CAUSAL UNCERTAINTY AND SELF-REGULATION ABILITIES

By

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ABSTRACT

Causal uncertainty refers to the lack of confidence in one's ability to understand causal relations in the social world (Weary & Edwards, 1994). Relative to people with low causal uncertainty, individuals with high causal uncertainty exhibit enhanced self-regulation performance following a social interaction (Jacobson, Papile, Passey, & Boucher, 2006). The current studies investigated the potential mechanisms underlying this relationship, and the role of self-esteem.

Study 1 investigated whether the social or nonsocial nature of the depleting task and expectations about the need for future self-control could account for the relationship between causal uncertainty and self-regulation ($N = 181$). For the social task, high causally uncertain participants' self-regulation performance was consistent across expectations for future self-control regardless of participant self-esteem. In contrast, low causally uncertain participants' performance improved with increasing instructions to conserve energy for future tasks but only for participants with lower self-esteem. For low causally uncertain participants with higher self-esteem, self-regulation performance decreased with increased expectations for future self-control.

In the nonsocial condition, the findings did not differ by self-esteem. Learning that the future task involved self-control and that the initial task was depleting were both associated with increases in self-regulation for high causally uncertain participants. In contrast, self-regulation abilities did not differ for low causally uncertain participants upon learning that the future task involved self-control and marginally decreased when they learned that the initial task was depleting.

Study 2 examined whether or not self-presentation could account for the relationship between causal uncertainty and self-regulation abilities ($N = 88$). Higher causal uncertainty was associated with better self-regulation performance, but self-presentation goals did not moderate this relationship. Self-esteem did not influence self-regulation performance in this study.

Study 3 investigated whether or not an accuracy goal could account for the relationship between causal uncertainty and self-regulation abilities ($N = 112$). For participants with lower self-esteem, high causally uncertain participants' self-regulation performance was consistent regardless of the goal manipulation; whereas low causally uncertain participants' performance improved with instructions to create accurate impressions of their partner. In contrast, for participants with higher self-esteem, self-regulation did not differ by causal uncertainty or goal conditions.

CO-AUTHORSHIP

I assumed primary responsibility for the execution and analysis of the research reported in this thesis. In recognition of her contribution in the generation of the research questions that were tested and her assistance in the design of the studies, my supervisor, Dr. Jill A. Jacobson, serves as a co-author.

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CHAPTER 1

GENERAL INTRODUCTION

Self-regulation is the process by which people control their thoughts, feelings, and behavior (Baumeister, 2002; Hoyle, 2006). Successful self-regulation is essential to adaptive functioning. It allows people to effectively manage their perceptions of themselves and their surroundings and behave in ways consistent with their personal goals and standards of behavior. Self-regulation failure results in an individual's loss of control over their personal and social experience and a failure to fulfill important goals. Self-regulation is associated with cognitive performance (Neshat-Doost, Dalgleish & Golden, 2008; Robinson, 2007; Schmeichel, Demaree, Robinson, & Pu, 2006; Schmeichel, Vohs, & Baumeister, 2003); academic achievement (Buckner, Mezzacappa, & Beardslee, 2009); mental health and happiness (Buckner, Mezzacappa, & Beardslee, 2009; Robinson, 2007; Tangney, Baumeister, & Boone, 2004); resistance to persuasion (Wheeler, Briñol, & Hermann, 2007); and stereotype suppression (Gailliot, Peruche, Plant, & Baumeister, 2009; Gailliot, Plant, Butz, & Baumeister, 2007). It is also associated with aggression (Dewall, Baumeister, Stillman, & Gailliot, 2007; Meier, Wilkowski, & Robinson, 2008; Stucke & Baumeister, 2006); problem behavior (Buckner, Mezzacappa, & Beardslee, 2009); risky behaviors and the perceived benefits associated with them (Magar, Philips & Hosie, 2008); drinking (Muraven, Collins, Morsheimer, Shiffman, & Paty, 2005; Muraven, Collins, & Neinhaus, 2002); smoking cessation (O'Connell, Schwartz & Shiffman, 2008); diet and health behavior (Kahan, Polivy, & Herman, 2003; Papies, Stroebe, & Aarts, 2008; Vohs & Heatherton, 2000); and coping with distressing life events or thoughts (Buckner, Mezzacappa, & Beardslee, 2009;

Gailliot, Schmeichel, & Baumeister, 2006). Consequently, discovering predictors of successful self-regulation is an important and promising area of research (Baumeister, Gailliot, Dewall, & Oaten, 2006; Hoyle, 2006).

The Strength Model

Baumeister, Bratslavsky, Muraven, and Tice (1998) proposed that seemingly different and unrelated acts of volition share a common and limited resource. According to their strength model of self-regulation, people have a limited capacity for self-control, and exertion of self-control strength or energy is followed by a period of diminished capacity (Muraven, Tice, & Baumeister, 1998). That is, self-regulating for one task will result in a subsequent depletion in self-regulation ability.

The strength model has several assumptions (Muraven & Baumeister, 2000): 1) all acts of volition and self-control require strength; 2) people have a finite resource for self-control that can be depleted; 3) all operations of self-control draw on the same resource; 4) success or failure of self-control depends on one's self-control strength; and 5) self-control strength is expended in any self-control process, reducing the strength available for subsequent tasks. Likely large individual differences exist in the basic capacity for self-regulation, and a person's reservoir of strength may be improved over time by frequent exertion of self-control (Muraven & Baumeister, 2000). The strength model provides a compelling explanation for the difficulties experienced in self-regulating multiple behaviors. That is, inhibition of one behavior decreases the resources available for inhibiting other behaviors or coping with other stressors, which results in inhibition failure (Heatherton & Vohs, 1998).

Baumeister and his colleagues have conducted several studies demonstrating support for the strength model. For example, participants who regulated their emotions while watching distressing videos exhibited poorer performance when squeezing a hand grip (Study 1), and participants who suppressed thoughts about an arbitrary stimulus persisted less on subsequent unsolvable anagrams (Study 2; Muraven et al., 1998). In another series of experiments, participants instructed to eat radishes gave up on solving figure tracing problems sooner (Study 1), and participants who regulated their emotions while watching sad or amusing videos performed worse on solvable anagrams (Study 3; Baumeister, Bratslavsky, Muraven, & Tice, 1998). In addition, several studies have demonstrated that self-regulation resulted in diminished performance on tasks requiring controlled information processing tasks but not basic information processing (Schmeichel et al., 2003). Furthermore, several studies show that making a choice, which requires volition, also results in diminished self-regulation abilities (Baumeister et al., 1998; Moller, Deci, & Ryan, 2006; Vohs et al., 2008).

The occurrence of self-regulation depletion is strongly influenced by expectations about the need for self-control in the future (Muraven, Shmueli, & Burkley, 2006) and about how self-control works (Martijn, Tenbült, Merckelbach, Dreezens, & de Vries, 2002). Muraven and colleagues (2006) found that anticipation of a future self-control task (compared with anticipation of a future non-self-control task and a control condition) resulted in less self-regulation during an initial task and higher ratings of the importance to conserve energy for a remaining task. Thus, expecting to need control in the future should heighten the motivation to conserve self-regulatory strength, resulting in less effort expenditure during the self-regulation depleting task and leaving more resources

available for the assessment task. In addition, Martijin et al. (2002) showed individuals'
susceptibility to regulatory depletion was strongly influenced by their expectations about
how energy expenditure on one task would affect another.

Self-Regulation and Social Relationships

Baumeister, DeWall, Ciarocco, and Twenge (2005) and Rawn and Vohs (2006)
contend that successful self-regulation is essential for success in interpersonal
relationships (but see Rawn, Vohs, & Lehman, 2006, for evidence that losing self-control
is occasionally associated with social success). That is, people's ability to control their
own impulses strongly and positively predicts their success at appearing to be and
actually behaving as a good relationship partner. Several studies have shown that children
who are better at self-control (e.g., delay of gratification) are liked more (e.g., Maszk,
Eisenberg, & Guthrie, 1999) and are more socially skilled (e.g., Buckner et al., 2009;
Eisenberg et al., 1997). In adults, Tangney et al. (2004) found that greater self-control
was related to better social skills and relationships, higher empathy, and a secure
attachment style. Likewise, individuals with interdependent self-construals or high in
other directed self-monitoring (i.e., people who should be more attuned to others)
experience less self-regulation depletion in general (Seeley & Gardner, 2003).

The reverse has also been found such that people who are depleted have more
social difficulties. For example, in Finkel and Campbell (2001), self-regulation depleted
participants were less accommodating and less constructive in their reactions to romantic
partners. In other research, self-regulation depletion has resulted in more negative
perceptions of others (Stucke et al., 2006) and significant increases in aggressive
behaviors toward others (Dewall et al., 2007).

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Managing difficult interpersonal situations also can lead to subsequent impairments in self-control (Finkel, Campbell, Brunell, Dalton, Scarbeck, & Chartrand, 2006). For instance, in Ciarocco, Sommer, and Baumeister (2001), participants who consistently ignored a confederate (rather than speaking freely) gave up more easily when subsequently attempting an unsolvable puzzle or squeezing a handgrip. In addition, Richeson and colleagues (Richeson & Shelton, 2007; Richeson & Trawalter, 2005) have demonstrated that interracial social situations increase the self-regulatory demands of dyadic interactions yielding greater self-regulation failure. Furthermore, work by Inzlicht, McKay, and Aronson (2006) shows that sensitivity to stigma increases self-regulation depletion. Recent research by Gailliot and colleagues (2009) demonstrated that participants who had consumed glucose, which should provide an increase in the energy available for self-regulation processes, used fewer stereotypes when writing an essay about a gay man than did participants who had not received a boost to their self-regulatory resources. Furthermore, high prejudice participants in the high resource (glucose) condition used fewer derogatory statements in their essays than did high prejudice participants in the control condition. Thus, high self-regulation resources and abilities seem to be associated with more positive social interactions.

However, some research demonstrates that a loss of self-control or failure to self-regulate is occasionally associated with social success (Rawn et al., 2006), particularly when the regulatory strategies used may be maladaptive (Apfelbaum & Sommers, 2009). For example, in a study of contentious intergroup interactions by Apfelbaum and Sommers (2009), European-American participants who discussed approaches to campus diversity with an African-American partner following an ego depletion task enjoyed the

interaction more, exhibited less inhibited behavior, and seemed less prejudiced to African-American observers than did non-depleted participants. Consequently, these researchers suggest that self-regulation depletion may facilitate positive interpersonal outcomes.

In addition to the work demonstrating the relationship between self-regulation ability and social success or failure, several studies by Baumeister and colleagues (Baumeister & Dewall, 2005; Baumeister et al., 2005; Twenge, Catanese, & Baumeister, 2002) have established that experiences of social rejection result in self-regulation failures. For example, Baumeister et al. (2005) found that not being chosen by anyone as a partner resulted in higher cookie consumption (Study 2) and that receiving feedback that one can expect a future of loneliness resulted in less subsequent drinking of a healthy but bad tasting beverage (Study 1); less persistence on an unsolvable puzzle tracing task (Study 3); and worse performance on a dichotic listening task (Study 4). Perhaps people may become unwilling to self-regulate following social rejection because self-control seems an ineffective strategy (Baumeister et al., 2005). Indeed, in a study by DeWall, Baumeister, and Vohs (2008), rejected participants performed worse than accepted participants on self-regulation tasks, but these differences were eliminated when the self-regulation task was ostensibly diagnostic of the ability to get along well with others. Accepted participants performed better on self-regulation tasks, but they seemed unwilling to exert the effort to self-regulate if the task would ostensibly gain social acceptance they had already obtained.

Self-Regulation and Personality: The Case of Causal Uncertainty

To date, little research has investigated self-regulation failure as a feature of personality or how personality is reflected in self-regulation (Hoyle, 2006). Still, Baumeister and colleagues (2006) argue that self-regulation is one of the most important aspects of personality, and that the links between traits and behavior can be moderated by self-regulation and its depletion, specifically.

For example, recent work on causal uncertainty has examined the role of self-regulation in understanding this construct. Causal uncertainty refers to a person's level of confidence about his or her ability to fully understand causal relations in the social world (Weary & Edwards, 1994b). According to Weary and Edwards (1994a), causal uncertainty is made up of two components: causal uncertainty beliefs and causal uncertainty feelings. Causal uncertainty beliefs are generalized self-constructs about one's uncertain aptitude for understanding or detecting causal relations. Presumably, everyone has experienced some level of causal uncertainty at some point in their lives as everyone encounters situations where the cause is ambiguous. However, such beliefs are likely to be more global and accessible and, consequently, more likely to influence behavior of some people more than others. Causal uncertainty feelings are meta-cognitive feelings of confusion, surprise, and puzzlement that automatically follow causal uncertainty beliefs. These feelings provide a cue signaling an individual that his or her knowledge is inadequate.

To clarify these ideas, consider a person who expects to receive an invitation to a party but does not receive one. The individual expecting the invitation may come up with several possible reasons why she was not invited, such as the host for the party did not want her to come, believed that she could not attend the party, had asked someone else to

invite her, or had forgotten to invite her. This person may begin to question whether or not she knows why she was not invited (causal uncertainty beliefs). These beliefs then may lead to feelings of doubt about why she was excluded (causal uncertainty feelings).

According to Weary and Edwards' (1994a) causal uncertainty model, causal uncertainty beliefs become activated in response to information relevant to causal analyses or expectations of uncontrollability, and belief activation has two consequences. The first is the adoption of a subjective accuracy goal or sense that one understands the social world. This accuracy goal is a motive to reduce uncertainty by decreasing the discrepancy between one's current and desired states of knowledge. The knowledge discrepancy is amplified by each person's own error sensitivity, such that the higher an individual's sensitivity, the more salient the error. In other words, a reduction in knowledge discrepancy, and thus a reduction in causal uncertainty, will be more important for some people or in some situations than others. For example, higher levels of error sensitivity may result when understanding causal relationships is necessary to avoid serious consequences or in situations of self-focused attention. The second consequence of belief activation is a more extensive, effortful, vigilant, and complex search for and processing of information that may plausibly afford them greater understanding and ability to predict and control their environments. These actions will continue until the discrepancy is no longer detected or until the individual disengages from the task.

Individuals with chronic control loss expectations should possess more accessible and global causal uncertainty beliefs because lack of control may lead to doubt regarding one's understanding of cause-and-effect relationships (Weary & Edwards, 1994a; Weary

& Edwards, 1996; Weary, Marsh, Gleicher, & Edwards, 1993). Indeed, Jacobson, Weary, and Edwards (1999) found that frequently experiencing feelings of uncontrollability led to more chronic or readily accessible causal uncertainty beliefs six weeks later. They also found that causal uncertainty predicted increases in perceived control loss over time.

Thus, causal uncertainty and perceptions of control are interrelated but are not identical constructs (Edwards & Weary, 1998). A person may perceive a lack of control over an event, but at the same time, he or she may be certain of the causes of the event. Likewise, causal uncertainty is only moderately related to other control constructs like locus of control (Weary & Edwards, 1994b; Edwards & Weary, 1998). People who are causally uncertain do not necessarily attribute the causes of events to internal or external sources, and people with an external locus of control may be quite sure about the causes of events.

Causal uncertainty and its relationship to other constructs have been investigated by Weary and her colleagues (e.g., Weary & Edwards, 1994b). These researchers have consistently demonstrated a moderate positive association between causal uncertainty and both depression and trait anxiety (Weary & Edwards, 1994b) as well as neuroticism (Edwards, Weary, & Reich, 1998). Previous research also has revealed negative moderate relationships to self-esteem, need for cognition, and decisiveness (Weary & Edwards, 1994b). Causal uncertainty has been shown to be specific to one's ability to understand causal relations (Weary & Edwards, 1994b) and is, therefore, distinguishable from general self-doubt (Oleson, Poehlmann, Yost, Lynch, & Arkin, 2000).

Another construct with a similar name, uncertainty orientation, is also conceptually different from causal uncertainty (Weary & Edwards, 1994b). People with

uncertainty orientation attend to and seek out situations affording an opportunity to achieve greater clarity about the self and the environment. Conversely, people with certainty orientation are motivated by situations likely to maintain clarity. Causal uncertainty applies only to social events and involves a reactive process; whereas uncertainty orientation applies to all situations and is proactive. Furthermore, all people have causal uncertainty beliefs and feelings. Individual differences lie in the ease of activation of these beliefs and feelings and the responses they initiate. In contrast, uncertainty orientation represents a difference in how people cope with uncertainty regarding situational outcomes; some motivated by certainty, and others motivated by uncertainty. In addition, Walker and Sorrentino (2005) found that the relationship between causal uncertainty and uncertainty orientation to be extremely low (rs = -.07 and -.10).

Cognitive and Social Concomitants and Consequences of Causal Uncertainty

Most research on causal uncertainty has focused on the social-cognitive consequences. For example, Jacobson, Weary, and Lin (2008) found that high causally uncertain participants engaged in greater information processing than did low causally uncertain participants. Specifically, participants read behaviors performed by a person to form an impression of him or her and were told to stop reading when they were confident they had sufficient information about the target individual. High causally uncertain participants read more information and for a longer time than did low causally uncertain participants, indicating that they needed to process more information to relieve their uncertainty.

In Weary and Jacobson (1997), high and low causally uncertain people were randomly assigned to interview either a member of their gender in-group or out-group. They also were told either that they were accountable for their judgments (which would increase error sensitivity) or were given no additional information. When they were accountable for their judgments of an out-group member (i.e., someone who should be more uncertainty provoking due to lack of familiarity), high causally uncertain participants asked more diagnostic-seeking questions than did low causally uncertain participants. That is, due to their accuracy goal, the high causally uncertain people attempted to improve their understanding and lower their uncertainty by seeking additional clarifying information.

As a result of their more thoughtful and systematic processing of social information, high causally uncertain people evidence less stereotype usage on target judgments than do low causally uncertain people, even when controlling for the participant's levels of perceived control, need for cognition, affect, and depression (Weary, Jacobson, Edwards, & Tobin, 2001). High causally uncertain people also are more empathically accurate in judging another's thoughts and feelings in both face-to-face (Currie, 2005) and computer-mediated communications (Bondy, 2005). Furthermore, they are more likely to adjust their dispositional inferences for a target's behavior (Weary, Vaughn, Stewart, & Edwards, 2006). Finally causal uncertainty is positively correlated with greater emotion recognition (Harkness, Sabbagh, Jacobson, Chowdry, & Chen, 2005).

Despite these apparent social-cognitive benefits, causal uncertainty has been positively associated with interpersonal problems such as loneliness and shyness

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(Jacobson, Weary, & Chakroborti, 1997). Causal uncertainty is also positively associated with reassurance-seeking behavior, which has been linked to greater social rejection (Jacobson, 2007; Jacobson & Weary, 1999). Moreover, it mediates the relationship between reassurance seeking and depression. In addition, recent research demonstrates that high causally uncertain individuals are more likely to experience roommate rejection (Jacobson, Passey, & Rytwinski, 2009; Passey, 2006) as well as more extreme reactions to experimentally induced rejection experiences (Passey, 2006). The reasons for causally uncertain people's social difficulties, however, remain unclear. If explanations for the influence of causal uncertainty on social difficulties could be determined, then perhaps interventions could be generated to assist causally uncertain people in their social interactions, thus reducing their likelihood of experiencing further interpersonal problems. Examining the relationship between causal uncertainty and self-regulation abilities may clarify the reasons for causally uncertain people's interpersonal difficulties.

In accord with Hoyle's (2006) suggestion that more research is required to examine the relationship between personality and self-regulation, and the advice of Baumeister et al. (2006) to investigate self-regulation abilities to better understand individual differences in behavior, Jacobson, Papile, Passey, and Boucher (2006) studied the relationship between causal uncertainty and self-regulation depletion following dyadic social interactions. In one study with same-sex strangers (Study 1) and one with roommates (Study 2), participants engaged in conversations about mild-to-moderately distressing personal problems. The self-regulation depletion assessment in both studies was the amount of time they could squeeze a handgrip before versus after a conversation.

In Study 1 ($n = 128$), self-regulation performance was regressed onto causal uncertainty scores, participant's role in the conversation (either speaker or listener), gender of the dyad, and all of the interactions. Greater causal uncertainty was associated with better handgrip performance, and women demonstrated more self-regulation depletion than did men. However, these main effects were qualified by a causal uncertainty X gender interaction, such that the difference between men and women's self-regulation performance was only observed at high levels of causal uncertainty. In Study 2 ($n = 102$), using the same analysis, greater causal uncertainty was associated with better handgrip performance. Thus in both studies, greater causal uncertainty was associated with less regulatory depletion. That is, following a face-to-face social interaction that should be self-regulation depleting, high causally uncertain people exhibited more self-regulation abilities than did low causally uncertain people. As self-regulation is associated with social success (Tangney et al., 2004), and causally uncertain people experience social difficulties (e.g., Passey, 2006), the findings of these two studies seem to present a paradox.

The Current Studies

Although Jacobson et al.'s (2006) research established that high causally uncertain people exhibit enhanced self-regulation performance following a social interaction, it did not determine the mechanism behind this somewhat paradoxical finding. Several possible explanations exist. First, the previous studies always used an initial social task. Perhaps high causally uncertain people, who also are more likely to be socially rejected (Passey, 2006), have come to believe that self-regulating during social interactions is fruitless. Hence, they are less depleted by such activities. Therefore, they

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may choose to direct their efforts to the more controllable self-regulation task because they have learned over time that expending energy in social interactions leads to unpredictable, and possibly undesirable, outcomes. Second, in the earlier studies, high casually uncertain people may have performed better than low causally uncertain people did because during the initial social task, they were trying to conserve their energies for future activities. As a result, high causally uncertain people had more energy remaining for the self-regulation assessment (cf. Baumeister, Muraven, & Tice, 2000).

High causally uncertain people also may have performed better than low causally uncertain people because they engage in less self-presentation during the social interaction. Self-presentation, or attempting to present oneself in a positive light, is in itself self-regulation depleting (Vohs, Baumeister, & Ciarocco, 2005). Thus, if low causally uncertain people are engaging in more self-presentation than high causally uncertain people do, they would be using more self-regulation strength and, consequently, perform worse on the subsequent self-regulation task. Finally, high causally uncertain people may exhibit reduced self-regulation depletion compared to low causally uncertain people due to more vigilant social information processing. Perhaps high causally uncertain people are more focused on creating an accurate representation of their social interaction partners, and for this reason, they do not self-regulate their own behavior to the same extent, thereby expending less self-regulatory strength.

In the following three studies, I examined these four possible explanations. More specifically, I investigated if the influence of causal uncertainty on self-regulation performance results from: expectations about engaging in future self-regulation following social or nonsocial self-regulation depleting tasks (Study 1); variations in self-

presentation (Study 2); or heightened goals for accurate social perception (Study 3). All participants engaged in a self-regulation depleting task that involved reporting or discussing a mild-to-moderately distressing personal problem. Participant performance on a series of anagrams (Study 1 and 3) or a difficult retyping task (Study 2) served as the measures of self-regulation ability.

Only women were recruited to participate in these studies for several reasons. First, Seeley and Gardner (2003) and Jacobson et al. (2006) demonstrated that women experienced more self-regulation depletion than did men. Second, the participant pool and the available confederates for the study were predominantly women. Third, in looking at same-sex interactions, we could reduce most concerns regarding sexual attraction between the participant and confederate as an explanation and avoid any increase in causal uncertainty effects due to interacting with an out-group member (cf. Weary & Jacobson, 1997).

I also included a measure of self-esteem in these studies for several reasons. First, Weary and Edwards (1994b) reported a significant association between causal uncertainty and self-esteem, such that higher causal uncertainty was associated with lower self-esteem ($r = -.40$). Second, these studies were some of the first investigations of causal uncertainty conducted in an interpersonal context. Self-esteem is associated with interpersonal success and the degree to which people believe that they are approved of and accepted by others (Leary & MacDonald, 2003; Leary, Tambor, Terdal, & Downs, 1995). In the current studies, participants' self-esteem may be influenced by the self-regulation depletion task (either enhanced because of the social nature or diminished by the distressing content). Third, some studies have demonstrated associations between

self-regulation ability and self-esteem (Baumeister, Heatherton, & Tice, 1993; Lambird & Mann, 2006; Vohs et al., 2005). Finally, recent research by Schmeichel and Vohs (2009) showed that self-affirmation facilitates self-control under depleted conditions, and that self-affirmation reduced the likelihood of self-control failure. Although the social interactions involved in the present studies were not self-affirmation tasks per se, discussing a personal problem may have allowed the participants to express their core values, which was the focus of the self-affirmation tasks in the Schmeichel and Vohs' studies. Therefore, I wanted to rule out the possibility that the effects of causal uncertainty on self-regulation following social interactions was actually due to self-esteem and investigate the possibility that the relationship between causal uncertainty self-regulation abilities may differ for high vs. low self-esteem individuals.

CHAPTER 2

STUDY 1: EXPECTATIONS OF FUTURE SELF-CONTROL FOLLOWING

SOCIAL AND NONSOCIAL TASKS

In the studies by Jacobson et al. (2006), high causally uncertain people may have performed better on the hand-grip task because of the social nature of the initial task. Previous studies by Baumeister and colleagues (Baumeister & DeWall, 2005; Baumeister et al., 2005; Ciarocco et al., 2001) have established that social rejection results in self-regulation failures (although see DeWall et al., 2008 for a study demonstrating that accepted participants will fail to self-regulate if the task ostensibly will fulfill the drive for social acceptance that they have already satisfied). Recent evidence suggests that high causally uncertain people experience social rejection more often than do low causally uncertain people (Jacobson et al., 2009; Passey, 2006), and they experience more extreme reactions to experimentally induced rejection experiences (i.e., less belonging and more negative affect) than do low causally uncertain participants (Passey, 2006). In a recent study by Passey, Jacobson, Edwards, and Hickey (2008), higher causal uncertainty was associated with more rejection sensitivity in men and women and was further associated with less attachment security in women. High causally uncertain participants chronic exposure to rejection could lead high causally uncertain people to believe that self-regulating during social interactions is fruitless. During social encounters, high causally uncertain people may fail to engage in effortful self-regulation (or not self-regulate at all), and hence, they are less depleted by such activities. As a result, high causally uncertain people have more energy remaining for a subsequent self-regulation task. Therefore, in

this study, I varied the social nature of the initial task to determine if the superior self-regulation ability following social tasks is replicated following nonsocial tasks.

Alternatively, high causally uncertain people may have performed better on the self-regulation assessment because they were better at conserving their energies during the social interaction than were low causally uncertain people. This explanation would be consistent with previous research demonstrating that different expectations regarding the future need for self-regulation (Baumeister et al., 2000; Muraven et al., 2006) and different theories of how self-regulation works (Martijn et al., 2002) influence self-regulation depletion. High causally uncertain people may have anticipated a future need for self-control and that self-control exertion on the social task would be depleting thus leaving fewer resources remaining for the subsequent tasks. Having these expectations, high causally uncertain people may have chosen not to exert much energy during the social interaction, conserving their energies for future tasks. Hence, they performed better on the subsequent self-regulation task.

In Study 1, I investigated if the social or nonsocial nature of the depleting task and expectations about the need for future self-control could account for the relationship between causal uncertainty and self-regulation abilities. I manipulated whether participants engaged in a social self-regulation depleting task (discussion of a mild-to-moderately distressing personal problem) or a nonsocial self-regulation depleting task (thought suppression task while reading their own mild-to-moderately distressing personal problem aloud). I also varied participants' expectations about the future need for self-control and the depleting nature of the initial task.

In the social condition, high causally uncertain participants' experiences with rejection may make them unwilling to engage in effortful self-regulation during the personal problem task, thus resulting in more self-regulation resources available for subsequent tasks than for low causally uncertain people. Whereas high causally uncertain participants will conserve their energies, low causally uncertain participants will not do so unless given instructions indicating the benefit of conserving self-regulatory resources for future tasks. That is, in the social condition, high causally uncertain participants' performance on subsequent self-regulation tasks following the depleting personal problem task would be consistent across different levels of expectations for future self-control. In contrast, low causally uncertain participants' performance on subsequent self-regulation tasks following the depleting personal problem task would improve with increasing instructions to conserve energy for future tasks.

I also examined the previously unstudied relationship of causal uncertainty to self-regulation abilities following nonsocial tasks and if self-esteem accounts for or moderates the causal uncertainty-self-regulation relationship.

Method

Participants

Two hundred and two women from an introductory psychology class at Queen's University participated in this study. Participants' mean age was 18.37 years ($SD = 1.64$), ranging from 17 to 31 years. Participants received 1.0% towards their introductory psychology grade for their participation.

In a post-experimental measure of suspiciousness, 5 participants reported knowing that their conversation partner was a confederate, and 16 participants incorrectly

reported that the anagrams were unsolvable. Thus these 21 participants were excluded from the final analyses.[1,2] Consequently, the final sample of 181 participants (90% of original sample) had a mean age of 18.38 years ($SD = 1.69$), ranging from 17 to 31 years.

Materials (See Appendix A for all Study 1 experimental materials)[3]

Causal Uncertainty Scale. Participants completed the Causal Uncertainty Scale (CUS; Weary & Edwards, 1994b) during a prescreening session at the beginning of the school year. This method provided me with an assessment of causal uncertainty that was untainted by the tasks in the experiment. This scale assesses individual differences in the strength and frequency of causal uncertainty beliefs. It is composed of 14 items (e.g., "When things go right, I generally do not know what to do to keep them that way" and "I do not know what it takes to get along well with others"). Participants respond to each item using a 6-point scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). A total score is calculated by summing across the items, and higher scores indicate greater causal uncertainty. This scale has high internal consistency (Cronbach's alpha = .83) and six-week test-retest reliability ranging from .62 to .80 (Edwards & Weary, 1998; Jacobson et al., 1999).

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[1] Knowing that their conversation partner was part of the study may not have activated causal uncertainty beliefs and feelings in participants the same way as having a conversation with an actual other participant would because participants would expect that the confederate's behavior would be determined by the experiment and, therefore, not have been motivated to understand the confederate. Also, this knowledge could have influenced the amount of self-regulation that participants employed in controlling their own behavior during the conversation. In addition, as the dependent variable was performance on the anagram task, believing that the anagrams were unsolvable likely would have reduced participants' willingness to persist at that difficult task, thus obscuring the measurement of their self-regulation abilities.

[2] Excluded participants fell into all 8 cells of the study. Participants were excluded from the nonsocial ($n = 11$) and social conditions ($n = 10$), respectively. Also, participants were removed from the control (n = 3), expect no future self-control ($n = 6$), expect future self-control ($n = 5$), and expect future self-control with depletion conditions ($n = 7$), respectively. Chi-square analyses indicated no significant differences in the proportions of participants in the original and final samples for the type of task conditions, $\chi^2(1) = 0.05$, $p = .83$, or for the expectations conditions, $\chi^2(3) = 1.67$, $p = .64$. The samples also did not differ on Causal Uncertainty Scale scores, $t(200) = -0.79$, $p = .43$; Self-Esteem Questionnaire scores, $t(200) = 1.11$, $p = .27$; or age, $t(200) = 0.24$, $p = .81$.

[3] Iterated principal axis factor analyses supported a one-factor structure for the Causal Uncertainty Scale and Self-Esteem Questionnaire within my sample.

The CUS also had good internal consistency in the current sample ($\alpha = .86$). Participants had a mean score of 36.67 ($SD = 10.20$), ranging from 14 to 67. These scores were typical of previous research (e.g., Weary et al., 2001). To determine if participants' scores on the CUS differed according to their type of task or expectations conditions, I conducted a 2 (type of task) X 4 (expectations) ANOVA. CUS scores did not significantly differ by expectations condition ($ps > .57$); however, participant scores did differ by type of task, $F(1, 173) = 5.41$, $p = .02$, such that the participants in the social condition ($M = 38.41$, $SD = 10.23$) had higher CUS scores than the participants in the nonsocial condition ($M = 34.83$, $SD = 9.89$). As the CUS was completed several weeks before the experiment, this difference on the CUS between conditions could not be due to the experiment but instead from an unforeseen failure of randomization[4].

Self-Esteem Questionnaire. Because of the social nature of the tasks, and because previous studies have demonstrated relationships between self-esteem and self-regulation abilities (Lambird & Mann, 2006) and causal uncertainty (Weary & Edwards, 1994b), respectively, I included self-esteem in this study. Rosenberg's Self-Esteem Questionnaire (SEQ; Rosenberg, 1965) is a 10-item questionnaire completed by the participants with regard to their feelings about themselves. Sample items include, "I see myself as a person of worth, at least on an equal basis with others," and "At times, I think I am no good at all." Each item is scored on a 4-point scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). Negatively worded items were reverse coded, and a total score was

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[4] In all three studies, participants were randomly assigned to condition upon arrival at the laboratory for their experimental session. For each study, a randomization program was used to create a randomized list of conditions. Blocking was used for each list in order to maintain an equal number of participants per condition. That is, one participant was assigned to each of the conditions before a second participant was assigned to any condition. When a participant arrived at the laboratory, the experimenter assigned them to the next condition on the list.

calculated by summing across items with higher scores indicating higher self-esteem. The SEQ has high internal consistency (Cronbach's alpha = .83; Rosenberg, 1965).

The SEQ also had good internal consistency in the current sample (α = .89). Participants had a mean score of 29.62 (*SD* = 5.20), ranging from 10 to 40. These scores were typical of previous research (e.g., Schmitt & Allik, 2005). To determine if participants' scores on the SEQ differed according to their type of task or expectations conditions, I conducted a 2 (type of task) X 4 (expectations) ANOVA. SEQ scores did not significantly differ by expectations condition (*ps* > .75); however, participant scores did marginally differ by type of task, $F(1, 173) = 3.56$, $p = .06$, such that the participants in the social condition (*M* = 30.31, *SD* = 4.79) had slightly higher SEQ scores than did the participants in the nonsocial condition (*M* = 28.90, *SD* = 5.54). The SEQ was completed at the experimental session after the personal problem task. Therefore, discussing their personal problem with the confederate may have raised self-esteem scores for the participants in the social condition relative to the scores of those in the nonsocial condition. A prescreening measure of self-esteem was not available for any of the three data sets, so the SEQ scores from the experimental sessions were used in all analyses.

Procedure

At a prescreening session held at the beginning of the school year, introductory psychology students at Queen's University completed the CUS as well as some general questions about themselves (e.g., gender, age, etc.). Women who completed the prescreening materials were contacted by email or telephone and given the opportunity to participate in a study on the influence of personality variables on motivation and

interactions with others.

Upon arrival at the laboratory, participants read and signed a consent form before being randomly assigned to one of eight conditions representing the manipulation of the two independent variables. The first variable was the type of task with 93 participants completing the social task used by Jacobson and colleagues (2006), and 88 participants completing the nonsocial task previously adapted from Baumeister and colleagues (Muraven, Baumeister, & Tice, 1999; Vohs et al., 2005; Vohs & Schmeichel, 2003). Both tasks were designed to deplete self-regulatory resources. All participants wrote down a mild to moderately distressing personal problem of their choosing. The participants who completed the social task then discussed their personal problem with a woman they believed to be another participant. In reality, this conversation partner was a confederate. The participants who completed the nonsocial task read their personal problem aloud to themselves (to make it as similar to the conversation as possible) while simultaneously trying to "not think about a white bear."

The second manipulation was the expectations regarding further need for self-control, and it had four levels. This manipulation was a combination of those used by Martijn et al. (2002) and Muraven et al. (2006). These expectations were manipulated before the participants completed either the social or nonsocial self-regulation depletion task. Forty-nine participants were given no additional instructions before completing the self-regulation task (control condition). Forty-seven participants were told that following the initial task they also would be required to complete 8-letter anagrams. These participants did not know about the time limit, but they did learn that the task did not require self-control strength (expect no future self-control condition). Forty-one

participants were told that following the initial task, they would be required to complete a series of 8-letter anagrams in a limited amount of time and that completing these anagrams would require self-control strength (expect future self-control condition). Finally, 44 participants were told about the anagrams task and the time limit. They also learned that the initial self-regulation task would diminish their self-control strength available to complete the anagrams task (expect future self-control with depletion). The instructions for the three experimental conditions were as follows:

> *Expect no future self-control condition: "*Following the personal problem task, you will be required to complete a series of 8-letter anagrams. The anagrams task will not require self-control."
>
> *Expect future self-control condition: "*Following the personal problem task, you will be required to complete a series of 8-letter anagrams within a 6-minute time limit. Completing the anagrams task will require self-control strength."
>
> *Expect future self-control with depletion condition: "*Following the personal problem task, you will be required to complete a series of 8-letter anagrams within a 6-minute time limit. Completing the anagrams task will require self-control strength, which may be depleted by the personal problem task."

Following their initial task (either social or nonsocial), all participants were given a list of 13 solvable 8-letter anagrams to complete in six minutes (Baumeister et al., 1998; see Appendix A). Their performance on this task served as the measure of self-regulation ability in this study. Participants then completed the SEQ. As a manipulation check, all participants indicated, "How much effort did you plan to exert on the anagram task?" and "How much energy did you plan to exert on the anagram task?" on a 9-point scale from *no effort/very little* to *all my effort/very much,* and "How much was your self-control strength depleted by the personal problem task?" on a 9-point scale from *very little* to

very much. Participants also answered several open-ended questions designed to assess suspiciousness of the experimental tasks, including, "Did you notice anything unusual about your conversation partner?" and "Did you notice anything unusual about the content of the anagrams?" When participants completed the session, they were debriefed and thanked for their time.

<div align="center">Results</div>

Manipulation Check

The success of the expectations manipulation was assessed by examining the participants' estimations of the amount of energy or effort they had planned to exert on the anagrams task and their estimations of how the personal problem task depleted their self-control strength with one-way ANOVAs. Consistent with my expectations, these three measures did not differ by type of task ($ps > .14$). Contrary to my expectations, they also did not differ by expectations condition ($ps > .35$). However, the interaction between expectations and task type was significant for "How much effort did you plan to exert on the anagram task?", $F(3, 173) = 2.65$, $p = .05$. Consistent with my predictions, for those completing the nonsocial task, participants in the control condition ($M = 5.48$, $SD = 2.16$) reported that they had expected to exert significantly less effort on the anagrams than did the participants who expected a future task involving self-control and depletion ($M = 6.89$, $SD = 1.79$), $p = .02$, and marginally less effort than did the participants who expected no future self control ($M = 6.52$, $SD = 1.78$), $p = .07$. There were no differences for those participants completing the social task. However, as these questions were answered after participants completed the anagrams task, which was quite difficult, participants may have downplayed the amount of effort they had planned on exerting on

the anagram task in proportion to their own perception of their performance on the task. Indeed, participants' reported amount of effort was significantly associated with the number of anagrams they attempted, $r(179) = -.27$, $p < .001$, and their reported amount of energy they had planned to exert was significantly associated with the number of anagrams they correctly completed, $r(179) = .16$, $p = .02$.

Regression Analysis[5]

Participants completed an average of 1.54 anagrams ($SD = 1.64$) within the six-minute time limit, with a range from 0 to 11 completed. To assess the relationship between self-regulation performance and the predictor variables, a regression analysis was conducted. Participants' number of completed anagrams were regressed onto their centered CUS scores; their centered SEQ scores; an effects-coded type of task variable (+1 = social condition and -1 = nonsocial condition); three contrast-coded expectations variables; and all two-, three-, and four-way interactions. The three contrast-coded variables were: one comparing the control condition to all three other conditions (Contrast 1: +.25 = expect future task, -.75 = control), one comparing the expect no future self-control condition to the expecting future self-control conditions (Contrast 2: -.67 = expect no future self-control, +.33 = expect future self-control and future self-control with depletion, and 0 = control), and one comparing the expecting future self-control

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[5] I conducted a correlation analysis to determine is causal uncertainty alone was significantly related to the anagram performance, but this analysis was not significant, $r(181) = .08$, $p = .29$. I also conducted the analysis after selecting only the participants who participated in the social task with the control instructions, as these conditions most closely resembled those of the first study in Jacobson et al. (2006), but this analysis was also not significant, $r(24) = .03$, $p = .90$. However, these analyses do not necessarily indicate a failure to replicate the effects demonstrated in Jacobson et al. (2006) for two reasons. First, the zero-order correlation collapses across the various manipulations, which the regression analyses show do make a significant difference in the link between causal uncertainty and self-regulation performance (as gender did in the original Jacobson et al. study). Therefore, the lack of a relationship in some conditions could be wiping out the effect in others. Second, the sample size for the correlation involving only participants in the social condition with control instructions is significantly smaller than the sample size of the original study ($n = 24$ is 18.75% of the Jacobson et al. sample of 128 participants); thus, the power of this analysis is likely reduced. The correlation matrix for this study is presented in Appendix A.

conditions to the expecting future self-control and depletion condition (Contrast 3: -.50 = expect depletion, +.50 = did not expect depletion, and 0 = did not expect future self-control).

A significant main effect was found for the SEQ, $B = 0.06$, $t(149) = 2.35$, $p = .02$, such that higher self-esteem scores were associated with better self-regulation performance. Also, the type of task X Contrast 3, $B = 0.93$, $t(149) = 2.58$, $p = .01$; the CUS X Contrast 3, $B = -0.13$; $t(149) = -2.88$, $p = .005$; the type of task X SEQ X Contrast 1, $B = -0.17$, $t(149) = -2.66$, $p = .008$; and the CUS X SEQ X Contrast 1, $B = 0.02$, $t(149) = 2.57$, $p = .01$, interactions were significant. These effects were qualified by three higher order interactions: the type of task X CUS X Contrast 2, $B = -0.07$, $t(149) = -2.19$, $p = .03$; the type of task X CUS X Contrast 3, $B = 0.09$, $t(149) = 2.06$, $p = .04$; and the type of task X CUS X SEQ X Contrast 1, $B = 0.02$, $t(149) = 1.98$, $p = .05$, interactions. To interpret these interactions, the analyses were conducted separately for those participants in the social condition versus those participants in the nonsocial condition.

Social Condition Effects

For those in the social condition ($n = 93$), the CUS X SEQ X Contrast 1 interaction was significant, $B = 0.04$, $t(77) = 2.64$, $p = .01$. To interpret this interaction the CUS X Contrast 1 interaction was examined separately at higher and lower levels of SEQ. Based on the recommendation of Cohen and Cohen (1983), I chose one standard deviation above and below the centered SEQ mean as the higher and lower levels of SEQ because I had no a priori reason for choosing other values. Thus two new continuous variables were created (see Aiken & West, 1991, for a more detailed explanation of the creation of these new variables). The first, High SEQ, corresponded to one standard

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deviation above the centered SEQ mean. The second, Low SEQ, corresponded to one

standard deviation below the centered SEQ mean.

In regression, the effects of one variable are interpreted when the other variables

equal 0. Thus in the original analysis, I was examining the effects of the contrasts when

the other variables were at their mean because with centered scores, 0 is the mean value.

However, the value of 0 has changed with the two new continuous variables, High and

Low SEQ. For these variables, 0 is no longer the SEQ mean, but is one standard

deviation above or below the SEQ mean, respectively. Two separate regression analyses

were performed. In one regression analysis, I replaced SEQ with the High SEQ variable,

and in the second analysis, I replaced it with the Low SEQ variable.

Contrast 1 for High Self-Esteem. In the analysis replacing SEQ with High SEQ,

the CUS X Contrast 1 interaction was significant, $B = 0.20$, $t(77) = 2.04$, $p = .05$. To

interpret this effect, the Contrast 1 comparisons were examined separately at higher and

lower levels of CUS. The High and Low CUS variables were created in the same manner

as the High and Low SEQ variables. Two separate regression analyses were performed

for the contrast. In one regression analysis, I replaced the CUS with the High CUS

variable, and in the second analysis, I replaced it with the Low CUS variable. In the first

analysis, the number of completed anagrams were regressed onto the continuous High

CUS variable; the continuous High SEQ variable; the three contrast-coded expectations

variables (Contrasts 1, 2, and 3); and all two-, three-, and four-way interactions. In the

second analysis, the number of completed anagrams were regressed onto the continuous

Low CUS variable; the continuous High SEQ variable; the three contrast-coded

expectations variables (Contrasts 1, 2, and 3); and all two-, three-, and four-way

interactions.

The results of these analyses are shown in Figure 1. Consistent with my

hypotheses, for High CUS participants with High SEQ completing the social task, those

in the three conditions instructed to expect a future task did not differ from those in the

control condition, $B = 1.17$, $t(77) = 0.90$, $p = .37$, $d = 0.21$. On the other hand, contrary to

my predictions, for Low CUS participants with High SEQ completing the social task,

those in the three conditions instructed to expect a future task completed a lower number

of anagrams than did those in the control condition, $B = -2.90$, $t(77) = -2.63$, $p = .01$, $d =$

0.62.

Figure 1. Simple slope lines comparing the three conditions expecting a future task
versus the control condition on anagram performance for High and Low Causal
Uncertainty Scale (CUS) scores for participants completing the social task with
High Self-Esteem (SEQ) scores.

Contrast 1 for Low Self-Esteem. For the analysis replacing SEQ with Low SEQ,

the CUS X Contrast 1 interaction was again significant, $B = -0.13$, $t(77) = -2.26$, $p = .03$.

This interaction was examined in the same manner as it was above for those with High SEQ, by examining the difference between the three conditions expecting a future task and the control condition on anagram performance at higher and lower levels of CUS.

The results of these analyses are shown in Figure 2. Although I had not made specific predictions about the influence of self-esteem on the results, I had proposed that for the High CUS participants in the social condition, increasing expectations of future need for self-regulation strength would not influence self-regulation ability. For High CUS participants with Low SEQ completing the social task, the results were consistent with my predictions, such that those in the three conditions instructed to expect a future task did not differ from those in the control condition, $B = -0.41$, $t(77) = -0.68$, $p = .50$, $d = 0.16$. On the other hand, I had proposed that for Low CUS participants in the social condition, increasing expectations of future need for self-regulation strength would be significantly associated with improvements in self-regulation ability. For Low CUS participants with Low SEQ completing the social task, the results supported my predictions, such that those in the three conditions instructed to expect a future task completed a higher number of anagrams than did those in the control condition, $B = 2.29$, $t(77) = 2.41$, $p = .02$, $d = 0.57$.
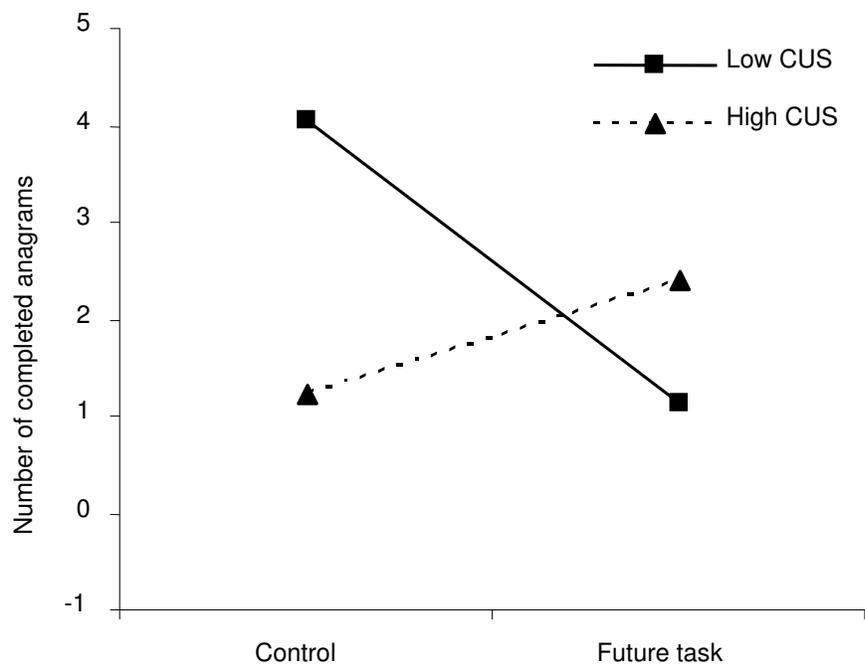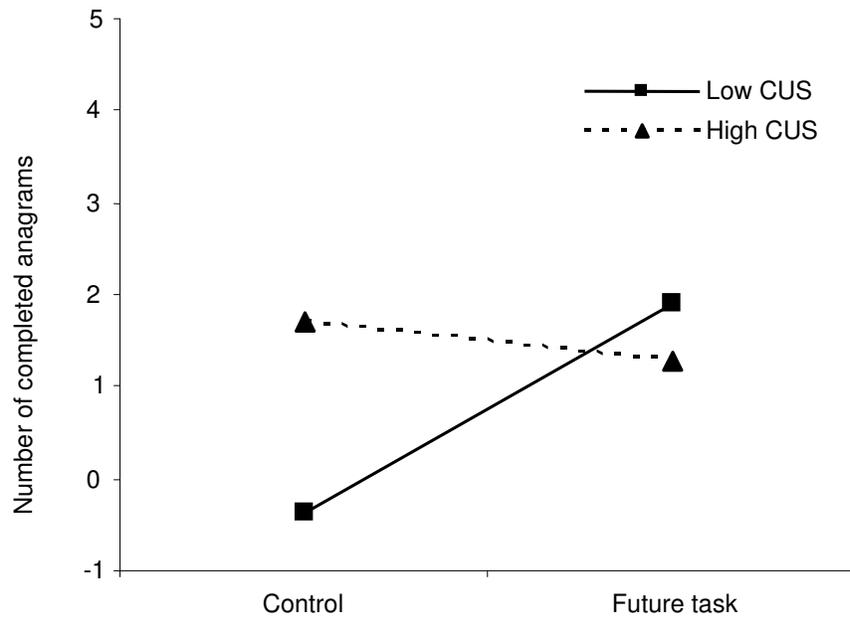
Figure 2. Simple slope lines comparing the three conditions expecting a future task versus the control condition on anagram performance for High and Low Causal Uncertainty Scale (CUS) scores for participants completing the social task with Low Self-Esteem (SEQ) scores.

Nonsocial Condition Effects

As the relationship of causal uncertainty to self-regulation abilities following nonsocial tasks was previously unstudied, I had not made any a priori hypotheses about the findings. For those in the nonsocial condition ($n = 88$), the CUS X Contrast 2, $B = 0.12$, $t(72) = 2.38$, $p = .02$, and the CUS X Contrast 3, $B = -0.21$, $t(72) = -2.66$, $p = .01$, interactions were significant. Thus contrary to the findings for the social condition, self-esteem did not moderate the relationship of causal uncertainty to self-regulation abililty following a nonsocial task. To interpret these interactions, the Contrast 2 and Contrast 3 comparisons were examined separately at higher and lower levels of CUS in the same manner as for the social condition.

Contrast 2. The Contrast 2 results are shown in Figure 3. For High CUS participants completing the nonsocial task, those in the two conditions instructed to expect a future task involving self-control completed a higher number of anagrams than did those in the condition instructed to expect a future task alone, $B = 1.91$, $t(72) = 2.99$, $p = .004$, $d = 0.77$. On the other hand, for Low CUS participants completing the nonsocial task, those in the two conditions instructed to expect a future task involving self-control did not differ from those in the condition instructed to expect a future task alone, $B = -0.51$, $t(72) = -0.74$, $p = .46$, $d = 0.19$. Therefore, contrary to the results in the social condition where increasing expectations of future need for self-regulation strength did not influence self-regulation ability for High CUS participants and improved abilities for Low CUS participants, in the nonsocial condition, High CUS participants improved with these instructions, and Low CUS participants performance did not differ.
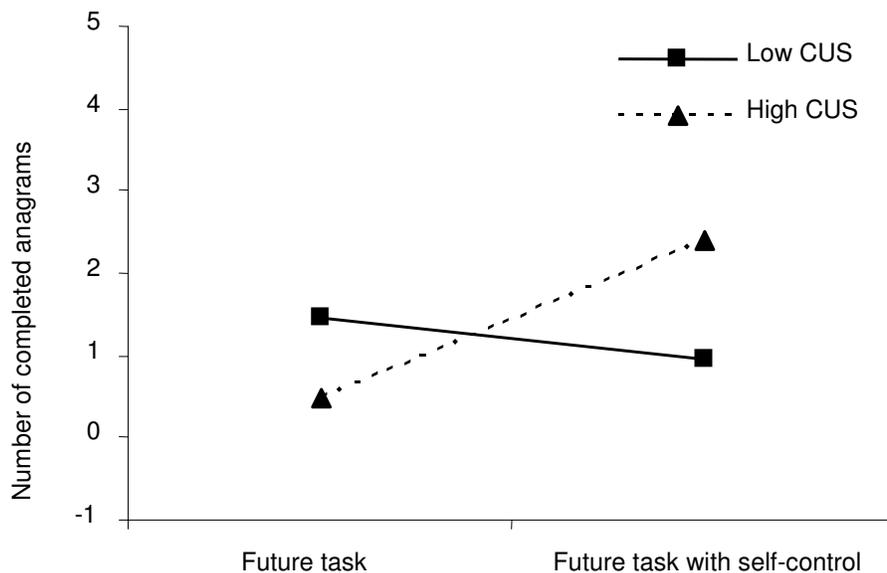
Figure 3. Simple slope lines comparing those in the two conditions expecting a future task involving self-control versus those in the condition expecting a future task alone on anagram performance for High and Low Causal Uncertainty Scale (CUS) scores for participants completing the nonsocial task.

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Contrast 3. The Contrast 3 results are shown in Figure 4. For High CUS

participants completing the nonsocial task, those in the condition instructed to expect a

future task involving self-control and that the initial personal problem task was depleting

completed a higher number of anagrams than did those in the condition expecting a future

self-control task alone, $B = -2.66$, $t(72) = -2.61$, $p = .01$, $d = 0.76$. On the other hand, for

Low CUS participants completing the nonsocial task, those in the condition instructed to

expect a future task involving self-control and that the initial personal problem task was

depleting completed a marginally lower number of anagrams than did those in the

condition expecting a future self-control task alone, $B = 1.84$, $t(72) = 1.81$, $p = .07$, $d =$

0.53. Again, contrary to the results in the social condition where increasing expectations

of future need for self-regulation strength did not influence self-regulation ability for

High CUS participants and improved abilities for Low CUS participants, in the nonsocial

condition, High CUS participants improved when they learned that the initial personal

problem task was depleting, and Low CUS participants' performance marginally

diminished.
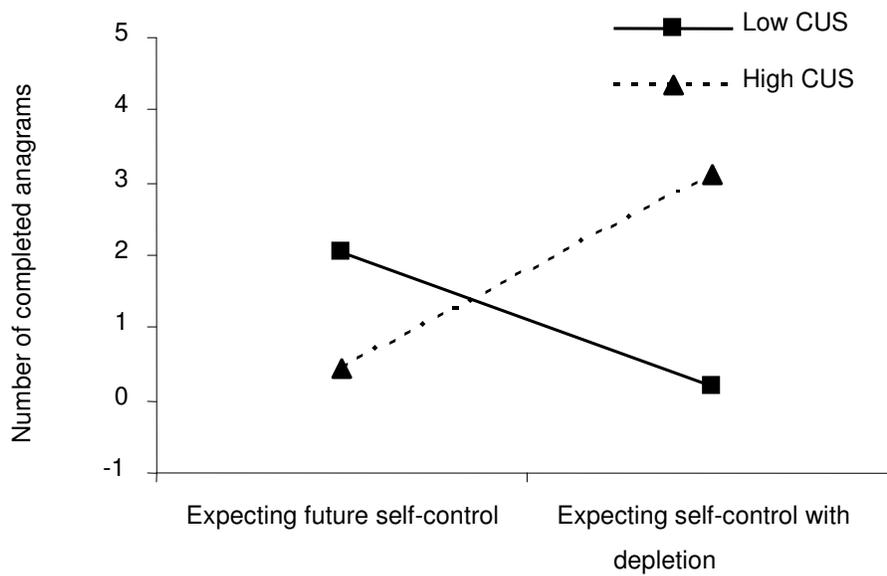
Figure 4. Simple slope lines comparing those in the condition expecting a future self-control task and that the personal problem task was depleting versus those in the condition expecting a future self-control task alone on anagram performance for High and Low Causal Uncertainty Scale (CUS) scores, for participants completing the nonsocial task.

Summary of Results

The relationship of causal uncertainty to self-regulation abilities differed by the type of personal problem task. For participants completing the social task who had lower self-esteem, the results were consistent with my predictions, such that high causally uncertain participants' performance on subsequent self-regulation tasks following the depleting personal problem task were consistent across different levels of expectations for future self-control. In contrast, but as predicted, low causally uncertain participants' performance on subsequent self-regulation tasks improved with increasing instructions to conserve energy for future tasks. Again, for participants with higher self-esteem, high causally uncertain participants' self-regulation abilities did not differ by expectations for future self-control; however, low causally uncertain participants' self-regulation abilities decreased with increased expectations for future self-control.

Contrary to the results in the social condition, the findings for the nonsocial condition did not differ by self-esteem. Learning that the future task involved self-control and further learning that the initial task was self-control depleting were both associated with increases in self-regulation abilities for high causally uncertain participants. In contrast, self-regulation abilities did not differ for low causally uncertain participants upon learning that the future task involved self-control and slightly decreased when they learned that the initial task was depleting.

Discussion

The purpose of Study 1 was to investigate if the social or nonsocial nature of the self-regulation depleting task and expectations about the need for future self-control can account for the relationship between causal uncertainty and self-regulation abilities. I manipulated whether participants engaged in a social or a nonsocial self-regulation depleting task and varied participants' expectations about the future need for self-control and the depleting nature of the initial task. Based on Jacobson et al.'s (2006) findings that higher causal uncertainty was associated with better self-regulation abilities following a depleting task, I hypothesized that for the social condition, high causally uncertain participants would conserve their energies; whereas low causally uncertain participants would not do so unless given instructions indicating the benefit of conserving self-regulatory resources for future tasks. Therefore, high causally uncertain participants' performance on self-regulation tasks following the depleting personal problem would not differ across levels of expectations for future self-control, but low causally uncertain participants' performance would improve with increasing instructions to conserve energy for future tasks. In this study, I also examined the previously unstudied relationship of

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causal uncertainty to self-regulation abilities following nonsocial tasks and whether self-esteem accounts for or moderates the causal uncertainty-self-regulation relationship.

My hypotheses were largely supported by the data. For participants completing the social task, the results were consistent with my predictions, such that high causally uncertain participants' self-regulation performance following the personal problem task was consistent across different levels of expectations for future self-control. This finding was true for high causally uncertain people regardless of self-esteem level. In contrast, but as predicted, low causally uncertain participants' performance on subsequent self-regulation tasks improved with increasing instructions to conserve energy for future tasks. However, this result was significant only for low causally uncertain people with lower levels of self-esteem. For low causally uncertain participants with higher levels of self-esteem, self-regulation performance decreased with increased expectations for future self-control.

I had not made any predictions about the relationship of causal uncertainty to self-regulation following a nonsocial self-regulation depleting task. Contrary to the results in the social condition, the findings for the nonsocial condition did not differ by self-esteem. Learning that the future task involved self-control and further learning that the initial task was self-control depleting were both associated with increases in self-regulation abilities for high causally uncertain participants. In contrast, self-regulation abilities did not differ for low causally uncertain participants upon learning that the future task involved self-control and marginally decreased when they learned that the initial task was depleting. Thus the influence of expectations for future self-control on the causal uncertainty-self-regulation relationship is reversed for nonsocial tasks, in that the high, not the low,

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causally uncertain people respond to different expectations for future self-control. Similar to the paradox of causal uncertainty affording certain social-cognitive benefits while at the same time having detrimental effects for interpersonal relationships, it may be that high causally uncertain individuals respond better when given expectations for future self-control in nonsocial circumstances, but that these benefits do not translate to social situations.

The studies conducted by Jacobson et al. (2006) did not investigate the influence of self-esteem on the relationship between causal uncertainty and self-regulation abilities. By controlling for self-esteem and all of its interactions with the other terms in the analysis, I was able to rule out the possibility that individual differences in self-esteem alone, which have been associated with both self-regulation and causal uncertainty in the past, are responsible for the observed differences in self-regulation performance in this study. This study also extended the results of Jacobson et al. (2006), in that it demonstrated the benefits of high causal uncertainty for performance on a different self-regulation task (i.e., the anagrams as opposed to the hand grip task that they used) and in a nonsocial context.

Causal Uncertainty and Self-Regulation Following Social Tasks

This study provided evidence that the context of a self-regulation task moderated the relationship of causal uncertainty to self-regulation abilities. Future studies are required to examine why the type of depleting task would influence causal uncertainty's outcomes for self-control strength. The finding that high causal uncertainty is associated with less self-regulation depletion (or higher self-regulation performance on a second task involving self-control strength) following a social interaction is consistent with the

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studies of Jacobson et al. (2006).

But why would the effects of causal uncertainty on self-regulation abilities differ between social and nonsocial tasks? As previously discussed, Baumeister and colleagues (Baumeister & DeWall, 2005; Baumeister et al., 2005; Ciarocco et al., 2001) have established that social rejection results in self-regulation failures. High causally uncertain people experience social rejection more often than do low causally uncertain people (Jacobson et al., 2009; Passey, 2006). Thus, chronic exposure to rejection could lead high causally uncertain people to abandon self-regulation during social tasks rather than nonsocial tasks because they lose the motivation to self-regulate and make sacrifices when it no longer yields any social benefits. Future studies should examine if indexes of rejection (i.e., rejection sensitivity, history of social difficulties and interpersonal problems, etc.) mediate the relationship of causal uncertainty to self-regulation following social tasks. Researchers also should examine the relationship of causal uncertainty to self-regulation performance following experimentally induced rejection experiences.

Causal Uncertainty and the Conservation of Self-Regulation Resources

Why would high causally uncertain people exhibit consistent self-regulation abilities regardless of expectations for future self-control following social tasks but demonstrate improved self-regulation abilities with increased expectations for future self-control following nonsocial tasks? One possible explanation is that the participants assigned to the social and nonsocial conditions significantly differed on the prescreening measure of causal uncertainty. Even though participants prescreening CUS scores were not used to assign them to conditions, but rather participants were randomly assigned to either the social or nonsocial condition, participants in the social condition had higher

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prescreening CUS scores than did participants in the nonsocial condition. Therefore, causal uncertainty activation could have differed by condition. As I expected that high and low causally uncertain people would differ on self-regulation performance, and that they would respond differently to the expectations for future self-control, it is possible that the differences observed between the results for the social and nonsocial tasks reflect the differences in causal uncertainty levels of the participants involved. However, as I examined differences in relationships, as opposed to mean differences, this possibility seems unlikely. Still, future studies could eliminate this explanation by yoking high and low causally uncertain participants to conditions (rather than relying on random assignment) to ensure equal representation or could experimentally manipulate levels of causal uncertainty using priming.

Although I do not have the data to address this issue, high causally uncertain people may have performed better than low causally uncertain people on the self-regulation assessment following nonsocial tasks because they are in general better at allocating their self-regulation resources. That is, they may be better at deciding when self-regulation expenditure is beneficial and better at responding to or anticipating future needs for self-control. As previously stated, high causally uncertain people may choose not to self-regulate during social interactions because they have learned over time that expending energy in social interactions leads to unpredictable, and possibly undesirable, outcomes. Thus, instructions to conserve self-regulation strength for future tasks would not influence their performance following the social task because high causally uncertain people were already self-regulating at a minimal level during social interactions. In addition, high causally uncertain people may choose to direct their self-regulation efforts

to more controllable nonsocial self-regulation tasks because they have learned over time that exerting energies in this context is fruitful. To further investigate these explanations, future studies could examine the relationship of causal uncertainty to the lay theories participants have about how self-regulation works in social and nonsocial contexts and if they believe preserving such energies for future tasks is beneficial. For example, participants could read descriptions of hypothetical scenarios and could then report where they would devote limited self-regulation resources in those situations.

Another way to further investigate the relationship of causal uncertainty and self-regulation would be to conduct a study where, before engaging in a social interaction, half of the participants complete a self-regulation depleting task (e.g., anagrams, or trying not to think about a white bear), and the other half of the participants do not. In this method, half of the participants would have their self-regulatory resources depleted before the conversation with their partner. If high causally uncertain people engage in minimal self-regulation under normal circumstances, then participants in the depleted condition should not behave any differently than participants in the control condition. In contrast, low causally uncertain people in the depleted condition should behave in a more socially inappropriate manner than low causally uncertain people in the control condition.

In addition to better allocating their self-regulation resources, high causally uncertain people's vigilant and effortful social-cognitive activities, which require self-regulation (Gilbert, Krull, & Pelham, 1988), may have built up the self-regulation resources they have available for nonsocial tasks. As exercise increases muscle strength, a person's reservoir of self-regulation strength may be improved over time by frequent exertion of self-control (Muraven & Baumeister, 2000; Muraven et al., 1998; Muraven et

al., 1999). If high causally uncertain people engage substantial self-regulation resources in attempting to make accurate perceptions of the social world, then they should build up enhanced self-regulatory resources over time. Future studies should investigate this possibility by examining the effects of practicing self-regulation exercises (e.g., good posture maintenance; Muraven, et al., 1999) over time and determining if the differences in self-regulation performance between high and low causally uncertain people are eliminated after training.

In general, because this study is the first to examine the relationship of causal uncertainty to self-regulation for nonsocial tasks, future studies should investigate if these effects are replicated for other nonsocial tasks. Future studies should also examine if the results are replicated for other social tasks that involve self-regulation, as the studies conducted thus far have all involved discussion of a mild-to-moderately distressing personal problem.

Undoubtedly, there are many questions regarding the relationship of causal uncertainty to self-regulation performance that remain unanswered, and that will need to be addressed in future research.

Role of Self-Esteem on Self-Regulation Performance

This study was the first to examine if self-esteem influenced the effects of causal uncertainty and, in particular, determine if self-esteem influenced the relationship of causal uncertainty to self-regulation abilities. I included self-esteem in this study because of the associations of self-esteem to both causal uncertainty (Weary & Edwards, 1994b) and self-regulation performance (Baumeister, et al., 1993; Lambird & Mann, 2006; Vohs, et al., 2005). Given these relationships, and the association of self-esteem to interpersonal

success, I wanted to rule out the possibility that the effects of causal uncertainty on self-regulation following social interactions was actually explained by self-esteem and investigate the possibility that the relationship between causal uncertainty and self-regulation abilities may differ for high vs. low self-esteem individuals.

Many questions regarding the influence of self-esteem on the relationship of causal uncertainty to self-regulation abilities remain. First, why would self-esteem moderate the influence of causal uncertainty on self-regulation performance following social tasks but not following nonsocial tasks? Second, why would self-esteem influence the relationship of causal uncertainty to self-regulation abilities for low, but not for high, causally uncertain people? In addition, low causally uncertain people with low self-esteem performed as expected. That is, they exhibited better self-regulation performance when they had increased expectations for future self-control. In contrast, low causally uncertain people with high self-esteem performed worse under these conditions. Why would low causally uncertain people with low self-esteem differ from low causally uncertain people with high self-esteem on self-regulation performance? The self-esteem results and possible answers to these questions will be discussed in more detail in the General Discussion.

Limitations

One limitation this study is the failure to find any significant differences in the manipulation check of expectations for the need for future self-control within the social task and that significant differences were found on only one of the three measures for participants in the nonsocial task. Therefore, the manipulation of expectations for future self-control may not have been strong enough. However, the significant differences found

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for the question "How much effort did you plan to exert on the anagram task?" were in the expected direction, and the regression analyses did reveal significant differences between expectations conditions on the dependent variable. Furthermore, the manipulation check questions were answered after participants completed the anagrams task, which was quite difficult. Participants may have downplayed the amount of effort they had planned on exerting on the anagram task in proportion to their own perception of their performance on the task. Future studies should examine if more extensive (though subtle) instructions regarding expectations for future self-control produce differences in the manipulation check.

Another limitation of this study may have reduced generalizability of the results. Although the original sample was quite large ($N = 202$; approximately 25 participants per cell), the final sample (90% of the original; $N = 181$) was reduced due to suspiciousness about the confederate and the anagrams task. Five of the excluded participants reported knowing that their conversation partner was a confederate. Some responses indicated that the participants were suspicious of the confederate because they a) seemed older than the participant, b) seemed more knowledgeable about how things worked around the university (e.g., knew more details about the roles of teaching assistants), or c) did not seem nervous or puzzled by the instructions in the experiment. A further 16 participants incorrectly reported that the anagrams in the self-regulation task were unsolvable. As the anagrams were eight letters long and the participants were required to complete them in a limited amount of time, the task was quite difficult. Indeed, the performance on the anagrams was quite low ($M = 1.54$ anagrams completed out of 13 possible anagrams). Thus, participants who struggled to complete the task may have incorrectly assumed that

their performance was due to the anagrams not having solutions.

Another limitation of the present study may have been a restriction of range in completion of the anagrams. The mean number of completed anagrams was quite low, and the standard deviation of 1.64 anagrams also indicates that the majority of participants completed fewer than 5 of the 13 anagrams in the task. None of the participants completed all 13 anagrams. In addition, participants who found the personal problem task extremely depleting to their self-regulatory resources may have decided not to attempt any of the anagrams, thus giving them a score of zero for the task. However, the limited variability should have reduced, not enhanced, the possibility of being able to significantly predict self-regulation performance. Future studies examining self-regulation with an easier set of anagrams may improve the variability in performance.

CHAPTER 3

STUDY 2: SELF-PRESENTATION

In the studies by Jacobson et al. (2006), high causally uncertain people may have performed better on the self-regulation task because of differences in self-presentation. Vohs and colleagues (2005) have demonstrated that effortful self-presentation results in a depletion of self-regulatory resources. Furthermore, Shelton, Richeson, Salvatore, and Trawaler (2005) speculated that the self-regulation depletion differences they observed between low and high prejudice white people following an interaction with a black person could be accounted for by self-presentation. That is, high prejudice white people, who exhibited higher self-regulation depletion following the interaction, were concerned about concealing their true attitudes and feelings and may have required more self-regulation during the interaction to do so. On the other hand, low prejudice white people did not need to self-regulate as much during the interaction, and hence, they were less depleted afterward. Perhaps high causally uncertain people performed better on the self-regulation assessment than their low causally uncertain counterparts did because they were less concerned about their self-presentation. For instance, high causally uncertain people might have been so focused on gaining greater understanding of the other person that their more chronic uncertainty reduction goal overrode any temporary goals to make a good impression on their partner. Furthermore, because of their heightened uncertainty surrounding social interactions and increased frequency of rejection, high causally uncertain people may not feel that self-presentation, which is effortful, is worthwhile.

In Study 2, I investigated whether or not self-presentation could account for the relationship between causal uncertainty and self-regulation abilities by manipulating

participants' self-presentation instructions before the social interaction. I hypothesized that the participants' subsequent self-regulation abilities would differ by level of self-presentation during the initial task. I predicted that high causally uncertain people, who may not normally engage in self-presentation because they are focused on accuracy or because effortful self-presentation during social interactions seems fruitless, would demonstrate a decrease in self-regulation abilities on the subsequent task when instructed to present themselves in a positive light during the social interaction. In contrast, low causally uncertain people would exhibit consistent self-regulation performance across different self-presentation conditions possibly because they naturally engage in self-presentation behaviors when interacting with others. Consistent with Study 1, this study investigated whether self-esteem accounted for or moderated the causal uncertainty-self-regulation relationship.

<div align="center">Method</div>

Participants

  Eighty-eight women from an introductory psychology class at Queen's University participated in this study. Participants' mean age was 18.31 years ($SD = 1.43$), ranging from 17 to 28 years. Participants received 1.0% towards their introductory psychology grade for their participation.[6]

Materials (See Appendix B for all Study 2 materials not used in Study 1)[7]

  Scales. As in Study 1, CUS ($M = 35.66$, $SD = 12.29$, ranging from 10 to 61; $\alpha = .91$),[8] and SEQ ($M = 30.12$, $SD = 5.20$, ranging from 19 to 40; $\alpha = .90$) scores were

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[6] Excluding participants on the basis of suspiciousness did not change the results for this sample. Consequently, all analyses presented were conducted on the full sample of 88 participants.
[7] Iterated principal axis factor analyses supported one-factor structures for all scales with my sample.

typical of previous research. I conducted independent samples t tests to determine if

participants' scores on the CUS and SEQ differed according to their self-presentation

condition. No significant difference was observed for CUS, $t(86) = -0.97$, $p = .33$.

However, participants in the self-presentation condition ($M = 31.25$, $SD = 5.15$) scored

significantly higher on the SEQ than did participants in the control condition ($M = 29.00$,

$SD = 5.06$), $t(86) = 2.07$, $p = .04$.[9]

Procedure

Participants completed the same prescreening materials and were recruited to the

study in the same manner as in Study 1. Upon arrival at the laboratory, participants read a

letter of information and signed a consent form before being randomly assigned to one of

two conditions representing the manipulation of the self-presentation independent

variable. All participants in this study completed the same social task (the personal

problem conversation with a confederate) from Study 1.

Before the conversation, participants were randomly assigned to the self-

presentation or the control condition. The self-presentation instructions were adapted

from studies by Vohs et al. (2005). One half of the participants were given no additional

instructions before completing the self-regulation task (control condition; $n = 44$). The

other half of the participants were told that during their conversation, they should act in a

manner that would make them stand out in a very positive fashion to their partner. They

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[8] Consistent with Study 1, participants completed the CUS during a prescreening session at the beginning of the school year.

[9] In Study 2, the SEQ was completed at the experimental session after the personal problem task as it was in Study 1. As studies 1 and 2 were conducted during the same time period (but not with the same participants), I did not know about the potential reactive effects of self-esteem to my manipulation. That is, I did not yet realize the possibility that the discussion of the personal problem with the confederate could elevate participants' SEQ scores. In addition, attempting to present themselves in a positive light during the discussion with the confederate may have led participants in the self-presentation condition to experience an increase in self-esteem relative to participants in the control condition.

were instructed not to lie but to draw on real experiences and slant them to appear

positive and favorable (self-presentation condition; $n = 44$). In all conditions, participants

were told veridically that their partner was unaware of any instructions by the

experimenter to skew their responses. As a manipulation check, both the confederate and

the participant indicated, "How much do you think you/the participant was attempting to

present herself in a positive light?" on a 9-point scale from *very little* to *very much.*

Following the conversation, all participants retyped an unrelated paragraph but were

instructed not to type any e's or spaces as they did so (Muraven et al., 2006; see

Appendix B for the paragraph used in this study). Performance on this task was assessed

by counting the number of words successfully retyped and served as the measure of self-

regulation ability in this study. Participants then completed the SEQ. Participants also

answered, "How much did you have to control yourself on the retyping task?" on a 9-

point scale from *not at all* to *very much*, and "Did the retyping task require much effort?"

on a 9-point scale from *definitely no* to *definitely yes.* When participants finished, they

received a debriefing and were thanked for their time.

<div align="center">Results and Discussion</div>

Manipulation Check

The success of the self-presentation manipulation was assessed with independent

samples *t* tests of the participants' and confederates' estimates of how much participants

attempted to present themselves in a positive light. Neither the confederate ratings of self-

presentation, nor the participant ratings of how much control or effort the retyping task

required were significant (*ps* > .34). However, the participants in the self-presentation

condition ($M = 6.34$, $SD = 1.58$) rated themselves significantly higher on the question

"How much do you think you were attempting to present yourself in a positive light?"

than did the participants in the control condition ($M = 5.48$, $SD = 1.79$), $t(86) = 2.40$, $p = .02$.

Regression Analysis[10]

Participants retyped an average of 84.61 words ($SD = 26.64$), with a range from 10 to 149 words completed out of a total possible of 149 words[11]. To assess the relationship between self-regulation ability and the predictor variables, a regression analysis was conducted. Participants' number of completed words were regressed onto their centered CUS scores; their centered SEQ scores; an effects-coded self-presentation variable (+1 = self-presentation condition and -1 = control condition); and all two- and three-way interactions.

Consistent with the findings of Jacobson et al. (2006), higher causal uncertainty was associated with better self-regulation performance following the social interaction, $B = 0.52$, $t(80) = 2.12$, $p = .04$, $d = 0.47$. Contrary to my predictions that high causally uncertain people would demonstrate lower self-regulation performance when they had the goal of presenting themselves in a positive light than when they had no such goal, and that low causally uncertain people would show no self-regulation differences between

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[10] I conducted a correlation analysis to determine is causal uncertainty alone was significantly related to the retyping performance, and this relationship was significant, $r(88) = .23$, $p = .03$. I also conducted the analysis after selecting only the participants who participated in the control condition, but this analysis was not significant, $r(44) = .16$, $p = .28$. However, as previously discussed, the analysis with the control participants alone involves a much smaller sample than in the original Jacobson et al. (2006) study. The correlation matrix for this study is presented in Appendix B.

[11] I examined the retyping results of each participant to determine if they followed the instructions for the task or if there were any indications that they were not taking the task seriously. Excluding participants on the basis that they followed only one of the instructions but not the other (i.e., they removed the e's but not the spaces, or vice-versa) or on the basis of extremely low responding did not change the results for this sample. Consequently, all analyses presented were conducted on the full sample of 88 participants.

conditions, no other effects were significant (all *ps* > .15). Also, in contrast with Study 1, self-esteem did not influence self-regulation performance in this study.

As self-regulation performance did not indicate a change in performance by self-presentation instructions, self-presentation does not appear to provide a viable explanation for the causal uncertainty – self-regulation relationship. Still, as other factors were changed from Study 1 to Study 2 (in addition to the difference in experimental manipulation), other possible explanations for the failure to find a significant causal uncertainty by self-presentation interaction in this study should be considered.

For one, I changed the task that measured self-regulation strength because of the problems with the anagrams task, but this change may account for the difference in results. In Study 1, participants completed a series of difficult anagrams; whereas in Study 2, participants completed a complicated retyping task. Even though Baumeister and colleagues (1998) have argued that any self-regulation task will deplete the same limited resource, these two tasks may not have been equivalent in their ability to detect self-regulation performance differences. The dependent variable in this study may not have been sensitive enough to detect the influence of self-presentation. This difference may also explain why I failed to find the significant relationship between self-esteem and self-regulation performance that was present in Study 1. However, participants showed a great deal of variability in the retyping task performance (which ranged from 10 to 149 words completed; *SD* = 26.64 words); whereas Study 1 participants had limited variability in their anagram performance. This increase of variability in Study 2's dependent variable should have made it less (not more) difficult to find the relationships I was testing. Furthermore, as the retyping task appears to have been less difficult for the

participants to complete than the anagrams, and because participants completed the self-esteem measure following the self-regulation tasks in both studies, participant performance in Study 2 may not have affected their self-esteem to the same extent as participant performance in Study 1. The increased variability in responding in this study indicates that the change in dependent variable is unlikely to have eliminated the interaction between causal uncertainty and self-regulation; however, future studies could eliminate the possibility by varying the dependent variable task within the same study to determine the tasks' equivalency in detecting self-regulation differences.

Another possibility is that Study 2 did not have an adequate sample size to detect the predicted causal uncertainty X self-presentation interaction. Indeed, the sample size for Study 1 ($N = 181$) was substantially larger than that of Study 2 ($N = 88$; 48.6% of the sample size for Study 1). However, the number of cells involved in the design for Study 1 (4 expectations conditions X 2 type of task conditions = 8 cells) was also substantially larger than that of Study 2 (2 self-presentation conditions = 2 cells or 25% of the cells in Study 1). In Study 2, the p-value for the predicted interaction between causal uncertainty and self-presentation was .92, indicating that additional participants would likely not have resulted in a significant effect. However, the p-value for the three-way interaction between causal uncertainty, self-presentation, and self-esteem was .15. Using the effect size ($d = 0.49$) from Jacobson et al.'s (2006) initial study, a power analysis revealed that a sample size of 124 participants would be necessary to find the effect. Therefore, additional participants could have resulted in a significant causal uncertainty X self-presentation interaction that was additionally moderated by self-esteem. Future studies should investigate this possibility further. I did not collect data from further participants

in this study because the additional data would have had to be collected with a different set of confederates due to the end of the school year.

Another possibility is that the manipulation of self-presentation in this study was not strong enough to result in differences in actual self-presentation between the participants in the self-presentation and control conditions. Indeed, the confederate assessments of how much the participant was attempting to present themselves in a positive light did not differ by condition. However, as the participant was discussing a personal problem and had no prior experience with the confederate, the confederate may have had trouble accurately judging whether or not the participant was engaging in self-presentation.

Participant reports of how much control or effort the retyping task required also did not differ by condition. The rational behind this question was that participants in the self-presentation condition should have found the conversation with the confederate more depleting than the control participants, and therefore, they were expected to report that the retyping required more effort. However, this question may have been flawed. I did not expect that the retyping task would actually require different amounts of effort depending on condition; instead, I expected that the participants in the self-presentation condition would have less effort or control remaining to devote to the task than did those in the control condition. Therefore, the responses to the question regarding control and effort may have not have been worded appropriately to detect the differences I had anticipated. In contrast, participants in the self-presentation condition self-reported that they engaged in significantly more self-presentation than did participants in the control condition. Thus participants who read instructions to self-present during the conversation

at least believed that they were self-presenting at a higher rate than did the participants in the control condition. The self-presentation instructions used in this study were the same as those used in a study by Vohs et al. (2005; Study 1), where differences in self-presentation were observed. Therefore, self-presentation participants may, in fact, have engaged in more self-presentation than did control participants. Alternatively, self-presentation participants may have reported self-presentation levels in a socially desirable manner, wanting the experimenter to believe that they had followed the instructions.

Rather than self-presentation, the mechanism behind the high and low casually uncertain people's differences in self-regulation performance could be due to differences in accuracy goals. I could not investigate goals for accurate perception in Study 2 because pilot participants had difficulty implementing instructions to gain an accurate perception of their partner when they were the one discussing a personal problem. Because I could not manipulate accuracy goals while participants were presenting their own personal problem, I could not combine the accuracy goal manipulation with the self-presentation manipulation in Study 2. Therefore, Study 3 was conducted to investigate the possibility that high causally uncertain people may sacrifice self-regulation of their own behavior in favor of attempting to obtain an accurate perception of their interaction partner who discussed a personal problem.

CHAPTER 4

STUDY 3: ACCURACY GOALS

Study 3 examined the other side of the explanation offered in Study 2. High and low causally uncertain people may have exhibited different self-regulation abilities following a social interaction in Jacobson et al.'s (2006) studies not because of differences in self-presentation but because they had different goals for social perception accuracy. When causal uncertainty beliefs are activated, people become motivated to engage in actions that will reduce their uncertainty such as engaging in greater information seeking (Weary & Edwards, 1994a). High causally uncertain individuals may ask more diagnostic-seeking questions (Weary & Jacobson, 1997) and engage in more effortful as well as less biased (Weary et al., 2001) social-cognitive activity than low causally uncertain individuals do. However, a social perceiver requires cognitive resources to draw accurate inferences about others, and self-regulation interferes with the resources available for this task (Gilbert et al., 1988). Perceivers who devote substantial resources to the regulation of their own behavior should be unable to focus on the difficult task of accurately understanding their interaction partners. Thus, perceivers who are intent on forming accurate impressions of others may be willing to sacrifice the regulation of their own behavior to reserve cognitive resources for the pursuit of accuracy.

Perhaps high causally uncertain people performed better on the self-regulation assessment than low causally uncertain people did because they were more concerned with reducing their uncertainty and gaining an accurate perception of their interaction partners. Rather than focusing on the impression they were making on their partners, high

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causally uncertain people might have been more focused on the impression they were forming of their partner. That is, high causally uncertain participants' chronic uncertainty reduction goal may have interfered with the self-regulation of their own behavior, and as a result, they were less depleted after the interaction.

Study 3 investigated if accuracy goals could account for the relationship between causal uncertainty and self-regulation abilities by manipulating participants' accuracy goals for the conversation with the confederate. I hypothesized that the participants' subsequent self-regulation abilities would differ by level of accuracy goal for the initial task. Unlike my hypotheses for Study 2, I expected that high causally uncertain people's self-regulation performance following the social interaction should be consistent across different levels of accuracy goal conditions. In contrast, self-regulation performance would differ for low causally uncertain people, such that when they received no instructions, they would perform worse than when they received accuracy goal instructions. Consistent with the methods used in the previous studies, the role of self-esteem was also investigated.

<center>Method</center>

Participants

One hundred and thirty-seven women from an introductory psychology class at Queen's University participated in this study. Participants' mean age was 18.26 years (*SD* = 1.96) ranging from 17 to 38 years. Participants received 1.0% towards their introductory psychology grade for their participation.

In a post-experimental measure of suspiciousness, 1 participant reported knowing that their conversation partner was a confederate, and 23 participants incorrectly reported

<center>55</center>

that the anagrams were unsolvable. Additionally, one participant was excluded because they completed only 3 of the 14 items on the CUS. Thus a total of 25 participants were excluded from the final analyses.[12] Consequently, the final sample of 112 participants (82% of original sample) had a mean age of 18.32 years ($SD = 2.15$) ranging from 17 to 38 years.

Materials (See Appendix C for all Study 3 materials not used in Studies 1 and 2)[13]

    Scales.[14] As in Studies 1 and 2, the CUS ($M = 34.85$, $SD = 12.23$, ranging from 11 to 72; α = .88) scores were typical of previous research. However, the SEQ ($M = 20.06$, $SD = 5.16$, ranging from 10 to 37; α = .89) scores were significantly lower than in Studies 1, $t(111) = -19.60$, $p < .01$, and 2, $t(111) = -20.62$, $p < .01$. I conducted independent samples *t* tests to determine if participants' scores on the CUS and SEQ differed according to their accuracy goal condition. No significant differences were observed for CUS, $t(110) = 1.38$, $p = .17$, or the SEQ, $t(110) = 0.89$, $p = .37$.

Procedure

    Participants completed the same prescreening materials and were recruited to the study in the same manner as in Studies 1 and 2. Upon arrival at the laboratory,

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[12] Participants were excluded from the accuracy ($n = 8$) and the control conditions ($n = 17$), respectively. Chi-square analyses indicated a marginally significant difference in the proportion of participants excluded, $\chi^2(1) = 2.93$, $p = .09$, such that slightly more participants were excluded from the control condition than the accuracy condition. However, the remaining sample sizes ($n = 57$ for accuracy and $n = 55$ for control) were nearly equal. The samples did not differ on CUS scores, $t(135) = 1.64$, $p = .10$, or age, $t(135) = -0.75$, $p = .46$. However, they did differ significantly on SEQ scores, $t(135) = 2.27$, $p = .03$, such that the excluded participants had significantly higher self-esteem ($M = 22.64$, $SD = 4.95$) than did the participants who were not excluded ($M = 22.64$, $SD = 4.95$). Thus the participants with higher self-esteem were more likely to question if the anagrams were solvable.

[13] Iterated principal axis factor analyses supported one-factor structures for all scales with my sample.

[14] One committee member had requested that items from the Multidimensional Aptitude Battery (MAB; Jackson, 2003) be added to Study 3 to rule out the possibility that verbal ability could account for the differences on the dependent measure. Half of the MAB items (23 items in total) were included in the study. As the total score for the MAB did not correlate with the number of anagrams completed, $r(112) = .02$, $p = .83$, the CUS scores, $r(112) = .07$, $p = .45$, or the SEQ scores, $r(112) = .02$, $p = .84$, the MAB scores were not included in any of the analyses.

participants read a letter of information and signed a consent form before being randomly

assigned to one of two conditions representing the manipulation of the independent

variable. All participants completed a social self-regulation task (a personal problem

conversation with a confederate) similar to that from Studies 1 and 2 with one important

distinction: this time, the confederate discussed a personal problem and not the

participant.

The confederate's personal problem (and responses to several potential questions

regarding the personal problem) remained the same for each participant and was modeled

after a personal problem commonly discussed by participants in Studies 1 and 2. The

confederate's problem was that she was having difficulty in choosing between taking a

trip or working at her regular job for the next summer. This personal problem topic was

chosen because it had been listed as a personal problem by some of the participants in the

first two studies.[15] The confederate acknowledged that the summer seemed far away, but

she also stated that she had to make a decision in the next couple of weeks to be able to

book the trip and save the money for her expenses. To ensure that the confederate seemed

knowledgeable and could answer potential questions about both the job and the potential

trip (in terms of duties, costs, etc.), the confederate used details from a job that she had

held in the past and a trip that she had previously taken in creating her personal problem.

To reduce potential participant suspicion regarding the confederate, the procedure

for this study was improved in three ways. First, some participants in the first two studies

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[15] In reality, the person playing the role of the confederate in all three studies was always a psychology
major. Because we wanted the participants to believe that the confederate was taking PSYC 100 for the
first time, we had to hide the confederate's real major from the participants. Having the confederate discuss
a non-academic personal problem avoided discussion of details about an academic program (such as
workload, courses, and professors) outside of her major. Furthermore, choosing a non-relationship problem
avoided having to create characters or other details that may have been difficult to remember and relate
consistently.

had wondered about the confederate's age and her knowledge of how things worked on campus and at the university. In this study, if the confederate was asked, she openly acknowledged that she was an upper-year student but stated that she was taking the introductory psychology course for the first time. Second, the confederate always made sure to place a book bag or coat on the chair that the participant would be sitting in for the conversation to promote the idea that the confederate was not part of the experiment and had no idea what would happen during the study. Later when the experimenter brought the participant into the confederate's cubicle for the conversation the experimenter, she asked the confederate to move her belongings onto the floor, so that the participant would have a place to sit. Third, some participants in the previous studies had seemed mildly anxious or puzzled prior to discussing their personal problem with the confederate, and some had also indicated that they thought it was odd that only they had been asked to discuss their personal problem. In this study, to make the confederate appear puzzled by the experiment and unaware of the procedure, after the experimenter announced that only the confederate would be discussing her personal problem, the confederate acted surprised and asked the experimenter, "Ok, so we're not going to talk about her problem at all?".

Before the conversation, participants were randomly assigned to an *accuracy goal* or a control condition.[16] Half of the participants ($n = 55$) were simply told that they would have to complete some impression measures following the conversation with their partner (control condition). Thompson, Roman, Moskowitz, Chaiken, and Bargh (1994) have proposed that accuracy goal instructions need to have two components, accuracy and accountability, and the accuracy goal instructions for Study 3 were adapted from their

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[16] See Appendix C for detailed instructions given by condition.

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experiments and Jacobson (1999). Thus other half of the participants ($n = 57$) were told

that forming an accurate impression was important and that following their conversation

they would have to explain, justify, and discuss their impressions of their partner

(accuracy condition). In all conditions, participants were told veridically that their partner

was unaware of any instructions by the experimenter to skew their responses. As

manipulation checks, the confederate answered, "How much do you think the participant

was attempting to create an accurate perception of you?", and the participant answered

"How much do you think you were attempting to create an accurate perception of your

partner?" on a 9-point scale from *very little* to *very much.*

Following the conversation, all participants were given the same anagrams task

completed by participants in Study 1 and performance on this task served as the measure

of self-regulation ability in this study. Because of the possibility that the retyping task

used in Study 2 was not sensitive enough to detect the differences I was testing (although

it did replicate the causal uncertainty main effect found in previous studies), and to ease

comparison of results with those of Study 1, I used the same anagrams that had been used

in Study 1. Participants also answered, "How much did you have to control yourself on

the anagram task?" on a 9-point scale from *not at all* to *very much*, and "Did the anagram

task require much effort?" on a 9-point scale from *definitely no* to *definitely yes.* When

participants were finished, they were debriefed and thanked for their time.

<div align="center">Results</div>

Manipulation Check

The success of the accuracy goal manipulation was assessed by examining the

participants' and confederates' estimates of how much participants attempted to create an

accurate perception of the confederate with independent samples *t* tests. Neither the

confederate or participant ratings, nor the participant ratings of how much they had to

control themselves or the effort required by the anagrams task were significant (*ps* > .46).

However, as in Studies 1 and 2, these questions were answered after participants

completed the difficult anagrams task. Therefore, participants may have downplayed the

amount of effort they had planned on exerting on the anagram task in proportion to their

own perception of their performance on the task. Indeed, participant's reported amount of

effort was significantly associated with the number of anagrams they completed, $r(111) =$

$-.27, p < .01$.

Regression Analysis[17]

 Participants completed an average of 2.42 anagrams (*SD* = 2.30) within the six-

minute time limit, with a range from 0 to 10 completed. This anagram performance was

comparable to the participant performance in Study 1. To assess the relationship between

performance on the anagrams and the predictor variables, a regression analysis was

conducted. Participants' number of completed anagrams was regressed onto their

centered CUS scores; their centered SEQ scores; an effects-coded accuracy condition

variable (+1 = accuracy goal condition and -1 = control condition); and all two- and

three-way interactions.

 A significant main effect was found for the SEQ, $B = -0.11, t(104) = -2.24, p =$

.03, such that higher self-esteem scores were associated with worse anagram

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[17] As done in Study 1, I conducted a correlation analysis to determine is causal uncertainty alone was significantly related to the anagram performance, but this analysis was not significant, $r(112) = .01, p = .97$. I also conducted the analysis after selecting only the participants who participated in the control condition, but this analysis was also not significant, $r(55) = .04, p = .80$. However, as previously discussed, these analyses do not necessarily indicate a failure to replicate the effects demonstrated in Jacobson et al. (2006) due to collapsing across conditions for the first analysis, and due to small sample size for the second analysis. The correlation matrix for this study is presented in Appendix C.

performance. However, this main effect was qualified by a marginally significant CUS X SEQ X accuracy condition interaction, $B = 0.01$, $t(104) = 1.85$, $p = .07$. To interpret this interaction, the CUS X accuracy condition interaction was examined separately at higher and lower levels of SEQ in the same manner that was done in Study 1. Thus, two separate regression analyses were performed. In one regression analysis, I examined the CUS X accuracy condition interaction at higher levels of SEQ, and in the second analysis, I examined the CUS X accuracy condition interaction at lower levels of SEQ.

For the analysis replacing SEQ with High SEQ, the CUS X accuracy interaction was not significant, $B = 0.03$, $t(104) = 1.02$, $p = .31$. Therefore, the interaction of causal uncertainty and accuracy condition did not predict anagram performance for high self-esteem participants. For the analysis replacing SEQ with Low SEQ, the CUS X accuracy condition interaction was marginally significant, $B = -0.06$, $t(104) = -1.75$, $p = .09$. To interpret this interaction, the accuracy condition differences were examined separately at higher and lower levels of CUS. The High and Low CUS variables were created in the same manner as the High and Low SEQ variables. Two separate regression analyses were performed. In one regression analysis, I examined the difference between the accuracy goal and control conditions on anagram performance at higher levels of CUS, and in the second analysis, I examined the difference between the accuracy goal and control conditions on anagram performance at lower levels of CUS. In the first analysis, the number of completed anagrams were regressed onto the continuous High CUS variable; the continuous Low SEQ variable; the effects-coded condition variable; and all two- and three-way interactions. The second analysis was the same but with High CUS replaced by Low CUS.

The results of these analyses are shown in Figure 5. Although I had not made specific predictions about the influence of self-esteem on the results, I had hypothesized that for the High CUS participants, accuracy condition would not influence self-regulation performance. For High CUS participants with Low SEQ, the results were consistent with my predictions, such that participants in the accuracy goal condition did not differ from those in the control condition, $B = -0.44$, $t(104) = -0.76$, $p = .45$, $d = 0.14$. On the other hand, I had hypothesized that for Low CUS participants, instructions for creating an accurate perception of the confederate would be significantly associated with better self-regulation performance. For Low CUS participants with Low SEQ, the results supported my predictions, such that those in the accuracy goal condition completed a higher number of anagrams than did those in the control condition, $B = 0.91$, $t(104) = 2.04$, $p = .04$, $d = 0.39$.
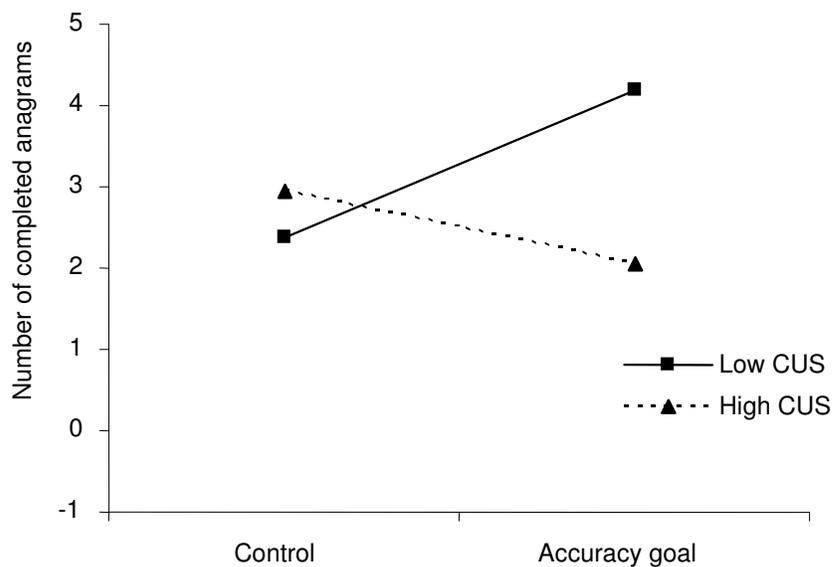

Figure 5. Simple slope lines comparing the accuracy and control conditions on anagram performance for High and Low Causal Uncertainty Scale (CUS) scores, for participants with Low Self-Esteem (SEQ) scores.

Summary of Results

The relationship of causal uncertainty to self-regulation abilities differed by accuracy condition. Similar to the results for Study 1, the results for participants with lower self-esteem were consistent with my predictions, such that high causally uncertain participants' performance on the subsequent self-regulation task was consistent regardless of goals for accuracy. In contrast, but as predicted, low causally uncertain participants' performance on subsequent self-regulation task improved with instructions to create accurate impressions of their partner. For participants with higher self-esteem, participants' self-regulation abilities did not differ by causal uncertainty or accuracy goal conditions.

Discussion

The purpose of Study 3 was to investigate if the goals for accurate social perception could account for the relationship between causal uncertainty and self-regulation abilities. I hypothesized that high causally uncertain people would be focused on accurate social perception regardless of condition and would demonstrate consistent self-regulation abilities regardless of accuracy instructions. In contrast, when focused on obtaining an accurate impression of their partner, low causally uncertain people should engage in less self-regulation of their own behavior during the conversation and, therefore, experience improved self-regulation performance on the anagrams task.

My hypotheses were largely supported by the data. For participants with lower self-esteem, the results were consistent with my predictions, such that high causally uncertain participants' performance on the subsequent self-regulation task was consistent regardless of goals for accuracy; whereas low causally uncertain participants'

performance on subsequent self-regulation task improved with instructions to create accurate impressions of their partner. In contrast, for participants with higher self-esteem, self-regulation abilities did not differ by causal uncertainty or accuracy goal conditions.

Role of Accuracy on the Causal Uncertainty to Self-Regulation Relationship

This study provided evidence that goals for accurate social perception moderated the relationship of causal uncertainty to self-regulation abilities. But why would this effect exist? The finding that high causally uncertain people demonstrate consistent self-regulation performance regardless of accuracy goal is consistent with the idea that they strive for accuracy in social interactions under usual circumstances. The accuracy goal manipulation then may not have changed their self-regulation performance because they were already sacrificing the self-regulation of their own behavior in order to focus their attention on accurate social perception. As previously discussed, high causally uncertain people's chronic exposure to rejection could lead them to believe that self-regulating during social interactions is fruitless. During social encounters, high causally uncertain people may fail to engage in effortful self-regulation (or not self-regulate at all), and hence, they are less depleted by such activities. In addition, effortful and less biased (Weary et al., 2001) social-cognitive processes that high causally uncertain people engage in require self-regulation and, therefore, expending self-control strength on their own behavior during social interactions may interfere with the resources available for accurate social perception (Gilbert et al., 1988). Thus, during the social interactions, high causally uncertain people engage in less self-regulation of their own behavior in favor of accuracy regardless of external instructions to focus on accurate social perception. As previously discussed, future studies should investigate if indexes of rejection mediate the

relationship of causal uncertainty to self-regulation following social tasks and if causal uncertainty is related to people's lay theories about how self-regulation works. Perhaps high causally uncertain people's history of rejection experiences could predict a shift from self-regulating their own behavior to a focus on accuracy in an attempt to better understand their social environment.

Why would the self-regulation performance of low causally uncertain people be greater in the accuracy goal condition than in the control condition? This finding is consistent with the idea that low causally uncertain people, who may be less likely to experience rejection, self-regulate their own behavior when interacting with others under usual, control circumstances. However, when they are focused on creating an accurate impression of their partner, low causally uncertain people may sacrifice self-regulating their own behavior to devote these resources to the accuracy task. Therefore, low causally uncertain people who are instructed to focus on accurate social perception will have more self-regulatory resources available for subsequent tasks like the anagrams.

Individuals high in causal uncertainty are (by definition) not confident in their abilities to interact appropriately with others, which may further drive their goals for accuracy and be associated with less successful interactions. Future studies should also investigate how the fulfillment of accuracy goals influences the behavior of causally uncertain people. For example, after engaging in a task assessing empathic accuracy or emotion recognition abilities, at which causally uncertain people are adept, the participants could receive results indicating superior performance. These results may increase confidence in causally uncertain individuals and persuade them that their goal for accuracy has been achieved. If causally uncertain individuals feel that their accuracy

goals have been met, then they may allow themselves to disengage from those goals and instead focus on regulating their own behavior. If lack of confidence produces social difficulties for people with causal uncertainty, then this manipulation should result in more positive outcomes in a subsequent social interaction.

Role of Self-Esteem on Self-Regulation Performance

As in Studies 1 and 2, self-esteem was included to investigate the possibility that the relationship between causal uncertainty self-regulation abilities could be accounted for by self-esteem and to determine if this relationship differed for high vs. low self-esteem individuals. In this study, the relationship of causal uncertainty to self-regulation performance was moderated by accuracy goals in the predicted manner but only for low self-esteem people. For high self-esteem participants, I observed no significant differences. These results somewhat mirror the results of Study 1, such that a) in both studies self-esteem moderated the relation of causal uncertainty to self-regulation following a social task, and b) in both studies, the predicted results were found for low but not high self-esteem people. These results will be discussed further in the General Discussion.

Limitations

One possible limitation of this study is the failure to find any significant differences in the accuracy goal manipulation checks. Therefore, the manipulation of accuracy goals in this study may not have been strong enough to result in differences in actual attempts to create accurate impressions between the participants in the accuracy goal and control conditions. Indeed, both the confederate and participant assessments of how much the participants were attempting to create an accurate impression of their

partners did not differ by condition. However, as the participant was listening to a personal problem and had no prior experience with the confederate, the confederate may not have been able to accurately judge whether or not the participant was attempting to gain an accurate perception of her.

Although the failure to obtain a significant goal effect may indicate that the goal manipulation was not effective, it is consistent with previous research that has failed to find differences on self-reports of accuracy motivation (Chen, Shechter, & Chaiken, 1996; Jacobson, 1999; Kassin & Hochreichl, 1977; Pelham & Neter, 1995). For example, in a study by Kassin and Hochreichl (1977) participants in the incentive for accuracy conditions read instructions indicating that their reports of causal attributions were either indicative of their ability to understand causal factors, an aspect of social intelligence, or that their reports were very important and that their serious cooperation was needed. The researchers used the number of words written by subjects in their open ended explanations as a measure of response importance or task involvement, and as a crude check on the effectiveness of the instructional manipulations. Despite the clear and consistent effects of the incentive manipulations on the sophistication of participants' causal attributions, the analysis of variance on the number of words written yielded only marginally significant differences.

For another example, two studies by Pelham and Neter (1995) also failed to demonstrate significant differences on manipulation checks for their accuracy motivation manipulation. In one study (Study 2), participants reported how hard they had tried to remember the names in a list, as well as how hard they had tried to accurately judge the number of male and female names in their list, both on scales ranging from 1 *(not at all*

hard) to 9 *(extremely hard)*. Despite the clarity of the study's primary findings, there were no significant main or interactive effects of accuracy motivation on the two effort items. In a second study (Study 3), participants reported how motivated they had been to make their judgments in an area estimation task accurately on a scale ranging from 1 *(not at all motivated)* to 7 (*extremely motivated)*. Only a marginally significant effect of accuracy motivation emerged such that, relative to participants in the low accuracy motivation group, those in the high accuracy motivation group reported trying somewhat harder to make accurate judgments. Pelham and Neter (1995) speculated that this manipulation check yielded more favorable results than did the manipulation checks in the previous study because participants considered making the area judgments to be less intellectually threatening than making memory judgments.

In the present study, participants' self-reports of how much they were attempting to create an accurate impression of their partner were generally above the midpoint of 5 on the scale, with 85.7% of responses falling at 5 or above, and 79.5% of responses falling at 6 or above. Participants' self-reports may have been tainted by their self-presentational concerns. Participants could have overrated their motivation to be accurate because they did not want to appear lazy or indifferent in the eyes of the experimenter. Alternatively, self-presentational concerns may have led some participants to underrate their motivation. Indeed, Pelham and Neter (1995) proposed that self-report measures of motivation may be unreliable because individuals may not want to report that they were trying to be accurate because they risk embarrassment if they are shown to be incorrect in their judgments. Unfortunately, as pointed out by Pelham and Neter (1995) the only established method of reducing these self-presentational concerns would be to guarantee

participants anonymity in their responses, which isn't possible with accuracy goal manipulations that involve accountability. This embarrassment concern may be especially true for high causally uncertain people who engage in more cognitive processing of social information but, at the same time, have more uncertainty about the social environment and are less confident in their judgments (Jacobson, 1999). In the present study, I did not find a significant relationship between causal uncertainty and accuracy motivation, $r(112)$ = -.04, p = .64, overall or within either the control or accuracy conditions (ps > .46).

Another possible reason for the failure to find differences between conditions on the manipulation check is that everyone actually may have been very motivated to perform well, and the null results were due to a ceiling effect. Consequently, their responses may have been honest reports, but the manipulation check question just was not sensitive enough to pick up differences. Another possible explanation is that people just may not have access to the necessary information or the ability to accurately report on their behavior (Nisbett & Wilson, 1977; Pelham & Neter, 1995). Individuals may not be able to accurately report the amount of cognitive effort that they expend (Petty & Cacioppo, 1986), and this lack of awareness may also extend to the amount or nature of motivation that they possess as well. Future studies could employ multiple questions regarding accuracy motivation to attempt a more reliable measure. In addition, future studies could also vary the strength of a goal prime to determine what strength is needed to activate the accuracy goal (as done in Jacobson, 1999) or use implicit measures (such as the implicit associations test; Greenwald & Banaji, 1995) to establish that a particular goal state was activated.

Participant reports of how much control or effort the anagram task required also

did not differ by condition. However, as in Study 1, the manipulation check questions were answered after participants completed the anagrams task, which was quite difficult. Participants may have downplayed the amount of effort they had planned on exerting on the anagram task in proportion to their own perception of their performance on the task. Furthermore, the rational behind these questions were that participants in the control condition should have found the conversation with the confederate more depleting than the accuracy goal participants, and therefore, they were expected to report that the anagrams task required more effort and control. As I explained for Study 2, these questions may have been flawed in that I did not expect that the anagrams would actually require different amounts of effort depending on condition; instead I expected that the participants' perceptions of how much effort or control they had remaining to complete the task would differ. Therefore, the responses to the question regarding control and effort may have not have been worded appropriately to detect the differences I had anticipated.

In addition, although the original sample consisted of 137 participants, the final sample (82% of the original; $N = 112$) was reduced due to suspiciousness about the confederate and the anagrams task. Only one of the excluded participants reported knowing that their conversation partner was a confederate, which was an improvement over Study 1. However, 23 participants incorrectly reported that the anagrams in the self-regulation task were unsolvable. I used the same anagrams as in Study 1 to be able to compare the results of the two studies, especially as the retyping task resulted in mostly null results for Study 2. As in Study 1, the anagrams proved to be fairly difficult for the participants, as indicated by fairly low performance ($M = 2.42$ anagrams completed out of

13 possible anagrams). Thus, participants who struggled to complete the task may have incorrectly assumed that their performance was due to the anagrams not having solutions.

Furthermore, as discussed in Study 1, another limitation of the present study may have been a restriction of range problem in completion of the anagrams as the dependent variable. Although the mean and standard deviation of the number of completed anagrams was slightly elevated in this study over Study 1, the standard deviation of 2.30 anagrams indicates that the majority of participants completed fewer than 7 of the 13 anagrams in the task. None of the participants completed all 13 anagrams. However, the limited variability should have reduced, not enhanced, the possibility of being able to significantly predict self-regulation performance. As stated in Study 1, future studies examining self-regulation with an easier set of anagrams may improve the variability in performance.

CHAPTER 5

GENERAL DISCUSSION

Jacobson et al.'s (2006) research established that high causally uncertain people exhibit enhanced self-regulation performance following a social interaction, but it did not determine the mechanism behind this somewhat paradoxical finding. The purpose of the present research was to investigate the role of causal uncertainty on self-regulation performance and several possible mechanisms for this relationship. I also examined whether or not these relationships were accounted for or moderated by self-esteem.

Several possible mechanisms exist for the relationship between causal uncertainty and self-regulation performance. First, the Jacobson et al. (2006) studies always used an initial social task. Perhaps high causally uncertain people, who also are more likely to be socially rejected (Passey, 2006), have come to believe that self-regulating during social interactions is not worthwhile, and hence, they are less depleted by such activities. Second, in the earlier studies, high casually uncertain people may have performed better than low causally uncertain people did because during the initial social task, they were trying to conserve their energies for future activities. As a result, high causally uncertain people had more energy remaining for the self-regulation assessment.

In Study 1, I investigated whether the social or nonsocial nature of the depleting task and expectations about the need for future self-control could account for the relationship between causal uncertainty and self-regulation abilities. I found that for the social task, high causally uncertain participants' self-regulation performance following the personal problem task was consistent across different levels of expectations for future self-control. This finding was true for high causally uncertain people regardless of self-

esteem. In contrast, but as predicted, low causally uncertain participants' performance on subsequent self-regulation tasks improved with increasing instructions to conserve energy for future tasks. However, the latter occurred only for low causally uncertain people with lower levels of self-esteem. For low causally uncertain participants with higher levels of self-esteem, self-regulation performance decreased with increased expectations for future self-control. Contrary to the results in the social condition, the findings for the nonsocial condition did not differ by self-esteem. Learning that the future task involved self-control and further learning that the initial task was self-control depleting were both associated with increases in self-regulation abilities for high causally uncertain participants. In contrast, self-regulation abilities did not differ for low causally uncertain participants upon learning that the future task involved self-control and marginally decreased when they learned that the initial task was depleting. Thus the influence of expectations for future self-control on the causal uncertainty-self-regulation relationship is reversed for nonsocial tasks, in that the high, not the low, causally uncertain people responded to different expectations for future self-control.

In Jacobson et al. (2006), high causally uncertain people also may have performed better than low causally uncertain people because they engage in less self-presentation during the social interaction. Self-presentation is in itself self-regulation depleting (Vohs et al., 2005); thus, if low causally uncertain people are engaging in more self-presentation than high causally uncertain people do, they would be using more self-regulation strength and consequently perform worse on the subsequent self-regulation task. In Study 2, I examined whether or not self-presentation could account for the relationship between causal uncertainty and self-regulation abilities by manipulating participants' self-

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presentation instructions before the social interaction. In this study, higher causal uncertainty was associated with better self-regulation performance following the social interaction. But contrary to my hypotheses, self-presentation goals did not moderate the causal uncertainty – self-regulation relationship, and no other significant effects emerged. Also, in contrast with Study 1, self-esteem did not influence self-regulation performance in this study.

Finally, in Jacobson et al. (2006), high causally uncertain people may have exhibited reduced self-regulation depletion compared to low causally uncertain people due to goals for accurate social perception. Perhaps high causally uncertain people are more focused on creating an accurate representation of their social interaction partners, and for this reason, they do not self-regulate their own behavior to the same extent, thereby expending less self-regulatory strength. In Study 3, I investigated whether or not an accuracy goal could account for the relationship between causal uncertainty and self-regulation abilities by manipulating participants' goals for the conversation with the confederate. In this study, at lower levels of self-esteem, high causally uncertain participants' performance on the subsequent self-regulation task was consistent regardless of goals for accuracy; whereas low causally uncertain participants' performance on a subsequent self-regulation task improved with instructions to create accurate impressions of their partner. In contrast, at higher levels of self-esteem, self-regulation abilities did not differ by causal uncertainty or goal condition.

In sum, these three studies investigated four possible explanations for the relationship between causal uncertainty and self-regulation. These studies established that the social nature of the self-regulation depleting task, expectations regarding future need

for self-control, and goals for accurate social perception all contribute to the relationship between casual uncertainty and self-regulation ability. In addition, these studies revealed that the relation of causal uncertainty to self-regulation performance cannot be explained by self-presentation goals and is moderated by self-esteem. These studies are the first to examine the potential mechanisms of the causal uncertainty – self-regulation relationship, and Study 1 was the first to examine the association of causal uncertainty to self-regulation performance following a nonsocial self-regulation depleting task. All three studies examined the self-regulation abilities of causally uncertain individuals within carefully controlled social interactions. Also, these studies employed different self-regulation assessment tasks than used in Jacobson et al. (2006), thus enhancing the generalizability of the causal uncertainty – self-regulation relationship.

Future Directions

   Self-awareness.   As previously discussed, Baumeister and colleagues (e.g., Baumeister & DeWall, 2005) have established that social rejection results in self-regulation failures, and Jacobson and colleagues (e.g., Jacobson et al., 2009) have demonstrated that high causally uncertain people experience social rejection more often than do low causally uncertain people. In addition to examining if indexes of rejection mediate the relationship of causal uncertainty to self-regulation following social tasks, future studies should also determine if manipulating self-awareness will influence this relationship. In a series of studies establishing the link of social rejection to self-regulation depletion, Baumeister and colleagues (2005) demonstrated that increasing self-awareness eliminated the difference between rejected and included participants on self-regulation performance.

Increasing self-awareness (e.g., by ensuring that participants can see their reflection in a mirror during the interaction task) may have the same result for high causally uncertain people's self-regulation as it did for rejected participants in Baumeister and colleagues study. That is, it may increase high causally uncertain people's incentive to self-regulate during the social task, thus resulting in less self-regulation strength available for subsequent tasks. Such a study would provide evidence that high causally uncertain individuals can self-regulate during social interactions, but they fail to do so during ordinary interactions. However, increasing self-awareness also may increase awareness of the discrepancy between high causally uncertain people's current and desired states of knowledge about the causes of social events. Therefore, high causally uncertain people's self-regulation performance may increase following a manipulation of self-awareness because it also increases their error-sensitivity, which should lead to greater search for and processing of social information and even less self-regulation of their own behavior during the conversation.

Self-regulation link to social rejection. In addition to investigating the possibility that social rejection experiences could mediate the relationship of causal uncertainty to self-regulation, future studies should also investigate if this lack of self-regulation during social tasks leads to more rejection from their interaction partners. Successful self-regulation is essential for success in interpersonal relationships (Baumeister et al., 2005; Rawn & Vohs, 2006). Appearing to be and actually behaving as a good relationship partner is strongly predicted by one's ability to control one's own behavior when interacting with others. Therefore, if high causally uncertain people are failing to engage in effective self-regulation of their own behavior during social interactions (in favor of

accurate social perception), their behavior may lead them to be further rejected by their relationship partners.

However, recent research indicates that self-regulation failure can be associated with social success when regulatory strategies are maladaptive (Apfelbaum & Sommers, 2009), such as when people attempt to inhibit responses that they think are risk socially unacceptable (Crandall & Eshleman, 2003; Dovidio & Gaertner, 2004). Thus, high causally uncertain people may believe that self-regulation during social interactions is ineffective because the strategies they have used in the past have been maladaptive, ineffective, and possibly resulted in rejection. Future studies could investigate this possibility by examining behavioral data of social interactions although behavioral data obtained thus far on social interactions has failed to show that high causally uncertain people engage in more inappropriate or less appropriate behavior when interacting with others (Boucher, 2005).

The possibility remains that the lack of self-regulation in high causally uncertain people's interactions could come out in other ways that have not been coded for in the past. For example, high causally uncertain people may rush to intimacy in conversation and seek more disclosure from their partners in an attempt to gain accurate understanding. If high causally uncertain people are focused on accuracy rather than regulating their own behavior, then they may demonstrate low levels of responsiveness during the conversation, which their partners would find insensitive. Furthermore, high causally uncertain people's experiences with rejection may have led them to develop a negative interpersonal style that interferes with the success of their social interactions. In addition, their uncertainty regarding the social environment and vigilant processing of

people's behavior may have made them intolerant of behavioral inconsistency. When encountering behavior that appears inconsistent, high causally uncertain people may point out the inconsistency and ask questions about it to assess cause and effect in the social environment. Although these judgments of behavioral inconsistency may be accurate, such judgments and probes for further information may not be welcomed by interaction partners.

Coordination of Self-Regulation Goals. Future studies should also investigate the relationship of causal uncertainty to coordinating one's self-regulation goals with others. Research by Fitzsimons and colleagues (Fitzsimons, 2006, 2009; Fitzsimons, Shah, Chartrand, & Bargh, 2005) has shown that exposure to significant others and social interactions activate interpersonal goals. In addition, people adjust their own goal pursuit to match those in the social environment. Fitzsimons (2009) has proposed that people coordinate their goals (and the manner in which they are pursued) with others to maximize efficiency and harmony and leave more self-regulatory resources available for other tasks. For example, one is likely to coordinate one's self-regulation goals when presented with someone who has failed on a related task such that it will increase one's own pursuit of that goal. Likewise, when presented with someone who has completed a goal, one should demonstrate a decrease in pursuit of that goal.

Future studies could investigate if high causally uncertain people are adept at coordinating their goals with others. If they are so focused on accurate social perception and processing of social information, they may fail to recognize the failure or completion of goals in others, leading to a lack of coordination. This lack of coordination of goals may further lead them to experience interpersonal difficulties and to waste self-regulation

strength on the pursuit of goals that have already been achieved. Future studies should

also investigate if causally uncertain people will cease their own pursuit of a goal for

accurate social information if they perceive that another has already achieved that goal.

Self-Esteem

Many questions regarding the influence of self-esteem on the relationship of

causal uncertainty to self-regulation abilities remain. The need for further investigation is

especially true considering that across three studies, I found one significant positive

(Study 1), one significant negative (Study 3), and one non-significant (Study 2) main

effect between self-esteem and self-regulation performance although the significant

effects were both qualified by higher order interactions.

First, in Study 1, why would self-esteem moderate the influence of causal

uncertainty on self-regulation performance following social tasks but not following

nonsocial tasks? One possibility is the significant difference in the self-esteem scores

between the two types of tasks. As previously stated, self-esteem is associated with

interpersonal success and acceptance in social situations (Leary & MacDonald, 2003;

Leary et al., 1995), and participants completed the measure of self-esteem following the

social interaction. Having the opportunity to discuss their personal problem with another

person may have increased self-esteem, thus resulting in the higher self-esteem scores for

participants in the social condition than participants in the nonsocial condition. Future

studies may examine if prescreening self-esteem scores (which would not be influenced

by the tasks in the experiment) or experimentally manipulated self-esteem scores also

moderated the relationship of causal uncertainty to self-regulation abilities.

Second, in Study 1, why would self-esteem influence the relationship of causal

uncertainty to self-regulation abilities for low, but not for high, causally uncertain people? As previously discussed, high causally uncertain people may have been self-regulating at a minimal level during the social interaction either because they have learned over time that engaging in self-control activity in a social context is fruitless and thus are preserving their energies for other tasks. In contrast, low causally uncertain people, who have not experienced chronic rejection, may not have been self-regulating at a minimal level, and therefore, their performance may have been more influenced by levels of self-esteem.

In Study 1, low causally uncertain people with low self-esteem performed as expected. That is, they exhibited better self-regulation performance when they had increased expectations for future self-control. In contrast, low causally uncertain people with high self-esteem performed worse under these conditions. In addition, in Study 3, all participants with low self-esteem performed as expected; whereas participants with high self-esteem did not and instead exhibited lower self-regulation performance.

Why would people with low self-esteem differ from people with high self-esteem on self-regulation performance? Furthermore, why would the high self-esteem participants demonstrate lower self-regulation performance? One possibility is that high self-esteem participants did not feel the need to exert self-regulation energies following their discussion with the confederate because they had already achieved acceptance. DeWall et al. (2008) demonstrated that participants who had already been accepted failed to engage in self-regulation that they believed would lead to acceptance. However, we do not know why high self-esteem participants in Study 1 would believe that their performance on the anagrams task would be associated with social acceptance.

Another possibility is that high self-esteem people in Study 1 did not feel the need to engage their self-regulation strength during the anagrams task because the instructions regarding the future need for self-control and the depleting nature of the personal problem task led them to believe that their performance on the anagrams would not be indicative of ability. Because performance could be attributed to the need for self-control strength rather than intelligence or competence on the task, poor performance would not be threatening. Therefore, high self-esteem people may have chosen not to expend the effort.

A third possibility is that low self-esteem people, who presumably feel less accepted and socially competent, may have felt that they performed poorly in the conversation with their partner. This estimation of poor performance during the social interaction may have made them more motivated to do their best on the anagrams task, thus resulting in better performance than their high self-esteem counterparts.

A fourth possible explanation is that the high self-esteem participants in both Studies 1 and 3, who presumably have more confidence in their abilities to perform well, simply misjudged the amount of effort they would need to expend in order to perform well on the anagrams task. High self-esteem is associated with a tendency to make unrealistically positive claims about the self (Roth, Snyder, & Pace, 1986). Therefore, high self-esteem people may be vulnerable to overconfidence or overestimating what goals they can achieve, thus increasing their chances for failure. They may have presumed that they could perform well on the task without much effort, and thus they did not exert the self-regulation required to perform well. In contrast, people with low self-esteem may be more modest in their expectations for achievement, and they may have

recognized that performing well on the task would take more substantial effort on their part. Although I found a small trend in Study 3 for higher self-esteem to be associated with a higher estimation of the effort required for the anagrams, $r(112) = .16$, $p = .10$, participants reported on the effort required only after they had already completed the task. Participants did not report how much effort they had expected to have to devote to the anagrams before they completed them.

A final explanation relates to self-esteem threat. Protecting one's self-esteem is a fundamental goal, and people with high self-esteem are presumed to be better at achieving this goal than are people with low self-esteem Baumeister et al., 1993). High self-esteem is associated with generally superior capabilities for self-regulation (Bandura, 1989; Taylor, 1989). In a series of studies conducted by Baumeister and colleagues (1993), people with high self-esteem were expected to outperform people with low self-esteem on a self-regulation task under normal conditions. However, when faced with an ego threat or challenge (referring to any event or communication having unfavorable implications about the self), high self-esteem people were expected to focus on maintaining strongly favorable views of the self, causing them to overestimate their abilities and subsequently experience self-regulation failure. Indeed, Baumeister and colleagues' high self-esteem participants showed superior self-regulation in the absence of ego threat. However, ego threat caused high self-esteem participants to set inappropriate and risky goals that they were not able to achieve.

Although the procedures for the current studies were not designed to be ego threatening, writing a description of a mild-to-moderately distressing personal problem on the computer before the social interaction may have brought to mind unfavorable

implications for the self. Thus, high self-esteem people may have perceived a threat to their self-esteem, which heightened their self-protective goals and led them to underestimate their need to conserve self-regulation strength during the social interaction for use on the subsequent self-regulation task. Indeed, in Study 1, the knowledge of a future task may have increased these feelings of threat if high self-esteem participants interpreted the instructions as warnings of future failure. Therefore, high self-esteem participants' overconfidence in their self-control abilities may have caused them to set themselves up for poorer self-regulation performance.

In addition, Lambird and Mann (2006) characterized individuals as having defensively high self-esteem if in addition to scoring high on a traditional self-report measure of self-esteem measure, they also scored high on a measure of self-presentation bias or scored low on an implicit measure of self-esteem. Defensively high self-esteem individuals are particularly sensitive to negative feedback. In their studies, Lambird and Mann (2006) demonstrated that defensively high self-esteem individuals demonstrated poorer self-regulation following ego threat; whereas those having genuinely high self-esteem did not. Therefore, future studies should examine the influence of various subtypes of self-esteem on self-regulation performance. Future studies should examine whether or not manipulations of ego threat or measures of defensively high self-esteem moderate the causal uncertainty-self-regulation relationship.

For the Study 3 finding that accuracy goals did not moderate self-regulation performance for high self-esteem people could be due to the high self-esteem people's overestimation of their abilities to accurately form impressions of their interaction partners, regardless of condition. If so, then these participants should have continued to

self-regulate their own behavior during the interaction rather than sacrificing the regulation of their own behavior in favor of accurate social perception. Consequently, they were more depleted by the social interaction task and had fewer self-regulatory resources remaining for the anagrams task, resulting in poorer performance. I did not observe a relationship between self-esteem and participants' assessments of their attempts to create an accurate perception of their partner, $r(112) = -.01$, $p = .99$. However, as discussed in Study 3, participants' assessments of their own accuracy motivation may be flawed.

One limitation to making any conclusions regarding the role of self-esteem on the relationship of causal uncertainty to self-regulation performance based on Study 3 is that self-esteem scores were significantly lower in this study than in Studies 1 and 2 (see t tests reported in Study 3). Perhaps the self-esteem of the participants in the prior two studies benefited from the participants being able to discuss their personal problem during their interaction with the confederate. In Study 1, the participants who completed the nonsocial task, and thus did not discuss their problem with the confederate, did exhibit lower self-esteem scores than did the participants who completed the social task. However, the mean self-esteem score for that sample of participants ($M = 28.90$, $SD = 5.54$) was still higher than that of the participants in Study 3 ($M = 20.06$, $SD = 5.16$), $t(198) = 11.64$, $p < .001$. These findings further illustrate the need for future studies to examine the role of prescreened self-esteem (that would not be tainted by the experiment) on the relationship of causal uncertainty to self-regulation performance.

Limitations

Only women participated in these studies because both Seeley and Gardner (2003) and Jacobson et al. (2006) demonstrated that women experienced more self-regulation depletion than did men. In addition, the participant pool and the available confederates for these studies were predominantly women. Furthermore, in looking at same-sex interactions, we could reduce most concerns regarding sexual attraction between the participant and confederate as an explanation and avoid any increase in causal uncertainty effects due to interacting with an out-group member (cf. Weary & Jacobson, 1997). However, future studies should determine if the findings of the current set of studies are replicated in men and/or mixed-sex dyads. If interacting with an out-group member increases causal uncertainty, then participants may focus even more on accuracy and preservation of self-regulation resources for future tasks. This enhancement of causal uncertainty effects when interacting with an out-group member would be consistent with the findings of Weary and Jacobson (1997).

Conclusion

The findings of these studies have implications for understanding of the effects of causal uncertainty in the domains of self-regulation and interpersonal relationships. In addition to contributing to the growing causal uncertainty literature, these studies may also stimulate future studies assessing: a) the role of self-regulation resources depletion on the social and cognitive benefits of causal uncertainty, and b) the role of self-regulation in the interpersonal difficulties of causally uncertain people. Baumeister et al. (2005) and Rawn and Vohs (2006) contend that successful self-regulation is essential for success in interpersonal relationships, and Jacobson et al. (2006) propose that self-regulation may account for the social difficulties experienced by high causally uncertain

people. If explanations for the influence of causal uncertainty on social difficulties could be determined, then perhaps interventions could be generated to assist causally uncertain people in their social interactions, thus reducing their likelihood of experiencing further interpersonal problems. As previously discussed, rejection may have several serious consequences for emotional maladjustment including anxiety (Baumeister & Tice, 1990) and loneliness, depression, and helplessness (Williams & Sommer, 1997). It also may result in harmful cognitive and behavioral effects, such as self-defeating behaviors (Twenge et al., 2002) and decline in cognitive performance (Baumeister, Twenge, & Nuss, 2002). Given that causally uncertain people are more likely to experience rejection and have more extreme negative reactions to interpersonal interactions, and that social situations typically occur daily, they should be more likely to experience any number of these maladaptive consequences. Therefore, understanding the relation of causal uncertainty to relationship difficulties may help causally uncertain individuals cope with and avoid many social and emotional costs. By investigating the mechanisms behind the relationship between causal uncertainty and self-regulation, the results of this program of research provide the basis for future investigations on individual differences in self-regulation and how these differences contribute to both social perception and relationship difficulties.

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STUDY 1 EXPERIMENTAL MATERIALS

CONSENT TO ACT AS A HUMAN RESEARCH SUBJECT – Nonsocial Condition of Study 1
Personality and Motivation Study
Jennifer Passey and Jill A. Jacobson, Ph.D.
Department of Psychology, Queen's University

NAME OF PARTICIPANT (please print): _____

PURPOSE OF THE STUDY: I have been asked to participate in a research project designed to investigate the influence of personality variables on interactions with others.

PARTICIPANT: I understand that I will report my own feelings and attitudes and complete some personality scales. If time permits, I may be asked to complete some tasks for a study investigating word perception and language processes. It will take approximately 1 hour to complete all tasks.

RISKS: Minimal risks are anticipated. If there is something that makes me uncomfortable, I understand that I have the right to refuse to answer any questions or withdraw from the study at anytime without penalty. Also, if I do experience any discomfort, I realize that I may contact the Student Counseling and Disability Centre at 533-2506.

BENEFITS: I will either receive 1.0 credit for my Psychology 100 course through the Queen's University Psychology subject pool or be paid $10. Also, I have the opportunity to learn more about social psychology and research in general.

CONFIDENTIALITY: I understand that any information that I provide will be stored in a locked cabinet in a secured building. I hereby authorize the use of all records and personal data derived from this experiment for research purposes. I understand that any information derived from this research project that personally identifies me will not be voluntarily released or disclosed by the researchers without my separate consent, except as specifically required by law.

IF I HAVE QUESTIONS: If I have any comments or questions regarding the conduct of this research or your rights as a research participant, you may contact Dr. Jill Jacobson at 533-2847, the Head of the psychology department at 533-2492, and/or the General Ethics Board for Queen's University, c/o Research Services at 533-6081.

VOLUNTARY PARTICIPATION: By signing below, I indicate that I have read the Letter of Information and understand the nature of this study. In addition, the experimenter has answered my questions satisfactorily. I know that I may refuse to answer any questions or discontinue my involvement at any time without penalty. My

signature below indicates that I have read the information in this form and consent to participate in this study voluntarily.

_____   _____

SIGNATURE OF PARTICIPANT   DATE

<p style="text-align:center">This study has received clearance from Queen's University.</p>

**CONSENT TO ACT AS A HUMAN RESEARCH SUBJECT - Social Condition of
Study 1, Study 2, and Study 3**
Personality, Motivation and Interactions with Others Study
Jennifer Passey and Jill A. Jacobson, Ph.D.
Department of Psychology, Queen's University

NAME OF PARTICIPANT (please print): _____

PURPOSE OF THE STUDY: I have been asked to participate in a research project
designed to investigate the influence of personality variables on interactions with others
and motivation.

PARTICIPANT: I understand that I will engage in a conversation with another
participant, as well as report my own feelings and attitudes and complete some
personality scales. If time permits, I may be asked to complete some tasks for a study
investigating word perception and language processes. These procedures will take
approximately 1 hour.

RISKS: Minimal risks are anticipated. If there is something that makes me
uncomfortable, I understand that I have the right to refuse to answer any questions or
withdraw from the study at anytime without penalty. Also, if I do experience any
discomfort, I realize that I may contact the Student Counseling and Disability Centre at
533-2506.

BENEFITS: I will either receive 1.0 credit for my Psychology 100 course through the
Queen's University Psychology subject pool or be paid $10 if I have completed my
credits. Also, I have the opportunity to learn more about social psychology and research
in general.

CONFIDENTIALITY: I understand that any information that I provide will be stored in
a locked cabinet in a secured building. I hereby authorize the use of all records and
personal data derived from this experiment for research purposes. I understand that any
information derived from this research project that personally identifies me will not be
voluntarily released or disclosed by the researchers without my separate consent, except
as specifically required by law.

IF I HAVE QUESTIONS: If I have any comments or questions regarding the conduct
of this research or your rights as a research participant, you may contact Dr. Jill Jacobson
at 533-2847, Ronald R. Holden, the Head of the psychology department at 533-2492,
and/or Joan Stevenson, Chair of the General Ethics Board for Queen's University, c/o
Research Services at 533-6081.

VOLUNTARY PARTICIPATION: By signing below, I indicate that I have read the
Letter of Information and understand the nature of this study. In addition, the
experimenter has answered my questions satisfactorily. I know that I may refuse to
answer any questions or discontinue my involvement at any time without penalty. My

signature below indicates that I have read the information in this form and consent to participate in this study voluntarily.

_____   _____
SIGNATURE OF PARTICIPANT   DATE
                    This study has received clearance from Queen's University.

DEBRIEFING – Nonsocial Condition of Study 1

      This experiment examined the relationship between various personality variables and motivation. Specifically, we are interested in examining how your answers to questionnaires correspond to your performance on self-regulation tasks. We were also interested in how your expectations about a future self-control task would influence your performance on the self-regulation task. You should understand that we will be looking at overall trends across participants and not findings for particular individuals. All results will be reported at the aggregate level and you participation will not be revealed. These data will help us to better understand the relationships between personality and self-regulation ability.

      Sometimes people find the subject matter of these questionnaires disturbing. If any part of this experiment led you to feel distressed and you would like to speak to someone about your thoughts, please contact one of the following:

	Phone Number
Queen's Student Counselling Service	**533-2506**
TALK Distress & Information Line	**544-1771**

      If your distress requires immediate assistance, please tell us now and one of the experimenters will be happy to accompany you to Student Counselling.

      We will be running this experiment for some time. **We would really appreciate it if you would <u>not</u> talk to anyone about the study.** Sometimes if people know what the study is about, that knowledge will affect their responses even when they don't mean for it to. If you have any comments or questions regarding the conduct of this research or your rights as a research participant, you may contact Dr. Jill Jacobson at 533-2847, the Head of the psychology department at 533-2492, and/or the General Ethics Board for Queen's University, c/o Research Services at 533-6081.

      If you would like to learn more about this experiment and its results, please contact Dr. Jacobson at the phone number above or at her email address (jacobsoj@post.queensu.ca). In addition, you might want to read the following article available at Stauffer Library or on-line through PsycARTICLES:

      Baumeister, R. F., Bratslavsky, E., Muraven, M., & Tice, D. M. (1998). Ego depletion: Is the active self a limited resource? *Journal of Personality & Social Psychology, 74,* 1252-1265.

      Baumeister, R. F., Gailliot, M., Dewall, C. N., & Oaten, M. (2006). Self-Regulation and Personality: How Interventions Increase Regulatory Success, and How Depletion Moderates the Effects of Traits on Behavior. *Journal of Personality, 74,* 1773-1801.

      Thank you for your participation.

DEBRIEFING – Social Condition of Study 1, & for Studies 2 and 3

This experiment examined the relationship between various personality variables, social interaction and motivation. Specifically, we are interested in examining how your answers to questionnaires and having a social interaction correspond to your performance on self-regulation tasks. In this study you were lead to believe that you were having a conversation with another participant. In reality, this participant was a confederate of the experimenter. This was done in order to keep the conversation partner in the experiment constant and unvarying for all participants. We were also interested in how your expectations about self-control, your expectations of a future task (that there would be another task or that there would not be another task), and how your goals for the conversation (either to create an accurate perception of your partner, present your best self, or no specific goal) would influence your performance on the self-regulation task. You should understand that we will be looking at overall trends across participants and not findings for particular individuals. All results will be reported at the aggregate level and you participation will not be revealed. These data will help us to better understand the relationships between personality and self-regulation ability. Now that you know that you were deceived in this experiment, you may choose to withdraw your data from analysis without any penalty. If you wish to do so please tell the experimenter now.

Sometimes people find the subject matter of these questionnaires disturbing, or feel concerned or uncomfortable about the fact that they were intentionally deceived. If any part of this experiment led you to feel distressed and you would like to speak to someone about your thoughts, please contact one of the following:

	Phone Number
Queen's Student Counselling Service	**533-2506**
TALK Distress & Information Line	**544-1771**

If your distress requires immediate assistance, please tell us now and one of the experimenters will be happy to accompany you to Student Counselling. We will be running this experiment for some time. **We would really appreciate it if you would <u>not</u> talk to anyone about the study.** Sometimes if people know what the study is about, that knowledge will affect their responses even when they don't mean for it to. If you have any comments or questions regarding the conduct of this research or your rights as a research participant, you may contact Dr. Jill Jacobson at 533-2847, the Head of the psychology department at 533-2492, and/or the General Ethics Board for Queen's University, c/o Research Services at 533-6081. If you would like to learn more about this experiment and its results, please contact Dr. Jacobson at the phone number above or at her email address (jacobsoj@post.queensu.ca). In addition, you might want to read the following article available at Stauffer Library or on-line through PsycARTICLES:

Baumeister, R. F., Bratslavsky, E., Muraven, M., & Tice, D. M. (1998). Ego depletion: Is the active self a limited resource? *Journal of Personality & Social Psychology, 74,* 1252-1265.

Baumeister, R. F., Gailliot, M., Dewall, C. N., & Oaten, M. (2006). Self-Regulation and Personality: How Interventions Increase Regulatory Success, and How Depletion Moderates the Effects of Traits on Behavior. *Journal of Personality, 74,* 1773-1801.

Thank you for your participation.

Causal Uncertainty Scale

Fill in the circle below the response that best expresses how much you agree or disagree with the statement.

Strongly Disagree	Moderately Disagree	Slightly Disagree	Slightly Agree	Moderately Agree	Strongly Agree		
○	○	○	○	○	○	1.	I do not know what it takes to get along well with others.
○	○	○	○	○	○	2.	When I receive good grades, I usually do not understand why I did so well.
○	○	○	○	○	○	3.	I do not understand what causes most of the problems that I have with others.
○	○	○	○	○	○	4.	When I see something good happen to others, I often do not know why it happened.
○	○	○	○	○	○	5.	When I receive poor grades, I usually do not understand why I did so poorly.
○	○	○	○	○	○	6.	When someone I know receives a poor grade, I often cannot determine if they could have done anything to prevent it.
○	○	○	○	○	○	7.	I do not understand what causes most of the good things that happen to me.
○	○	○	○	○	○	8.	When things go right, I generally do not know what to do to keep them that way.
○	○	○	○	○	○	9.	When bad things happen, I generally do not know why.
○	○	○	○	○	○	10.	When there is more than one possible reason for a person's action, it is difficult to determine which one is the actual reason.
○	○	○	○	○	○	11.	I often feel like I don't have enough information to come to a conclusion about why things happen to other people.
○	○	○	○	○	○	12.	When I see something bad happen to others, I often do not know why it happened.
○	○	○	○	○	○	13.	I often feel like I do not have enough information to come to a about why things happen to me.
○	○	○	○	○	○	14.	When I think about why someone does something, there are usually so many possible reasons for it that I cannot determine which one was the cause.

Rosenberg Self-Esteem Questionnaire

For each item below, please fill in the circle underneath the response that best indicates how you feel about yourself.

		Strongly Agree	Agree	Disagree	Strongly Disagree
1.	On the whole, I am satisfied with myself.	○	○	○	○
2.	At times, I think I am no good at all.	○	○	○	○
3.	I feel that I have a number of good qualities.	○	○	○	○
4.	I am able to do things as well as most other people.	○	○	○	○
5.	I feel I have much to be proud of.	○	○	○	○
6.	I certainly feel useless at times.	○	○	○	○
7.	I feel that I am a person of worth, at least on an equal plane with others.	○	○	○	○
8.	I wish I could have more respect for myself.	○	○	○	○
9.	All in all, I am inclined to feel that I am a failure.	○	○	○	○
10.	I take a positive attitude toward myself.	○	○	○	○

8-Letter Anagrams for Studies 1 and 3

Anagram	Solution
OMCANINN	CINNAMON
RRAABDLO	LABRADOR
ABEMETNS	BASEMENT
NOREOMBT	TROMBONE
INEHCDLR	CHILDREN
POTRCMUE	COMPUTER
QUISELRR	SQUIRREL
TBNIMAAO	MANITOBA
ILKOTCCA	COCKTAIL
HERCSATE	TEACHERS
LNCTOSAD	SCOTLAND
SEUISNSB	BUSINESS
OOKTNOEB	NOTEBOOK

Pearson Correlations among the Scales for Study 1 (N = 181)

	SEQ	# of anagrams completed
CUS	-.17*	.08
SEQ	_____	.10

Note.   CUS = Causal Uncertainty Scale (Weary & Edwards, 1994); SEQ = Rosenberg Self-Esteem Scale (Rosenberg, 1965).
* *p* < .05

STUDY 2 EXPERIMENTAL MATERIALS

Retyping Task Paragraph

Children with developmental delay (DD) are at risk for behavior problems, but little is known about natural contingencies of reinforcement that these children experience. The present study used descriptive analysis (antecedent–behavior–consequence observations) to study parent–child interactions of fourty-seven, 2–3 year-old children with or at risk for DD. Child adaptive and inappropriate behavior as well as their antecedents and consequences were observed across four conditions (free play, parent directed play, mealtimes, parental distraction). When parents were engaged in another task (distraction), child appropriate behavior occurred less frequently than in the other conditions, and child inappropriate behavior occurred 63% of the time. A lack of parental attention and no activity were the most frequent antecedents for inappropriate behavior. Potential positive reinforcers appeared as consequences of inappropriate child behavior 77% of the time. These findings have implications for the development and prevention of serious behavior disorders.

Pearson Correlations among the Scales for Study 2 (N = 88)

	SEQ	# of words retyped
CUS	-.37***	.23*
SEQ	_____	.08

Note.   CUS = Causal Uncertainty Scale (Weary & Edwards, 1994); SEQ = Rosenberg Self-Esteem Scale (Rosenberg, 1965).
* *p* < .05; *** *p* < .001

APPENDIX C

STUDY 3 EXPERIMENTAL MATERIALS

Accuracy Condition Instructions:

In this experiment, we are studying how individuals form impressions of other people. One of the primary issues that we are concerned with in this research is the accuracy of people's impression formation abilities -- that is, the thoroughness of the way they go about determining the nature of other people's personalities. These abilities are of considerable importance in everyday social interactions where it is often necessary to make accurate judgments about other people's personalities even when little information is available. For example, when a co-worker at your new job offers you assistance, you may need to determine whether his or her intentions are genuine or whether the person actually has an ulterior motive.

For the first task, you will be having a conversation with a partner. After the conversation you will need to complete some impression measures. After you have indicated your impression of your partner on the rating scales, you will be asked to explain and justify, in writing, the reasons for your particular impression - that is, why you think your interaction partner is the kind of person you described on the impression measures. You also will be asked to make predictions for her behavior in a variety of situations. Then, near the end of the experiment, you will read the explanations for your impressions as part of a short discussion with the experimenter.

At this time, please let the experimenter know that you have finished reading the instructions by knocking on the door. If anything that you read in the instructions was not clear, please take this opportunity to ask the experimenter any questions that you might have.

Control Condition Instructions:

In this experiment, we are studying how individuals form impressions other people. For the first task, you will be having a conversation with a partner. After the conversation you will need to complete some impression measures.

At this time, please let the experimenter know that you have finished reading the instructions by knocking on the door. If anything that you read in the instructions was not clear, please take this opportunity to ask the experimenter any questions that you might have.

Pearson Correlations among the Scales for Study 3 (N = 112)

	SEQ	# of anagrams completed
CUS	.37***	.01
SEQ	_____	-.15

Note.   CUS = Causal Uncertainty Scale (Weary & Edwards, 1994); SEQ = Rosenberg Self-Esteem Scale (Rosenberg, 1965).
*** *p* < .001