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What You Don't Know Can Hurt You: Uncertainty Depletes Self-Control Resources

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WHAT YOU DON'T KNOW CAN HURT YOU:
UNCERTAINTY DEPLETES SELF-CONTROL RESOURCES

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ABSTRACT

Three studies provide evidence that feeling uncertain impairs subsequent self-control. Participants were randomly assigned to either uncertain conditions (uncertain about how to complete a task; not knowing whether they would have to give a speech later) or control conditions (clear how to complete a task; definitely will or will not have to give a speech). Uncertainty caused poor performance measures of self-control unrelated to the uncertainty manipulation. Uncertainty impaired self-control even more than certainty of negative outcome (definitely will have to make speech). Findings suggest that coping with uncertainty depletes mental energy.

INTRODUCTION

Individuals' lives are punctuated by distinctly unpleasant periods of uncertainty. People spend days and sometimes weeks waiting to find out whether they received a job, contracted cancer, or damaged their car beyond repair. During these times of uncertainty, people may show more frequent lapses in self-control than they normally exhibit. We propose that uncertainty itself may reduce the likelihood that individuals will exert successful self-control.

An individual can be described as uncertain when he or she lacks some important piece of information about a situation (Knight, 1921; Wilson, Bar-Anan, & Gilbert, 2009). One may lack information about what, when, or where something will happen, or one may know the details of the situation but be uncertain about how he or she will respond in the situation. We propose that both uncertainty over what will happen and uncertainty over how to respond will cause subsequent detriments in self-control.

There were three possible mechanisms through which we believed uncertainty may reduce individual's self-control: time orientation, construal level, and working memory.

Time orientation

One way in which uncertainty may reduce individuals' self-control is through making them more present-focused. An important form of self-control is delay of gratification, the ability to give up present temptations for future rewards (Mischel, 1974). Individuals who cannot get their mind off their immediate situation may have difficulty delaying gratification.

Disengaging from present temptations may become more difficult as the future becomes more uncertain. When it is unclear whether an individual will receive future rewards for his or her efforts in the present, that individual may have a harder time buckling down in the present. A law student may be willing to work very hard in the present as long as there is a high likelihood that he or she will be rewarded at the end with a challenging and lucrative career. However, as the odds of getting a job become more uncertain, the student may have a more difficult time making himself or herself persist through his or her work. Researchers on nursing have noted that, "Participants described their inability to make any long-range plans because of the unpredictability in their lives and how they no longer focused on the future but shifted their emphasis to present-day, here-and now activities" (Neville, 2003). Because uncertainty often

makes it difficult to plan for the future, it may decrease both individuals' motivation and ability to focus on the future. This lack of focus on the future may then cause a decrease in self-control.

Construal Level

Uncertainty may also reduce individuals' self control through lowering their construal level. Construal level theory proposes that individuals can represent things and actions in concrete, detailed ways (low level construal) or broad, abstract ways (high level construal; (Trope & Liberman, 2003). Research has shown that individuals exhibit better self-control when they are focused at a high level of construal than when they are focused at a low level of construal (Fujita, Trope, Liberman, & Levin-Sagi, 2006). In one study, construal level was manipulated by asking participants to list either why (high level of construal) or how (low level of construal) they maintained personal relationships. Participants who were induced to have a high construal level subsequently showed significantly more self-control persisting on a physically tiring handgrip task than participants who were induced to have a low construal level.

Uncertainty may cause individuals to adopt a lower construal level by increasing individuals' attention to detail. Research has shown that uncertainty increases people's attention to and memory for the details of their situation (Wilson, Centerbar, Kermer, & Gilbert, 2005). In one study, participants who were given \$1.10 accompanied by a card containing a slightly ambiguous explanation for the gift remembered more of the details of the card than participants who were given the money with a card containing clearer information. The authors suggest that, in an attempt to make sense of the card, individuals paid greater attention to the details of the card. When individuals are uncertain, they may be motivated to glean information from their immediate environment in order to resolve their uncertainty. This may cause them to narrow their focus, causing them to adopt a lower construal level, which may, in turn, hamper their self-control.

Working Memory

Because uncertainty has been shown to increase people's attention to the details of a situation, we also predicted that uncertainty would put an increased burden on individuals' working memory capacity. Research has shown that individuals with higher working memory capacity exhibit better self-control than individuals with lower working memory capacity (Hofmann, Gschwendner, Friese, & Wiers, 2008). The researchers proposed that greater working

memory capacity may increase self-control by making it easier for individuals to generate and execute desirable behaviors in place of undesirable dominant responses. Insofar as uncertainty temporarily reduces individual's working memory capacity, it may thereby reduce their ability to exert self-control effectively.

Present Studies

The present studies were designed to test the hypothesis that participants in uncertain situations would perform more poorly on a subsequent test of self-control than participants in certain situations. In Study 1, some participants were given a task on which they were left uncertain about the appropriate response while other participants were given a task where the appropriate response was clear. They were then asked to complete an unsolvable puzzle and their time persisting on the puzzle was recorded as a measure of self-control. In Study 2, some participants were told that they would either be giving or watching a speech, but they were left uncertain about which they would have to do. They were then given a set of solvable anagrams as a measure of self-control. Study 3 extended the effects to a different measure of self-control, performance on the game Operation, and tested the three proposed mediators: time orientation, construal level, and working memory capacity.

STUDY 1: TASK UNCERTAINTY

Study 1 was designed to test the hypothesis that being uncertain about one task would cause a subsequent decrease in self-control on an unrelated task. Uncertainty was manipulated by giving participants a task where it was either clear how they should respond (control condition) or unclear how they should respond (uncertain condition). We predicted that participants who were given the unclear task would feel significantly more uncertain than participants who were given the clear task.

Self-control was measured using persistence on puzzles that were, unbeknownst to participants, unsolvable. Persistence on a difficult (in this case impossible) task is one form of self-control because an individual must override his or her immediate desire to give up in order to pursue the goal of finishing the task (Baumeister, Bratslavsky, Muraven, & Tice, 1998). We predicted that participants who were given the unclear version of the task would subsequently spend significantly less time persisting on the puzzles and make fewer attempts to solve the puzzle than participants who were given the clear version of the task. We also predicted that this relationship would be mediated by participants' self-reported uncertainty.

Method

Participants. Data were collected from 51 introductory psychology students (15 male, 36 female) who received course credit and \$5 for participating. One participant was removed for immediately recognizing that the puzzle was unsolvable. The experimenter told participants that the purpose of the study was to understand how people reason through different kinds of puzzles.

Procedure.

Uncertainty manipulation. The uncertainty manipulation was programmed using MediaLab research software (Jarvis, 2006). Participants were shown a square of color on the computer screen for one second. They were then shown four colors next to four math problems and were asked to complete the math problem associated with the color of the square they had seen previously. For example, participants saw a yellow square for one second and then the instructions on the computer read "Please complete the equation associated with the color you just saw: Blue: 2×6 , Green: 12×3 , Yellow: 10×7 ; Red: 9×9 ." For participants in the control condition, all twenty trials showed colored squares that fit clearly into the four categories provided (blue, green, yellow, and red). However, for participants in the uncertain condition,

twelve of the twenty trials included colors that did not fit the colors provided (e.g. orange, blue-green, purple).

In order to prevent participants from stopping to ask about the ambiguous colors, participants were told that they would be timed and that they should work as quickly as possible. To increase participants' motivation to do well, all participants were also told that they would be paid twenty-five cents each time they answer correctly and that they could earn up to five dollars on the task.

Persistence measure. After completing the boxes task, participants were given an unsolvable tracing puzzle (Baumeister, Bratslavsky, Muraven, & Tice, 1998). In order to convince participants that the puzzle was solvable, the experimenter completed a solvable tracing puzzle in front of the participant as an example. Then the experimenter gave the following instructions, taken from Baumeister et al. (1998): "Please trace the following figure without retracing any lines and without lifting your pencil from the paper. You can take as much time and as many trials as you want. You will not be judged on the number of trials or the time you take. You will be judged on whether or not you finish tracing the figure. If you wish to stop before you finish, ring the bell on the table." Participants were provided with many sheets of paper containing many copies of the same unsolvable puzzle and a highlighter. The experimenter left the room, and began timing the amount of time the participant persisted before ringing the bell. Any participant still working after 30 minutes was interrupted and asked to continue with the rest of the study (3 participants worked until the limit: 1 in the uncertain condition, 2 in the control condition).

Manipulation check and affect. After the unsolvable puzzle, participants were asked to respond to the question, "When you were completing the task with the colored boxes and the math problems, how uncertain did you feel?" on a scale of 1 (not at all uncertain) to 5 (very uncertain). Next, participants were asked to complete the PANAS (Watson, Clark, & Tellegen, 1988) as a measure of their current mood. Finally, participants were probed for suspicion, debriefed about the purpose of the study, paid, and dismissed.

Results

Manipulation check. There was a significant difference in how uncertain participants felt about the task between the uncertain and control conditions, $F(1, 48) = 11.71, p = .001$.

Participants in the ambiguous color condition ($M = 2.68$, $SD = .86$) reported being significantly more uncertain about the task than participants in the control condition ($M = 1.82$, $SD = .91$).

Persistence. There was a significant difference between the uncertain and control conditions on the number of attempts made at solving the tracing puzzle, $F(1, 48) = 5.18$, $p = .03$. As predicted, participants who were given the ambiguous task subsequently made fewer attempts at solving the puzzle ($M = 18.00$, $SD = 11.41$) than participants in the control condition ($M = 26.95$, $SD = 16.38$). There was also a marginally significant difference between conditions on the amount of time participants spent working on the puzzles, $F(1, 48) = 3.00$, $p = .09$. Participants who were given the ambiguous task ($M = 10.61$, $SD = 7.35$) subsequently spent less time persisting on the puzzle than participants in the control condition ($M = 14.53$, $SD = 8.63$).

Mediation. Using Baron and Kenny's (1986) criteria for establishing mediation, we tested whether uncertainty about the block task predicted mediated the relationship between condition and persistence on the unsolvable puzzle. Uncertainty was negatively correlated with both the number of attempts, $r = -.28$, $p = .05$, and the amount of time people spent on the unsolvable puzzle, $r = -.42$, $p < .01$. When controlling for uncertainty, condition no longer predicted participants' persistence as measured by number of attempts, $F(1, 48) = 2.39$, $p = .13$, or the amount of time they spent working on the puzzles, $F(1, 48) = .24$, $p = .62$. The amount of uncertainty participants felt about the color task mediated the relationship between their assigned condition and how much they persisted on the subsequent unsolvable puzzles.

Mood. There were no significant differences between conditions in positive or negative affect, F 's < 1 .

Discussion

As predicted, participants who were given an unclear task at the beginning of the study subsequently showed poorer self-control on an unrelated task than participants who were given a clear task at the beginning of the study. This relationship was mediated by how uncertain participants reported feeling and could not be accounted for by positive or negative mood. This offers preliminary evidence that uncertainty may lead to a subsequent decrement in self-control.

STUDY 2: PUBLIC SPEAKING UNCERTAINTY

Study 2 was designed to extend the effect of uncertainty on self-control to a different manipulation and measure. In order to manipulate uncertainty, participants were either told that they were giving a speech, told that they were not giving a speech, or left uncertain about whether they would have to give a speech or not. We were specifically interested in whether being left uncertain about whether one would have to give a speech would have a more negative effect on self-control than actually knowing one would have to give a speech. If uncertainty has a more negative effect than being sure of the worst possible outcome, it is something about the uncertainty itself that has a negative effect on self-control.

Because our uncertainty manipulation required our experimenter to pretend that they lost the condition sheet, we were concerned that participants may perceive the experimenter as less competent in the uncertain conditions than in the other two conditions. We were concerned that this, in turn, could cause the participant to put less effort into the study in the uncertain condition creating a confound with our effect. In order to test for this possibility, we asked participants to rate (on the computer, without the experimenter present) the competence of their experimenter.

Participants' self-regulation was measured using a series of solvable anagrams. Working through a daunting task under the pressure of a deadline demands that individuals use self-control to avoid daydreaming and distractions and focus their attention on the task at hand. Anagram attempts have been used as a measure of self-regulation in previous research (Muraven et al., 1998) and we specifically used solvable anagrams because we wanted to include a measure of self-control on which success was possible (unlike unsolvable puzzles). We predicted that participants who were left uncertain about whether or not they have to give a speech would attempt and solve fewer anagrams than participants who knew for sure that they wouldn't have to give a speech. Further, we predicted that participants who were left uncertain about whether they would have to give a speech would attempt and solve fewer anagrams than participants who knew for sure they would have to give a speech.

Method

Participants. Data were collected from 39 introductory psychology students (15 male, 24 female) who received course credit for participating. All participants were retained.

Procedure.

Cover story. The experimenter told participants that the study was designed to investigate what characteristics make people effective communicators. They were told that they would be completing a measure of intelligence, followed by a communication task that would be completed in groups of three. In order to maintain the cover story that participants would be giving speeches in front of other participants, the experimenter called an extra name when getting the participant from the participant waiting room. The experimenter also left the room a few times throughout the experiment to check on the ostensible other participants.

Uncertainty manipulation. Participants were told that some participants would be giving speeches while other participants rated those speeches. They were told that they would be completing the communication task later in the study but, to save time, they would be assigned their condition now. In the speech and no speech conditions, participants were told, “You are participant number ____, and it says here that you are in the speech (no speech) condition. Let’s start on the intelligence task, and when you’re done, we’ll move to another room for the communication task.” In the uncertain condition, the experimenter acted flustered and said, “Hmm. You are supposed to be participant number ____, but I don’t see your number on here anywhere. I have a master sheet in the other room with all the numbers on it. I’m going to start you on the intelligence measure, and I’ll go get the sheet while you are working.” This left the participant uncertain about whether or not they would be giving a speech later in the study.

Self-regulation. In order to measure participants’ self-regulatory abilities, participants were given a set of fifty solvable five-letter anagrams and were asked to solve as many as possible in ten minutes. There was a blank line next to each anagram where participants were asked to put their solution. Any line on which the participants wrote an attempted solution was coded as an attempted anagram and each anagram solved correctly was considered a completed anagram.

Mood and other measures. After working for ten minutes on the anagrams, participants were asked to answer some questions before they moved to the other room for the second part of the study. As a manipulation check, participants were asked, “How uncertain do you feel about your role in the communication task?” which was embedded in other distracter questions about the task. As in study 1, they then completed the PANAS (Watson, Clark, & Tellegen, 1988). In order to assess whether differences in performance were due to differences in perceived

competence of the experimenter, participants were also asked to answer the question, “How competent was the researcher who administered your study today?”

After completing all the measures, participants were told that the study was over and that they would not have to give a speech. Participants were fully debriefed, thanked, and dismissed.

Results

Manipulation check. There was a marginally significant difference between conditions in how uncertain participants reported feeling about their role in the communication task, $F(2, 36) = 2.52, p = .11$. Planned contrasts revealed that participants in the uncertain condition ($M = 2.69, SD = 1.18$) reported feeling more uncertain than participants in the no speech condition ($M = 1.83, SD = .84$), $t(36) = -2.09, p = .04$. Although the effect was in the right direction, participants in the uncertain condition did not report feeling significantly more uncertain than participants in the speech condition ($M = 2.50, SD = 1.02$), $t(36) = -.49, ns$.

Anagram performance. As predicted, there was a significant difference between conditions on the number of problems participants solved, $F(2, 36) = 6.48, p < .007$. Participants in the uncertain condition ($M = 15.92, SD = 7.32$) solved significantly fewer anagrams than participants in the no speech condition ($M = 26.58, SD = 7.14$), $t(36) = -3.55, p = .001$. Crucially, participants in the uncertain condition also solved significantly fewer anagrams than participants in the speech condition ($M = 22.57, SD = 7.97$), $t(36) = -2.30, p = .03$. Participants who were uncertain about what they would be doing next in the study both attempted and solved fewer anagrams than participants in the speech or no speech conditions.

There was also a significant difference between conditions on how many anagrams participants attempted, $F(2, 36) = 4.77, p = .02$, see Figure 1. Planned comparisons showed that participants in the uncertain condition ($M = 18.62, SD = 8.77$) attempted significantly fewer anagrams than participants in the no speech condition ($M = 28.50, SD = 6.80$), $t(36) = -2.87, p = .01$. Planned comparisons also showed that participants in the uncertain condition also attempted significantly fewer anagrams than participants in the speech condition ($M = 26.64, SD = 9.75$), $t(36) = -2.42, p = .02$.

Mood and experimenter competence. There was a marginally significant difference between conditions on positive affect ($F(2, 36) = 2.34, p = .11$). Participants in the no speech condition ($M = 2.88, SD = 1.06$) reported significantly more positive mood than participants in

the speech condition ($M = 2.16$, $SD = .58$), $t(36) = -2.13$, $p = .04$. There were no significant differences between the uncertain conditions and the no speech condition, $t(36) = -.80$, ns , or between the uncertain condition and the speech conditions, $t(36) = 1.34$, $p = .19$. There were no significant differences between conditions on negative affect, $F(2, 36) = .20$, ns .

As predicted, there were no significant differences between conditions on how competent the experimenter was perceived to be, $F(2, 36) = 1.39$, $p = .26$. Neither affect nor experimenter competence was correlated with the number of anagrams participants attempted or solved (all p 's $> .25$). These results suggest that the effects obtained were neither due to participants' mood nor participants' perception of how competent the experimenter appeared to be.

Discussion

As predicted, participants who were left uncertain about whether they would have to give a speech made significantly fewer attempts at solving and actually solved fewer anagrams than participants who knew whether they would have to give a speech. Participants who were uncertain about whether they would have to give a speech showed poorer self-control than participants who knew for sure that they would have to give a speech. This suggests that, as far as self-control is concerned, it is actually better to be sure a negative outcome will occur than to be unsure whether a negative outcome will occur.

The difference between the speech and uncertain conditions in self-reported uncertainty did not reach significance. This could be due to poor wording of the manipulation check. The question, ““How uncertain do you feel about your role in the communication task?” implied that the participant knows what their role will be in the communication task (the question did not say, “how uncertain do you feel about which role you have in the communication task”). Because participants in the uncertain condition thought their circumstances were exceptional (the experimenter lost the condition sheet), they may have just made a rough estimate of how they might feel if they knew what role they would be doing.

The present research also found that although participants who were certain they would not be giving a speech reported a significantly more positive mood than participants in the speech or uncertain conditions, there were no significant mood differences between participants in the speech and uncertain conditions. This suggests that being uncertain about a potential negative outcome can feel just as negative as being certain of a negative outcome. Further,

because participants in the speech condition and in the uncertain condition did not differ from each other in mood, mood cannot explain the differences between the conditions in self-control.

STUDY 3: OPERATING UNDER UNCERTAINTY

Studies 1 and 2 demonstrated that being uncertain can have a subsequent effect on one's self-control. Study 3 was designed to test for mediators of this effect and to extend the effect to a third measure of self-control.

Study 3 also tested whether trait neuroticism moderated the effect of uncertainty on self-control. Previous research has found that for individuals who are low on neuroticism, getting negative feedback results in greater brain activity than getting uncertain feedback (Hirsch & Inzlicht, 2008). However, for individuals who are high on neuroticism, getting uncertain feedback leads to greater brain activity than getting negative feedback. Because individuals high in neuroticism seem to have a harder time disengaging from uncertainty, we predict that individuals higher in neuroticism will show greater detriments in their self-control following uncertainty than individuals who are low in neuroticism.

Study 3 used the same uncertainty manipulation as study 2. In study 3, self-control was measured using the board game Operation (DeWall, Baumeister, & Vohs, 2008) which requires participants to remove pieces from a board as quickly and with as few errors as possible. Managing the trade-off between speed and accuracy is an important form of self-control, and balancing the need to finish things quickly and the desire to do them well is relevant in everything from meeting deadlines at work to performing non-board-game surgery to getting a paper out for publication. We predicted that participants who were uncertain about whether they were giving a speech would make more errors and take more time to complete the task than participants who were sure they were either in the speech or no speech condition.

Method

Participants. Fifty participants (22 women) participated in this study in exchange for course credit. Four participants were excluded in total: two participants knew there were no other participants in the experiment; one participant came into the lab very sick; one participant arrived too late to complete the study.

Measures.

Neuroticism. In order to measure neuroticism, participants completed the neuroticism subscale of the International Personality Item Pool (IPIP, Goldberg, 1999). Participants were asked to respond to statements such as "I worry about things" and "I keep my emotions under

control” (reverse-coded) on a scale of 1 (not at all characteristic of me) to 5 (extremely characteristic of me).

Construal level. To measure construal level, participants were asked to choose which of two statements best defined each of a series of actions (Fujita, Trope, Liberman & Levin-Sagi, 2006). For example, “sweeping the floor” can be defined as “moving a broom” or “being clean.”

Time orientation. In order to measure participants’ time orientation, participants were asked to respond to a series of four statements, including “I can only think about the present,” “I find it difficult to think about the future,” “I am most concerned about how I feel in the present,” and “I feel a strong tendency to enjoy myself today and let the future take care of itself” (Twenge, Catanese, & Baumeister, 2003; Gjesme, 1979; Kulen & Monge, 1968).

Working memory capacity. To measure working memory, participants completed the computation span task used in Hofmann et al. (2008). Participants were given a set of simple equations (e.g. $5 + 4 = 9$), some true, some false. Each equation was presented for 3 seconds followed by a 1 second break. Participants were asked to identify whether each equation was true. At the end of eight trials, participants were asked to record the answers to each of the eight equations in order. Participants repeated this procedure twice for two separate sets of eight equations and their ability to remember all eight answers was used as the measure of working memory. This measure was removed from the experiment after 32 participants, because only one participant got either one of the working memory questions correct.

Procedure.

Uncertainty manipulation. Uncertainty was manipulated using the same procedure used in Study 2.

Operation. Self-regulation was measured using the board game Operation (DeWall, Baumeister, & Vohs, 2008). Operation requires participants to carefully remove various shapes from holes in a human-shaped board without touching the edge of the hole. If the edge of the hole is touched, a buzzer sounds. The object of the game is to move as quickly as possible while avoiding setting off the buzzer.

Participants were told they were doing Operation as a measure of hand-eye coordination. Each participant was asked to try removing one piece for practice before the task began. Participants were asked to remove all the pieces from the board as quickly as possible. The

experimenter recorded the time they spent working and the number of times the participant sounded the buzzer by hitting the sides of a piece's space.

Competence. As in study 2, participants were asked to rate the competence of their experimenter. After rating the experimenter's competence, participants were told they would not actually have to give a speech. They were then debriefed, thanked, and dismissed.

Results

Operation performance. As predicted, there was a significant difference between conditions on the number of errors participants made (the number of times they sounded the buzzer), $F(2, 43) = 4.14, p = .02$. Planned comparisons revealed that participants in the uncertain condition ($M = 21.92, SD = 5.84$) made significantly more errors than participants in the no speech condition ($M = 15.92, SD = 7.50$), $t(43) = 2.15, p = .04$. As in study 2, planned comparisons also revealed that participants in the uncertain condition made significantly more errors than participants in the speech condition ($M = 15.10, SD = 7.29$), $t(43) = 2.77, p = .01$.

Contrary to prediction, there was no significant difference between conditions on the amount of time participants took to complete the Operation task, $F(2, 43) = .29, p = .75$. There was also no significant relationship between the time participants took and the number of errors made, $r = .09, p = .56$.

Neuroticism. Contrary to prediction, there was no significant interaction between condition and neuroticism on number of errors, $t(42) = -.52, p = .61$, or time to complete the task, $t(42) = -.04, p = .97$.

Potential Mediators. We found no significant differences between conditions on any of our three proposed mediators. There were no differences between the conditions on construal level, $F(43) = .25, p = .78$ or time orientation, $F(43) = .60, p = .55$. Neither construal level nor time orientation was correlated with time on operation or the number of errors, all p 's $> .53$.

Competence. There were no differences between conditions in participants' perceptions of the experimenter's competence, $F(2, 43) = .86, p = .43$. There was also no correlation between perceived experimenter competence and the number of errors participants made or the time they spent on the Operation task, all p 's $> .54$.

Discussion

Participants who were uncertain about whether they would have to give a speech made significantly more errors when performing the Operation task than both participants who knew they wouldn't have to give a speech and participants who knew they would have to give a speech. There were no significant differences between the conditions on the amount of time they spent on the task. This may be explained in part by the lack of relationship between amount of time and number of errors. Although a highly skilled player with relatively higher self-control resources would move both quickly and accurately, lower skilled players with relatively higher self-control resources may be willing to sacrifice time for accuracy.

Neither construal level nor time orientation were significant mediators of our effect. We address other potential mechanisms of the effect of uncertainty on self-control in the discussion.

Neuroticism did not moderate the effect of uncertainty on self-control. Uncertainty had a uniformly negative effect on the self-regulation of participants, regardless of whether they were high or low in neuroticism.

GENERAL DISCUSSION

An expanding body of experimental literature has demonstrated that uncertainty is unique in the extent to which it captures individuals' attention and extends the duration of their emotions (Wilson, Centerbar, Kermer, & Gilbert, 2005). The present research demonstrated that uncertainty also decreases the likelihood that individuals will effectively exercise self-control. Across three studies, using two different uncertainty manipulations and three different self-control measures, participants who were put in uncertain situations performed significantly worse on subsequent, unrelated measures of self-control than participants who were not put in uncertain situations. In one study, the effect of uncertainty on self-regulation was mediated by the amount of uncertainty individuals reported experiencing. The effect was not mediated by participants' mood, time orientation, or construal level, nor did individual differences in neuroticism moderate the effect of uncertainty on self-regulation.

Because neither construal level nor time orientation mediated the effect of uncertainty on self-control, more research is needed in order to understand the mechanism behind this effect. One untested explanation is that the increased attention that uncertainty demands may reduce individuals' self-control resources. Previous research has shown that people remember more and report thinking more about situations about which they are left uncertain than about situations where the details are clear (Wilson, Centerbar, Kermer, & Gilbert, 2005). Research on self-control has shown that self-control, decision-making, and logical reasoning all rely on the same limited resource (Schmeichel, Vohs, & Baumeister, 2003; Vohs, Baumeister, Schmeichel, Twenge, Nelson, & Tice). The mental effort that uncertainty seems to demand may directly reduce the resources necessary for effective self-control.

One way in which one might test this hypothesis would be to directly measure participants' attention to and memory for stimulus materials. Presumably, if given materials related to the uncertainty (e.g. details about the speech and rating tasks), participants in the uncertain condition should remember more of the material and report thinking more about the material than participants in the certain conditions. The more they self-reported focusing on the stimulus material and the greater their memory for that material, the worse their subsequent self-control performance should be. In this way, memory for and attention to details surrounding the cause of the uncertainty should mediate the effect of uncertainty on self-control.

Measuring glucose would be another way to test the hypothesis that uncertainty reduces the limited resource required for self control. Previous research has shown that glucose is the physiological mechanism behind the limited resource model of self-control (Gailliot et al., 2007). After engaging in an act of self-control, individuals' blood glucose levels are reduced. The lower the glucose level after the first act of self-control, the worse participants perform on a second act of self-control. Further, if individuals are given a drink containing glucose after the first act of self-control, participants no longer show decreased self-control performance following a first act of self-control. If uncertainty is affecting self-control by reducing the supply of glucose in the blood, giving participants a glucose drink should reduce the negative effect of uncertainty on self-control.

Another possible explanation, also derived from the limited resource model, is that individuals in uncertain situations are more likely to conserve their self-control resources than individuals in certain situations. Because self-control resources are limited, individuals sometimes conserve currently-available resources in order to have ample resources to cope with future demands on their self-control. Previous research has shown that when individuals know they will be participating in multiple acts of self-control, they tend to conserve their resources for the last task, thus impairing their performance on preceding tasks (Muraven, Shmueli, & Burkley, 2006). It may be that participants in uncertain conditions are motivated to save their resources for future demands more than participants who are not in uncertain conditions.

In order to directly test whether individuals in the uncertain condition are conserving self-control resources, one could resolve the uncertainty (e.g. tell everyone they won't have to give a speech) and then give yet another measure of self-control. If individuals in the uncertain condition are conserving resources, they should perform the best of all three conditions on a final measure of self-control. However, if uncertainty directly reduces self-control resources, participants in the uncertain condition should continue to perform the worst of the three conditions, even after the uncertainty is resolved.

The present research tested the hypothesis that uncertainty would reduce people's ability to exercise self-control. We found that participants who were put in uncertain situations subsequently persisted for less time, worked less efficiently, and made a greater number of errors than participants who were not put in uncertain situations. This suggests that, if one wants

someone's self-control resources to be at their peak, it may be best to resolve uncertainty as quickly as possible. Although there may be advantages in a corporate setting to leaving some aspects uncertain (e.g. everyone may work harder when they don't know who will get promoted), uniformly leaving subordinates uncertain about impending changes will undermine productivity. On the other hand there are some situations where reducing an individual's self-control may be a desired goal. Car salesman and real estate agents are both known to keep potential customers waiting for long periods of time during the bargaining process. This is sometimes described as an attempt for the salespeople to assert their power over the situation, but the present research suggests that it may also be lowering the potential customer's self-control. By leaving potential customers wondering if their offer will be accepted, salespeople may increase the odds that the customer will cave to a suboptimal offer.

The present research demonstrated that self-control is undermined by uncertainty. If one wants to quit smoking, stick to his or her diet, or tackle a frustrating project, it may be beneficial (at least temporarily) to keep life predictable.

APPENDIX A

Human Subjects Approval

Office of the Vice President For Research
Human Subjects Committee
Tallahassee, Florida 32306-2742
(850) 644-8673 · FAX (850) 644-4392

APPROVAL MEMORANDUM

Date: 9/8/2008

To: Jessica Alquist

Address: 4301
Dept.: PSYCHOLOGY DEPARTMENT

From: Thomas L. Jacobson, Chair

Re: Use of Human Subjects in Research
Uncertainty and Ego Depletion II

The application that you submitted to this office in regard to the use of human subjects in the research proposal referenced above has been reviewed by the Human Subjects Committee at its meeting on 08/20/2008. Your project was approved by the Committee.

The Human Subjects Committee has not evaluated your proposal for scientific merit, except to weigh the risk to the human participants and the aspects of the proposal related to potential risk and benefit. This approval does not replace any departmental or other approvals, which may be required.

If you submitted a proposed consent form with your application, the approved stamped consent form is attached to this approval notice. Only the stamped version of the consent form may be used in recruiting research subjects.

If the project has not been completed by 8/19/2009 you must request a renewal of approval for continuation of the project. As a courtesy, a renewal notice will be sent to you prior to your expiration date; however, it is your responsibility as the Principal Investigator to timely request renewal of your approval from the Committee.

You are advised that any change in protocol for this project must be reviewed and approved by the Committee prior to implementation of the proposed change in the protocol. A protocol change/amendment form is required to be submitted for approval by the Committee. In addition, federal regulations require that the Principal Investigator promptly report, in writing any unanticipated problems or adverse events involving risks to research subjects or others.

By copy of this memorandum, the Chair of your department and/or your major professor is reminded that he/she is responsible for being informed

concerning research projects involving human subjects in the department, and should review protocols as often as needed to insure that the project is being conducted in compliance with our institution and with DHHS regulations.

This institution has an Assurance on file with the Office for Human Research Protection. The Assurance Number is IRB00000446.

Cc: Dianne Tice, Advisor
HSC No. 2008.1626

Informed Consents

Study 1

INFORMED CONSENT FORM

I freely and voluntarily and without element of force or coercion, consent to be a participant in the research project entitled “Personality and Problem Solving”. This research is being conducted by Jessica Alquist, a graduate student at Florida State University. I understand the purpose of this research project is to better understand how personality influences the way people approach puzzles. If I participate in this study, I will be asked to fill out a few personality scales and complete some puzzles.

I understand my participation is totally voluntary and I may stop participation at anytime. The total time commitment would be about one hour for the entire project. I will be compensated by receiving one (1) credit toward by General Psychology class. If I decide to stop participation, I will still be entitled to the one (1) credit. All my answers to the questions will be kept anonymous and identified by a participant code number. My name will not appear on any of the results. No individual responses will be reported. Only group findings will be reported. Consent forms will be stored in a location separate from the experimental materials and destroyed on or before July 1, 2012. All information will remain confidential to the fullest extent allowed by law.

I understand that I must be at least 18 years of age in order to participate. I understand there is a possibility of a minimal level of risk involved if I agree to participate in this study. The research assistant will be available to talk with me about any emotional discomfort I any experience while participating. I am also able to stop my participation at any time I wish. I understand there are benefits for participating in this research project. First, I may learn more about the way I reason in situations and puzzles. Also, participating in this research project will give me the opportunity to see how a psychological study is conducted. I understand that this consent may be withdrawn at any time without prejudice, penalty or loss of benefits to which I am otherwise entitled. I have been given the right to ask and have answered any inquiry concerning the study. Questions, if any, have been answered to my satisfaction.

I understand that I may contact Jessica Alquist or Dr. Dianne Tice (tice@psy.fsu.edu) for answers to questions about this research or my rights. Group results will be sent to me upon my request. If I have questions about my rights as a subject/participant in this research, or if I feel I have been placed at risk, I can contact the Chair of the Human Subjects Committee, Institutional Review Board, through the Office of the Vice President for Research, at (850) 644-8633
I have read and understand this consent form.

(Subject)

(Date)

Study 2

INFORMED CONSENT FORM

I freely and voluntarily and without element of force or coercion, consent to be a participant in the research project entitled “Communication and Cognitive Ability”. This research is being conducted by Jessica Alquist, a graduate student at Florida State University. I understand the purpose of this research project is to understand the relationship between communication skills and cognitive ability. If I participate in this study, I will be asked to complete a measure of cognitive ability and do a speech task in a small group.

I understand my participation is totally voluntary and I may stop participation at anytime. The total time commitment would be about one hour for the entire project. I will be compensated by receiving one (1/2) credit toward by General Psychology class. If I decide to stop participation, I will still be entitled to half (1/2) a credit. All my answers to the questions will be kept anonymous and identified by a participant code number. My name will not appear on any of the results. No individual responses will be reported. Only group findings will be reported. Consent forms will be stored in a location separate from the experimental materials and destroyed on or before July 1, 2013. All information will remain confidential to the fullest extent allowed by law.

I understand that I must be at least 18 years of age in order to participate. I understand there is a possibility of a minimal level of risk involved if I agree to participate in this study. The research assistant will be available to talk with me about any emotional discomfort I any experience while participating. I am also able to stop my participation at any time I wish. I understand there are benefits for participating in this research project. First, I may learn more about the way I reason in situations and puzzles. Also, participating in this research project will give me the opportunity to see how a psychological study is conducted.

I understand that this consent may be withdrawn at any time without prejudice, penalty or loss of benefits to which I am otherwise entitled. I have been given the right to ask and have answered any inquiry concerning the study. Questions, if any, have been answered to my satisfaction.

I understand that I may contact Jessica Alquist or Dr. Dianne Tice (tice@psy.fsu.edu) for answers to questions about this research or my rights. Group results will be sent to me upon my request. If I have questions about my rights as a subject/participant in this research, or if I feel I have been placed at risk, I can contact the Chair of the Human Subjects Committee, Institutional Review Board, through the Office of the Vice President for Research, at (850) 644-8633

I have read and understand this consent form.

(Subject)

(Date)

Study 3

INFORMED CONSENT FORM

I freely and voluntarily and without element of force or coercion, consent to be a participant in the research project entitled “Communication and Cognitive Ability”. This research is being conducted by Jessica Alquist, a graduate student at Florida State University. I understand the purpose of this research project is to understand the relationship between communication skills and cognitive ability.

If I participate in this study, I will be asked to complete some personality measures, a measure of cognitive ability, including the game Operation, and do a speech task in a small group. There are some minor risks associated with these tasks that include frustration over performance, worries about the personality measure, and stress over public speaking. I understand there is a possibility of a minimal level of risk involved if I agree to participate in this study. The research assistant will be available to talk with me about any emotional discomfort I may experience while participating. I am also able to stop my participation at any time I wish.

I understand my participation is totally voluntary and I may stop participation at anytime. The total time commitment would be about one hour for the entire project. I will be compensated by receiving one (1) credit toward my General Psychology class. If I decide to stop participation, I will still be entitled to half (1/2) a credit. All my answers to the questions will be kept confidential and identified by a participant code number. My name will not appear on any of the results. No individual responses will be reported. Only group findings will be reported. Consent forms will be stored in a location separate from the experimental materials and destroyed on or before July 1, 2013. All information will remain confidential to the fullest extent allowed by law. I understand there are benefits for participating in this research project. Participating in this research project will give me the opportunity to see how a psychological study is conducted. I understand that I must be at least 18 years of age in order to participate. I understand that this consent may be withdrawn at any time without prejudice, penalty or loss of benefits to which I am otherwise entitled. I have been given the right to ask and have answered any inquiry concerning the study. Questions, if any, have been answered to my satisfaction.

I understand that I may contact Jessica Alquist or her adviser Dr. Roy Baumeister ((850) 644-4200, baumeister@psy.fsu.edu) for answers to questions about this research or my rights. Group results will be sent to me upon my request. If I have questions about my rights as a subject/participant in this research, or if I feel I have been placed at risk, I can contact the Chair of the Human Subjects Committee, Institutional Review Board, through the Office of the Vice President for Research, at ((850) 644-8633, jth5898@fsu.edu). I have read and understand this consent form.

(Subject)

(Date)

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BIOGRAPHICAL SKETCH

Jessica Alquist grew up in the small town of Kingsley, Pennsylvania. She completed her undergraduate education at Drew University in Madison, New Jersey where she majored in psychology and minored in music. Jessica's honors thesis on ego-depletion was supervised by Dr. Jessica L. Lakin. Professor Lakin invested countless hours into shaping Jessica, then 17, into a disciplined researcher and proficient writer. In spring 2007, Jessica was accepted to work with Dianne Tice and Roy Baumeister at Florida State University where she has countless opportunities to conduct any study she desires.