others’ chances of winning the bonus” and “The number of anagrams I report as solved affects others.” Participants indicated their agreement with the items on a 5-point scale (1 = *strongly disagree*; 5 = *strongly agree*). The two mediator items were very highly correlated,  $r = .87, p < .001$ , so we averaged them to create a single measure of perceived effect on others.

*Measure of socially desirable behavior.* Participants were told they would report how many anagrams they solved once the time for working on anagrams was over. Unbeknownst to participants, the anagrams were actually unsolvable. Any anagram reported as solved thus constituted cheating. This measure was adopted from prior research and it is widely used as a measure of cheating (e.g., DePalma, Madey, & Bornschein, 1995; Eisenberger & Leonard, 1980; Eisenberger & Masterson, 1983; Eisenberger & Shank, 1985; Shmueli & Muraven, 2007; Wiltermuth, 2010). To minimize suspicion, we selected anagrams of common English words and we changed only one letter. We used an online anagram tool to verify that the anagrams were unsolvable. Participants were told that the anagrams were difficult but possible to solve and that only common English words were included. Because all participants were native English speakers, it was unlikely that they mistakenly thought they had constructed a common English word.

Participants had three minutes to work on the anagrams, after which time the computer auto-advanced. Then they were asked to report the number of anagrams solved (1 = *none*, 10 = *all*). The actual winners of the bonus were randomly selected. Afterwards, participants reported their demographical characteristics and the study ended. They were then debriefed.

## **Results**

**Hypothesis 1 test.** We conducted a 2 (cognitive control impairment)  $\times$  2 (interpersonal impact) ANOVA on the number of anagrams misreported as solved. As illustrated in Figure 4, the main effect of interpersonal impact was significant,  $F(1, 100) = 20.69, p < .001, \eta_p^2 = .171$ , such that participants cheated less in the interpersonal impact condition ( $M = 1.90, SD = 2.43$ ) than in the no interpersonal impact condition ( $M = 4.40, SD = 3.33$ ). The main effect of cognitive control impairment was not significant,  $F(1, 100) = 0.04, p = .834, \eta_p^2 < .001$ .

Importantly, the predicted interaction between cognitive control impairment and interpersonal impact was significant,  $F(1, 100) = 10.36, p = .002, \eta_p^2 = .094$ . Simple effects analysis found that cognitive control impairment led to significantly more cheating when interpersonal impact was not salient,  $F(1, 100) = 5.88, p = .017, \eta_p^2 = .056$  ( $M_{\text{impaired}} = 5.35, SD_{\text{impaired}} = 3.39; M_{\text{not impaired}} = 3.46, SD_{\text{not impaired}} = 3.05$ ). However, when interpersonal impact was salient, cognitive control impairment led to significantly less cheating,  $F(1, 100) = 4.53, p = .036, \eta_p^2 = .043$  ( $M_{\text{impaired}} = 1.08, SD_{\text{impaired}} = 1.72; M_{\text{not impaired}} = 2.73, SD_{\text{not impaired}} = 2.76$ ).

[Insert Figure 4 about here]

**Hypothesis 2 test.** To test Hypothesis 2, we used the moderated path analysis framework (Edwards & Lambert, 2007; Preacher, Rucker, & Hayes, 2007) to examine whether perceived effect on others mediates the moderating effect of the interpersonal impact manipulation on the effect of cognitive control impairment on cheating (see Figure 3 for a visual depiction of the model). Supporting Hypothesis 2, in the first stage of the indirect effect, the interpersonal impact manipulation positively affected perceived effect on others,  $b = 2.64, SE = 0.14, p < .001$ . In the second stage, perceived effect on others significantly moderated the effect of cognitive control impairment on cheating,  $b = -1.36, SE = 0.37, p < .001$ , such that cognitive control impairment led to significantly more cheating when perceived effect on others was 1 SD below the mean (1.48),  $b = 2.07, SE = 0.78, p = .009$ , but significantly less cheating when perceived effect on others was 1 SD above the mean (4.47),  $b = -2.01, SE = 0.78, p = .012$ . We bootstrapped the product of the two paths based on 10,000 random replacements to test whether perceived effect on others was a significant mediator (Edwards & Lambert, 2007; Preacher et al., 2007). The 95%

bias-corrected confidence intervals for the indirect effect did not include zero [-5.323, -1.701], indicating a significant mediation by perceived effect on others (Shrout & Bolger, 2002).

## **Discussion**

Study 3 provided an additional test of our theory in the context of cheating. The results support our theory. Consistent with Hypothesis 1, salience of interpersonal impact moderated the effect of cognitive control impairment on cheating such that cognitive control impairment led to more cheating when interpersonal impact was not salient, but it led to less cheating when interpersonal impact was salient. Thus, Study 3 fully replicated the pattern of simple effects that we proposed in Hypothesis 1 and found in Study 1, but failed to document in its entirety in Study 2. By using a task in which cheating behavior was less detectable, we managed to obtain higher overall rates of cheating, thus avoiding a floor effect that likely affected our results in Study 2.

In addition, Study 3 provided direct evidence for the psychological mechanism implied by our theory. We measured participants' perceived effect on others and we found that it significantly mediated the moderating effect of salience of interpersonal impact on the effect of cognitive control impairment on socially desirable behavior. This result confirms that the interaction between salience of interpersonal impact and cognitive control impairment on socially desirable behavior occurs *because* people become more aware of the effect their actions have on others. Finally, another advantage of Study 3 is that it tested our theory among a more representative sample, thus increasing the confidence in the generalizability of our conclusions.

## **Study 4**

Studies 1–3 manipulated participants' cognitive control to test the idea that the salience of interpersonal impact determines whether people are impulsively self-serving or other-regarding. By impairing participants' cognitive control, we sought to reveal the dominant impulse in situations in which interpersonal impact either was or was not salient.

In Study 4, we tested our theory using a different strategy. Building on the finding that using cognitive control on one task reduces the availability of cognitive control on the subsequent task (Baumeister et al., 1998), we examined how cheating (vs. refraining from cheating) affected

participants' level of cognitive control in a subsequent task (cf. Gino et al., 2011, Study 4, for a similar design).

If the dominant impulse in a given situation is to behave in a self-serving manner, and people need to override this impulse using cognitive control to refrain from cheating, then those who cheat (and thus do not expend cognitive control) should be *more* able to exert cognitive control on a subsequent task. If, on the other hand, the dominant impulse is to behave in an other-regarding manner, and people refrain from cheating unless they use cognitive control to override the impulse, then those who cheat (and thus expend cognitive control) should be *less* able to exert cognitive control on a subsequent task.

Consistent with our theory that the salience of interpersonal impact determines whether the dominant impulse is to behave in a self-serving or other-regarding manner, we expected the opposite effect of cheating (vs. refraining from cheating) on cognitive control as a function of salience of interpersonal impact. Specifically, people who refrain from cheating when interpersonal impact is salient (and the dominant impulse is to behave in a socially desirable manner) should have more cognitive control available on a subsequent task; they will not have had to override their dominant impulse to behave in socially desirable manner. People who refrain from cheating when the interpersonal impact is not salient (and the dominant impulse is to behave in a self-serving manner) should have less cognitive control available on a subsequent task; they will have had to override their impulse to behave self-servingly. We predict:

*Hypothesis 3:* Refraining from cheating (vs. cheating) results in lower levels of cognitive control when interpersonal impact is not salient, but higher levels of cognitive control when interpersonal impact is salient.

## **Method**

**Participants and design.** We recruited 200 participants ( $M_{age} = 31.78$ ,  $SD_{age} = 11.06$ ; 47.00% female) through Amazon's Mechanical Turk. They took part in an online experiment, ostensibly on verbal abilities, in exchange for \$1.00 and an opportunity to win a bonus payment

of \$10. Participants were randomly assigned to conditions of a 2 (interpersonal impact: salient vs. not salient) between-subjects design.

**Procedure and materials.** After logging in and indicating their agreement with the consent form, participants were told that the study consisted of three tasks testing different verbal abilities. They were told that this study design allowed us to study how different verbal abilities are related and how they interact when used in sequence.

**Baseline measure of cognitive control.** The first task purportedly tested word recognition speed. In reality, this was the Stroop (1935) task, which served as a baseline measure of cognitive resources. Consistent with prior research (Gino et al., 2011; Study 4), we measured baseline level of cognitive resources to exclude self-selection as an explanation for the effect of refraining from cheating (vs. cheating) on subsequent level of cognitive resources. Participants were first shown, in sequence, 20 color names displayed in the same color (e.g., “green” printed in green). Next, they were shown 20 color names displayed in a different color (e.g., “green” printed in red). For each color name, they were asked to type the color the word was printed in, ignoring the meaning of the word. The Stroop task is often used as a measure of cognitive control because it requires participants to override their intuitive tendency to attend to the meaning of the word (DeWall, Baumeister, & Vohs, 2008). Consistent with prior research (see MacLeod, 1991, for a review), we operationalized the level of cognitive control as the time difference between the incongruent and congruent trials (the Stroop effect), such that a smaller Stroop effect indicates a higher level of cognitive control.

**Measure of socially desirable behavior and interpersonal impact manipulation.** Next, participants completed the same anagram task used in Study 3. Participants were again told they could win \$10 based on their performance on the task, and winners were again randomly selected. The task contained the same manipulation of interpersonal impact used in Study 3. Specifically, in the *interpersonal impact salient* condition, participants read that all participants are competing for the same bonus and thus that how many anagrams they (mis)reported as solved affected others. In the *interpersonal impact not salient* condition, this was omitted.

**Second measure of cognitive resources.** Finally, participants again completed the same Stroop task as at the beginning of the study.

## Results

Eighty-three out of 200 participants (41.50%) cheated on the anagram task. For subsequent analyses, we computed a variable indicating whether the participant cheated or refrained from cheating.

A 2 (cheated vs. refrained from cheating)  $\times$  2 (interpersonal impact) ANOVA on baseline measure of cognitive resources found no effects ( $ps > .647$ ), excluding self-selection as an explanation for the effect of cheating on subsequent levels of cognitive control.

The same ANOVA, this time performed on the second measure of cognitive resources, found the predicted interaction between cheating (vs. refraining from cheating) and interpersonal impact,  $F(1, 196) = 20.20, p < .001, \eta_p^2 = .093$ . Simple effects analysis found that when interpersonal impact was not salient, refraining from cheating led to a greater Stroop effect, indicating lower levels of cognitive control as a consequence of refraining from cheating,  $F(1, 196) = 12.65, p < .001, \eta_p^2 = .061$  ( $M_{\text{cheaters}} = 14.86, SD = 5.46; M_{\text{non-cheaters}} = 19.79, SD = 6.06$ ). In contrast, when interpersonal impact was salient, cheating led to lower levels of cognitive control,  $F(1, 196) = 8.32, p = .004, \eta_p^2 = .041$  ( $M_{\text{cheaters}} = 19.71, SD = 8.59; M_{\text{non-cheaters}} = 15.45, SD = 7.63$ ). Neither main effect was significant ( $ps > .744$ ).

## Discussion

Study 4 found that when interpersonal impact was not salient, refraining from cheating expended cognitive control, suggesting that the dominant impulse in this situation is to behave self-servingly. People need cognitive control to override the self-serving impulse and refrain from cheating. In contrast, when interpersonal impact was salient, cheating expended cognitive control, suggesting that the dominant impulse in this situation is to behave in an other-regarding manner. Here, people need cognitive control to override the other-regarding impulse to cheat. Using a different testing strategy, Study 4 provides additional evidence for our theory.

### **General Discussion**

Four studies provide support for the theory that salience of interpersonal impact determines the role of cognitive control in socially desirable behavior. Studies 1–3 tested the theory by examining how cognitive control impairment (which makes people less able to override impulses) affects socially desirable behaviors in situations in which interpersonal impact either was or was not salient. Participants whose cognitive control was impaired (and thus for whom impulses were more strongly expressed in behavior) engaged in more socially desirable behavior when interpersonal impact was salient, but in less socially desirable behavior when interpersonal impact was not salient. This pattern of results provides support for our theory that people’s dominant impulse is to behave in an other-regarding manner when interpersonal impact is salient, but in a self-serving manner when interpersonal impact is not salient. In addition, Study 3 provided mediational evidence for the reasoning that these effects occur because of perceived impact on others. Finally, Study 4 tested the same theory using a different strategy. We examined whether refraining (vs. not refraining) from cheating expends cognitive control (as measured on a subsequent Stroop task) when interpersonal impact is (vs. is not) salient. We found that when interpersonal impact was not salient, refraining from cheating resulted in lower levels of cognitive control, suggesting that in this situation the dominant impulse is to cheat, so overriding this response expends cognitive control. In contrast, when interpersonal impact was salient, cheating resulted in lower levels of cognitive control, suggesting that in this situation the dominant impulse is to refrain from cheating, so overriding the other-regarding impulse expends cognitive control. Taken together, these four studies provide support for our theory.

### **Theoretical Implications**

The central contribution of this article is a theoretical and empirical integration of two diverging sets of findings concerning the role of impulses and cognitive control in socially desirable behavior. One set of findings (e.g., Gino et al., 2011; Mead et al., 2009) suggested people are tempted by impulses to behave in a self-serving manner and use cognitive control, the ability to override such impulses, as “the moral muscle” (Baumeister & Exline, 1999, p. 1165), or

the motivator of socially desirable behavior. Another set of findings (e.g., Cornelissen et al., 2011; Zhong, 2011) suggested that an important role in motivating socially desirable behavior belongs to more primitive parts of human psychological machinery, guiding socially desirable behavior through impulses (de Waal, 2006; Haidt, 2001). This research proposed that people experience other-regarding impulses and that cognitive control can be used to override such impulses, allowing people to engage in more self-serving behavior (Cornelissen et al., 2011; Zhong, 2011).

We identified the salience of interpersonal impact as key situational feature that determines whether the dominant impulse is to behave in an other-regarding or self-serving manner, and thus whether cognitive control leads to more or less socially desirable behavior. We extended past research by providing a more nuanced account of psychological mechanisms underlying socially desirable behavior. In contrast to research that suggested all socially desirable behavior results from a successful suppression of self-serving impulses through exertion of cognitive control (Baumeister & Exline, 1999, 2000; Gino et al., 2011; Mead et al., 2009), we show that in some situations the dominant impulse is to behave in a socially desirable manner. In such situations, cognitive control impairment might even lead to more socially desirable behavior, as it reduces people's ability to override other-regarding impulses.

Research emphasizing the importance of impulses in motivating other-regarding behavior (de Waal, 1997, 2006; Haidt, 2001; Haidt & Kesebir, 2010), on the other hand, did not account for the evidence demonstrating the importance of cognitive control in motivating socially desirable behavior. Our research extends this work by explaining when and why cognitive control (rather than just impulses) is needed to motivate socially desirable behavior. Our results indicate that cognitive control is primarily required for socially desirable behavior in situations lacking salient interpersonal impact. In such situations, other-regarding impulses that likely motivated socially desirable behavior in the context of small groups are less likely to be activated.

Finally, our research provides theoretical arguments and empirical evidence showing the salience of interpersonal impact affects socially desirable behavior not just directly, but also

through its interactive role in the effect of cognitive control impairment in socially desirable behavior. Prior work demonstrated that various ways of highlighting social impact lead to more socially desirable behavior (e.g., Jenni & Loewenstein, 1997; Kogut & Ritov, 2005; Pillutla & Chen, 1999). Our manipulation of salience of interpersonal impact is similar to those used in this past work. While we also found that highlighting interpersonal impact leads to more socially desirable behavior (i.e., the main effect of salience of interpersonal impact we found in Studies 1–3), our results extend prior work by showing that the salience of interpersonal impact tempers the negative effects of cognitive control impairment on socially desirable behavior.

### **Practical Implications**

Our research is relevant for the management of ethical behavior in organizations. Ethical decisions in organizations often vary in the salience of interpersonal impact of the decision (Jones, 1991): some decisions have clear implications for other people (e.g., the decision to blame others for one's own mistakes or to knowingly sell inferior products to customers), while other decisions impact other people very indirectly (e.g., the decision to rig inter-bank lending rates or engage in insider trading). The present research shows that organizations should be particularly mindful of contexts in which the interpersonal impact of employees' behavior is not salient (e.g., jobs where the party harmed by employees' behavior cannot be clearly identified). In such work environments, managers might minimize the potential perils of cognitive control impairment and encourage more socially desirable behavior by raising employees' awareness of the ways in which their actions affect other people.

Managers might use several means to increase the salience of interpersonal impact of their employees' behavior. For instance, they could employ targeted corporate communication tools and focus on employees who are working in positions that do not involve much contact with those affected by their work. Such communication could be an effective means of explaining to employees how their behavior at work impacts other people. Managers might also adjust features of employees' job design to increase the level of interpersonal contact with those affected to buffer against the negative effects of cognitive control impairment on socially desirable behavior.

For instance, managers might be able to organize occasional encounters between employees and those affected by their work (e.g., customers, suppliers, etc.), and in that way make interpersonal impact more salient.

Note that the conclusions about managerial implications that we derive are different from and add to those drawn from the view that self-serving impulses are primary in organizational contexts (Gino et al., 2011; Mead et al., 2009). This research suggested that organizations should focus monitoring individuals who are likely to be depleted (Gino et al., 2011). We suggest that organizations can be designed to take advantage of humans' other regarding impulses.

### **Limitations and Directions for Future Research**

Our work has methodological limitations that we would like to acknowledge. First, one might wonder whether our manipulations of the salience of interpersonal impact elicited social comparison processes, rather than just raising concern for others. In our studies, the dependent variable was ostensibly related to performance on a task reflective of participants' ability and thus potentially relevant for participants' self-views. Directing participants' attention to other participants might have motivated them to self-enhance by attempting to outperform others (Chance, Norton, Gino, & Ariely, 2011). In an effort to outperform others, participants might have claimed greater performance than actually attained, thus engaging in less socially desirable behavior. But, we find the opposite effect of our manipulation of the salience of interpersonal impact (i.e., more socially desirable behavior as a result of making interpersonal impact salient), which suggest that social comparison processes are an unlikely explanation for our results. Nevertheless, it would be useful to replicate our results using different manipulations of the salience of interpersonal impact that isolate more effectively the concern for others' wellbeing from social comparison concerns.

We also realize that our manipulation of the salience of interpersonal impact used in Study 1 might have led to demand effects. Directly informing participants about the interpersonal impact of their actions could have signaled to them what the goal of the study was. We are unable to rule out this possibility as we did not administer suspicion checks. We sought to address this

limitation in subsequent studies, which used more subtle manipulations of the salience interpersonal impact, but additional research testing our theory using different manipulations is warranted. We note however, that demand effects cannot be the sole explanation for the differential (i.e., interactive) effect of cognitive control impairment that is the focus of our theory.

Another potential limitation concerns the scope of the theory test we conducted. We tested our theory across two types of socially desirable behaviors: selfish resource distribution decisions and adherence to the standards of ethical conduct. Therefore, generalizing our findings to other types of socially desirable behavior warrants some caution. As our theory emphasizes the relevance of the salience of interpersonal impact for the activation of other-regarding impulses more generally, we expect that the role of cognitive control should similarly vary based on the salience of interpersonal impact in motivating other socially desirable behaviors. Further research is needed to verify this reasoning.

Our theory may not apply to all situations. One important boundary condition of our theory might be the nature of the relationship with those affected by socially desirable behavior. For example, people care less about out-group members than about in-group members. Making it salient that one's behavior has an effect of others should matter less when others are members of out-groups. Consequently, one likely boundary condition of our theory is defined by the psychological closeness with people who are affected by one's behavior (e.g., Aron, Aron, Tudor, & Nelson, 1991; Jones, 1991). Even amongst in-group members, people are likely to be closer to some people than to others; the effect we document should generally be weaker for those with whom one is less close.

Another avenue for future research is to examine whether other factors that have the potential to influence the activation of other-regarding impulses moderate the effect of cognitive control on socially desirable behaviors. For instance, research in moral psychology suggests that acts of commission activate impulsive negative reactions more strongly than do acts of omission (Cushman, Young, & Hauser, 2006). It is possible that cognitive control is more relevant for the regulation of self-serving behavior when such behavior constitutes an omission than when it

constitutes a commission. Exploring moderating conditions other than the salience of interpersonal impact offers the potential to provide a more nuanced account of the motivational factors underlying socially desirable conduct.

### **Conclusion**

This research provides a theoretical and empirical integration of diverging findings on the role of impulses and cognitive control in motivating socially desirable behavior. We identified a key situational factor—the salience of interpersonal impact—that determines whether people are impulsively self-serving or other-regarding, and thus explains how cognitive control affects socially desirable behavior in different situations. People are impulsively other-regarding when their actions have a salient interpersonal impact, but when this condition is not satisfied, the dominant impulse is to engage in self-serving behavior.

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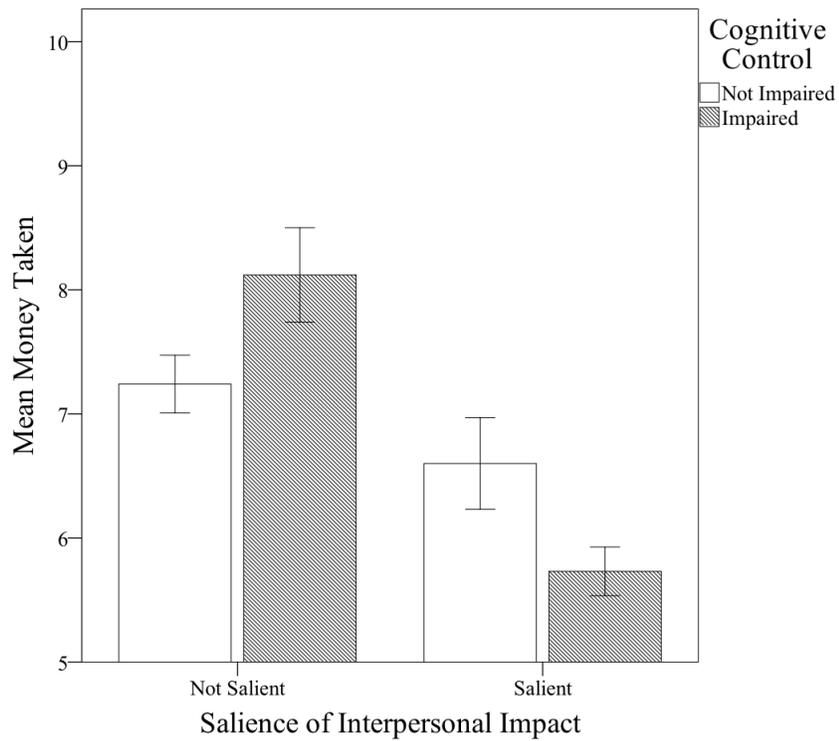
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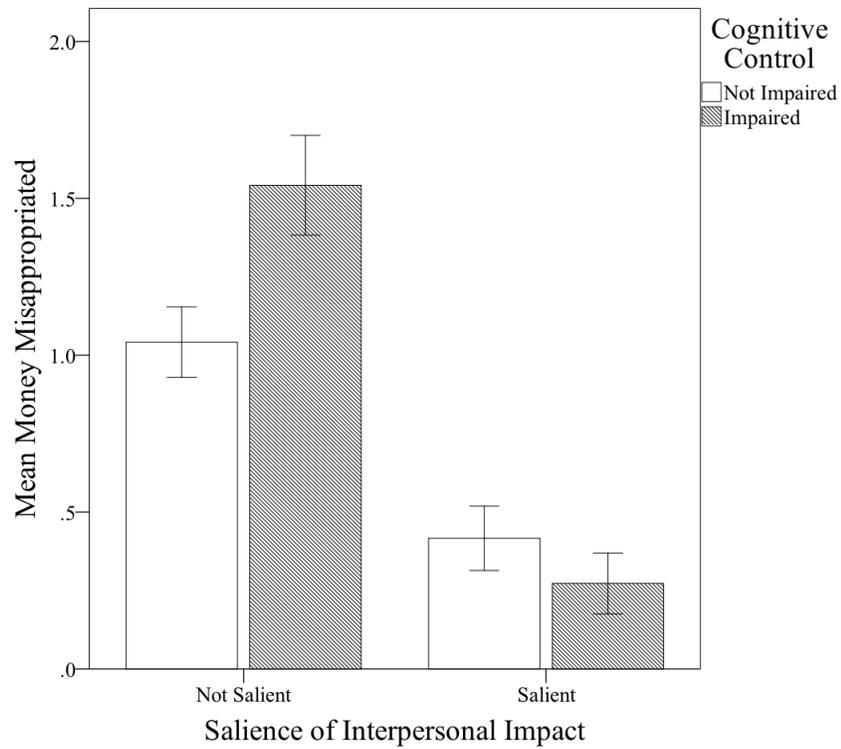
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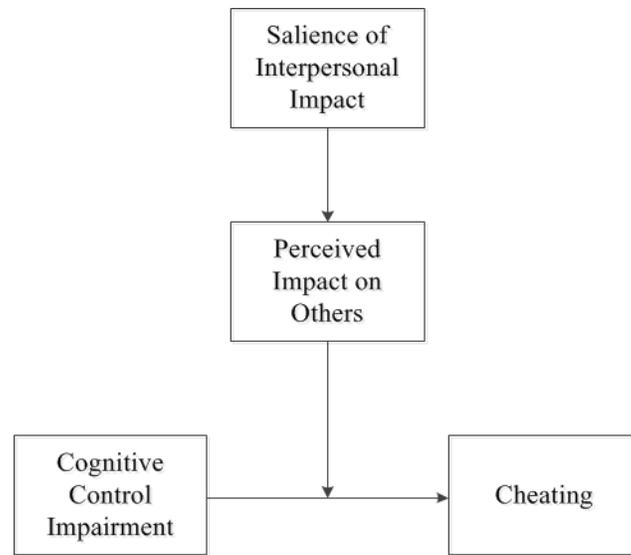
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**Figures**

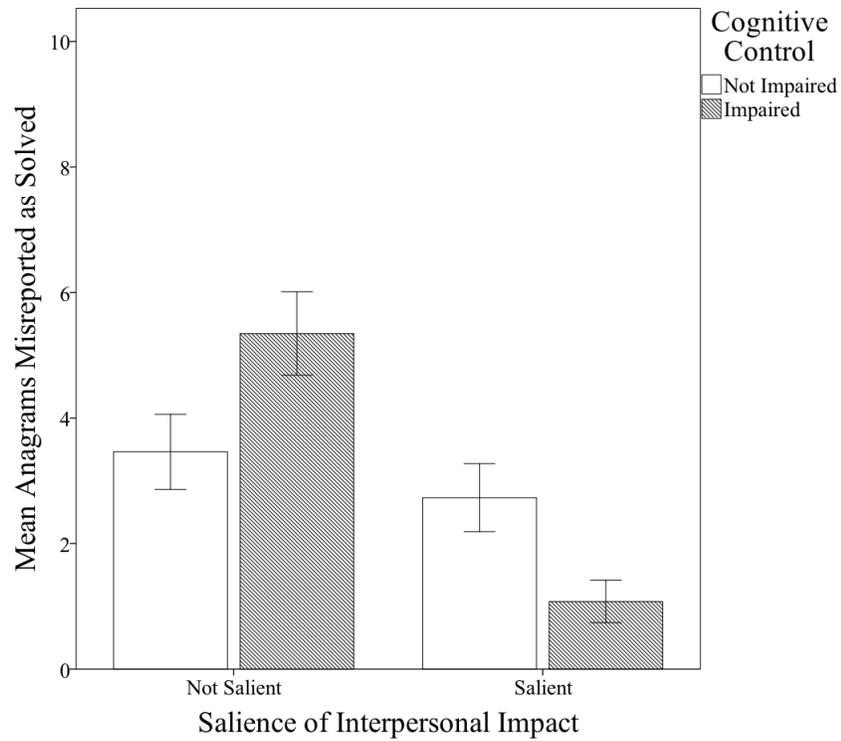
*Figure 1.* Study 1: Salience of interpersonal impact moderates the effect of cognitive control impairment in resource distribution. Error bars represent standard errors.



*Figure 2.* Study 2: Salience of interpersonal impact moderates the effect of cognitive control impairment on cheating. Error bars represent standard errors



*Figure 3.* Study 3: Perceived effect on others mediates the moderating role of salience of interpersonal impact in the effect of cognitive control impairment on socially desirable behavior.



*Figure 4.* Study 3: Salience of interpersonal impact moderates the effect of cognitive control impairment on cheating. Error bars represent standard errors.