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# Uncertainty and Religious Reactivity: Uncertainty Compensation, Repair, and Inoculation

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RUNNING HEAD: CONTROLLING UNCERTAINTY EFFECTS

Uncertainty and Religious Reactivity:  
Uncertainty Compensation, Repair, and Inoculation

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### Abstract

Recent research conducted in Western, democratic societies indicates that temporary uncertainty inductions lead to intolerance of religious dissent, increased conviction in religious attitudes, and even increased support for holy war. Past and current conflicts based on religious ideology underscore the danger such responses to uncertainty can pose. This paper responds to the need to learn how to control responses to uncertainty. After having confirmed through pilot testing that uncertainty increases self-report religious faith, two subsequent studies investigate different techniques to control compensatory responses to uncertainty. Study 1 demonstrates that uncertainty-induced increases in religiosity can be eliminated by a post-uncertainty directed positive recall writing task. Study 2 presents evidence for an uncertainty “inoculation”, whereby a pre-uncertainty self-affirmation exercise can protect against uncertainty compensation effects. These findings, in combination with a consideration of previous research, offer insight into how undesirable uncertainty compensation effects might be reduced and even prevented.

Keywords: uncertainty, self-esteem, religiosity, doubt, compensatory conviction

### Uncertainty and Religious Reactivity: Uncertainty Compensation, Repair, and Inoculation

In his essay “The End of History?”, Francis Fukuyama (1989) argued that with the end of the cold war, conflict based on ideology was dead. He postulated that the ideologies of liberal democracy and communism were the last great belief systems capable of causing significant violent conflict. History unfortunately has shown this to be wrong, and religious ideology may be the prime mover behind the annihilation of his hopeful hypothesis (e.g. Kinnvall, 2004).

Conflicts from Ireland to Afghanistan are a tragic testament to the power of religious attitudes, and we recently have learned that uncertainty can have disturbing effects on such attitudes. For instance, after being exposed to uncertainty, people respond more negatively to attacks on their religious views (van den Bos, van Ameijde, & van Gorp, 2006), show increased zeal in their religious convictions and, chillingly, are more supportive of religious war (McGregor, Haji, Nash, & Teper, 2008).

The present research has two major foci. First, unlike previous research, this work focuses on how uncertainty threat influences individual religious faith, not on the problems of religious intolerance (van den Bos et al., 2006), zeal, or support for religious war (McGregor et al., 2001). Individual religious faith may form an important schema that underpins a wide variety of behaviors, and has important implications for the kinds of values that people endorse (e.g. Roccas, 2005). Second, the present research focuses on ways that uncertainty threat can be controlled—by repair or inoculation. An initial study demonstrates how uncertainty threat effects on religious faith can be “repaired” with a post-uncertainty memory recall task. A subsequent study demonstrates a new means of uncertainty control—one in which participants can be “inoculated” against uncertainty.

Learning to control the effects of uncertainty seems especially important in light of the substantial knowledge gained over the last decade about how people react to uncertainty. For instance, we know that uncertainty causes compensatory conviction, the hardening of attitudes in response to uncertainty (McGregor, Zanna, Holmes, & Spencer, 2001). This work demonstrates that exposure to uncertainty causes participants to increase the extremity and certainty of their social convictions (such as attitudes toward the death penalty or gun control). Participants also sometimes will compensate for uncertainty by pursuing personal projects that are more consistent with important personal values (McGregor et al., 2001). Previous research thus demonstrates that uncertainty paradoxically can cause increased certainty in both socially relevant attitudes and the self. We also have learned that uncertainty increases identification with minimal groups (Grieve & Hogg, 1999). When participants are uncertain prior to allocating resources between two arbitrarily formed groups, they allocate greater amounts of resources to their own group than they otherwise would. Further, uncertainty causes people to place a premium on issues of fairness (van den Bos, 2001). For instance, participants who are denied voice in determining their outcomes respond most negatively when they first have been made to feel uncertain. Fair process seems to reassure people that the world is an orderly, predictable place when they are feeling uncertain; denying fair process denies them a means to deal with their uncertainty (e.g. van den Bos, 2001). Existing research demonstrates that people will go to lengths in their attempts to deal with uncertainty.

Although the list of effects tied to uncertainty is growing, research has been slower to uncover the means by which compensatory reactions to uncertainty can be controlled. Theories of uncertainty provide some ideas for this, however. One common theoretical perspective on uncertainty is that it poses a potent self-threat. From Heider (1958) to Weary and Edwards

(1994) and Hogg (2007), certain types of uncertainty are portrayed theoretically as aversive, and as a threat to prediction and control needs. This self-threat conceptualization of uncertainty suggests that self-enhancing manipulations might reduce some of uncertainty's effects, an idea that has received limited attention.

McGregor et al. (2001) found that a post-uncertainty self-affirmation task (e.g. Steele & Liu, 1983) blocked the impact of uncertainty on compensatory conviction. In keeping with theoretical conceptualizations of uncertainty, uncertainty threat was reduced by the post-uncertainty self-affirmation task. Although this research is encouraging, other research has questioned whether these effects are replicable. Hogg and Svensson (2006; reported in Hogg, 2007) found that a post uncertainty self-affirmation task did not reduce uncertainty effects on compensatory social identification. The theoretical meaning of this null effect is not entirely clear, however, especially given that McGregor (2006) recently replicated the original (McGregor et al. 2001) finding that post uncertainty self-affirmation could reduce the consequences of an uncertainty induction. Under some conditions, at least, self-affirmation appears to reduce the impact of uncertainty.

Recent findings that state uncertainty increases religious intolerance and even increases willingness for religious war (e.g. McGregor et al., 2008) underscore the need to advance understanding of how to control compensatory responses to uncertainty. This paper tests two approaches to controlling effects of uncertainty on religious attitudes. The first approach to uncertainty control either presents or does not present participants with a self-repair opportunity before measuring religious attitudes. After exposure to uncertainty, participants are asked to recall either positive or negative events in personally relevant life domains. To the extent that uncertainty triggers needs for threat compensation, recalling positive events might offer

participants a chance to repair any sense of self-threat, eliminating the effects of uncertainty on religious attitudes. The second approach tests the idea that a self-affirmation manipulation may offer a prophylaxis against uncertainty. Specifically, completing a self-affirmation task *before* exposure to uncertainty may inoculate participants so that their religious attitudes remain stable in the face of uncertainty. Such a finding would provide valuable insight into how people can be helped to manage the many sources of uncertainty that are part of life. Whereas previous research has shown that post-uncertainty manipulations seem to repair any disturbance caused by the effects of uncertainty, a finding that a pre-uncertainty manipulation could *protect* people from uncertainty threat would be a significant advance.

The Santa Clara Strength of Religious Faith Questionnaire (SCSORF; Plante & Boccaccini, 1997) served as the dependent measure in all studies. This scale has established psychometric properties (Lewis, Shevlin, McGuckin, & Navratil, 2001) and has been applied in contexts ranging from oncology (Sherman et al., 2001) to weight loss (Fitzgibbon et al., 2005) and depression (Aukst-Margetic, Jakovljevic, Margetic, Biscan, & Samija, 2005). Sample items include “My religious faith is extremely important to me.”, and “I consider myself active in my faith or church.” Responses are provided on a 7-point scale, with higher scores, averaged across items, indicating greater religiosity.

Before testing whether effects of uncertainty on religiosity could be controlled, a pilot study was conducted to establish whether the Santa Clara religiosity measure would be sensitive to an uncertainty induction in American participant samples. In this pilot study, 44 (35 female) participants entered the lab. They first completed an uncertainty induction or television control task patterned after Wichman, et al. (2008; Study 2). In the uncertainty induction task, participants were asked to describe the thoughts and feelings, as well as the physical state they

perceive during the experience of not understanding why something has happened. The control condition asked corresponding questions about the experience of watching television.

Participants then completed word search tasks for 3 min, based on research showing that uncertainty compensation effects are most likely when uncertainty is followed by a brief delay/distracter task (Wichman et al., 2008). Results showed that, as expected, writing about uncertainty ( $M = 4.8$ ,  $SD = 1.4$ ) increased claimed religiosity compared to the control condition ( $M = 3.7$ ,  $SD = 2.1$ ) ( $F(1, 42) = 4.17$ ,  $p = .048$ ,  $\eta^2_{partial} = .09$ ).

Uncertainty salience caused higher levels of claimed religiosity. Whereas previous research has measured zealousness in religious beliefs, support for religious war (McGregor, Haji, Nash, & Teper, 2008), or anger in response to anti-religious statements, (van den Bos, van Ameijde, & van Gorp, 2006), this is the first finding of increased claimed personal religious faith. Study 1 was conducted next, as the first test of an uncertainty compensation control strategy in the domain of religious attitudes. Specifically, Study 1 tested whether a post-uncertainty memory recall writing task could repair the impact of uncertainty on religiosity.

### Method

Participants were randomly assigned to condition in a 2 (uncertainty prime, no uncertainty prime) X 2 (positive vs. negative event memory recall) between participants design. The sample was composed of advanced undergraduate nursing students ( $N = 49$ ; 43 female) who completed questionnaire packets in a large lecture course on a voluntary basis. These students already had personal experience working with patients, and the personal relevance of this clinical experience was utilized in the uncertainty manipulation. In the questionnaire packet, participants first were asked either to briefly describe “A time when you were working with a patient in clinical and, either, second-guessed your actions or were unsure how to resolve a



patient problem.” Or “The course level and subject matter in each of the nursing courses that you are currently enrolled in this quarter.” These instructions served as the uncertainty or control primes, respectively. Next, participants completed either a positive or negative event recall task. In the positive event recall condition, participants briefly described “A time that you feel you had professionally or academically *succeeded* considerably. What were some of the thoughts you had? How did you feel? Please remember as vividly as you can.” In the negative event recall condition, they briefly described “A time that you feel you had professionally or academically *failed* considerably. What were some of the thoughts you had? How did you feel? Please remember as vividly as you can.” Participants then completed the Positive and Negative Affect Scale (PANAS; Watson, Clark, & Tellegen, 1988) as a distraction task. Because the PANAS was intended to serve as a distraction task and was not of theoretical interest at the time, its scores were not recorded. The PANAS was followed by the SCSORF (Plante & Boccaccini, 1997). Participants subsequently were debriefed.

## Results

The SCSORF scale was averaged so that higher scores indicated higher claimed religiosity. This average was analyzed with a 2 (uncertainty; yes/no) X 2 (event recall; success/failure) ANOVA. As seen in Figure 1, the expected interaction was obtained ( $F(1, 45) = 7.7, p = .008, \eta^2_{\text{partial}} = .146$ ). When participants had written about a personal failure, they showed increased religiosity under uncertainty ( $F(1, 45) = 4.84, p = .033, \eta^2_{\text{partial}} = .097$ ). However, when participants had written about a personal success, uncertainty did not increase religiosity ( $F(1, 45) = 2.89, p = .088, \eta^2_{\text{partial}} = .063$ ). In fact, uncertainty marginally decreased religiosity.

## Discussion

Uncertainty increased religiosity only for individuals who recalled negative events after exposure to uncertainty. When an alternative compensation opportunity was offered in the form of a personal success recall task, participants showed no increased religiosity effects. This finding is consistent with the idea that uncertainty does not result in defensive responding when individuals are given the opportunity to repair threatened self-worth.

In the personal success recall condition, uncertainty marginally decreased religiosity. This implies that under conditions where the potential self-worth threat of uncertainty has been eliminated, uncertainty may work more purely as a meta-cognition, as opposed to a self-threat that elicits a compensation response. Uncertainty therefore may have led participants to doubt their religiosity, rather than to respond with increased conviction (c.f. McGregor, 2001; Wichman et al., in preparation). Prior work on uncertainty as threat has not considered the conditions under which uncertainty plays a doubt-inducing or a conviction-increasing role, but this finding appears to offer some insight into this question.

Whereas previous research has investigated post-uncertainty integrity repair tasks with non-religious attitudes (c.f. McGregor et al., 2001), Study 1 provides the first evidence that a post-uncertainty self-repair manipulation can decrease compensatory effects of uncertainty on religiosity. In contrast to Hogg and Svensson (2006; cited in Hogg, 2007), who found no effects of a post uncertainty self-repair manipulation in a social-identity paradigm, these results support the effectiveness of this type of manipulation for religious attitudes.

One possible, though unlikely, alternative explanation for the results of Study 1 involves affect. The logic of uncertainty threat suggests that in addition to responding to self-affirmation tasks such as that used by McGregor et al. (2001) temporary uncertainty inductions might lead to decreased self-esteem or depressed affect. Evidence for this idea has not been consistent.

McGregor et al. (2001) failed to find effects of uncertainty on either state self-esteem or state positive or negative affect. Other researchers also have failed to find consistent effects of uncertainty on measures of affect (e.g. van den Bos, Euwema, Poortvliet, & Maas, 2007; Wichman, Brunner, & Weary, 2008).

Nevertheless, it remained a possibility that when the uncertainty induction immediately was followed by the personal failure recall task, that subsequent negative affect led participants to claim higher religiosity as a means of coping with uncertainty-induced negative affect. Study 1 did not include an uncertainty-only control condition to investigate this question. Further, PANAS scores were not recorded in Study 1 to investigate whether uncertainty-induced negative affect might have caused the observed increase in religiosity<sup>1</sup>. Study 2 incorporated modifications to address these issues.

Considering the state of research on uncertainty threat, uncertainty is thought to threaten the integrity of the self (e.g. McGregor et al., 2001). Uncertainty compensation attempts correspondingly often take the form of behaviors that in some way re-establish self-integrity. Previous research on how uncertainty compensation can be managed has provided participants with compensation, or integrity-repair, opportunities that occur at least in part *after* exposure to uncertainty. We now understand that if participants can repair their self-integrity after uncertainty before responding to the main dependent measure, the effects of uncertainty on this dependent measure are often reduced. We as yet do not know if it is possible to obviate entirely the need for self-integrity repair by pre-emptive buffering of the self. Is it possible not just to repair the effects of uncertainty threat, but to inoculate against it before it occurs?

## Study 2

Some recent research suggests that uncertainty inoculation theoretically is possible. Two recent experiments (McGregor & Marigold, 2003, and McGregor, Nail, Marigold, & Kang, 2005) indicate that uncertainty threat can interact with unstable self-esteem to cause compensatory conviction. If self-esteem instability makes people defensive in response to uncertainty, a manipulation to increase self-integrity might work to inoculate, or at least temporarily buffer, against uncertainty threat. Study 2 tests this idea by giving participants a self-affirmation opportunity or not before exposure to the uncertainty induction. As noted above, Study 2 also addresses a possible concern with the design of Study 1: the lack of a neutral event recall condition. Although the pilot study provided the initial demonstration of the reliability of uncertainty effects on the SCSORF, it remained possible that uncertainty was most likely to cause increased religiosity when combined with negative event recall. Study 2 used a neutral control condition in conjunction with uncertainty to address this concern. Study 2 further included the PANAS as a distraction task but this time responses were recorded so that affect could be examined as a potential alternative explanation for any effects.

### Method and Results

Participants (N = 81; 51 females) were approached across campus and asked to complete a short survey as part of a psychology class project. They first completed the self-affirmation task, followed by the uncertainty induction, the PANAS distracter/delay task, and the SCSORF scale before being debriefed.

The self-affirmation task was based on that used by Cohen, Aronson, and Steele (2000). Participants picked from a list of 5 values either their most important value and wrote about why it was important to them, or picked their least important value, but wrote about how it could be important for someone else. The values options included: Business/ Economics/ Making Money,

Art/ Music/ Theatre, Science/ Pursuit of Knowledge, Social Life/ Relationships, and Social Action/ Helping Others.

The uncertainty prime was identical to one used by Wichman, Brunner, and Weary (2008; Study 2). Participants were asked to write either about their thoughts and feelings when uncertain about something that had happened, or about their thoughts and feelings while watching television in the control condition.

To test affect as a possible alternative explanation for any uncertainty-religiosity effects, PANAS items were averaged into their positive ( $\alpha = .80$ ) and negative ( $\alpha = .84$ ) subscales. Separate 2(uncertainty; yes/no) X 2 (self-affirmation; yes/no) ANOVAs on these positive and negative subscales showed only a main effect of self-affirmation on the positive PANAS items; ( $F(1, 77) = 4.01, p = .049, \eta^2_{\text{partial}} = .05$ ). There were no other effects on either the positive ( $ps > .24$ ) or negative ( $ps > .73$ ) PANAS. These results indicate that uncertainty-induced changes in affect are not responsible for uncertainty-religiosity effects.

For the main analysis, the religiosity scale was averaged as in the previous two studies. An ANOVA revealed a significant interaction of Self-Affirmation with Uncertainty conditions ( $F(1, 77) = 4.33, p = .041, \eta^2_{\text{partial}} = .053$ ). The nature of this interaction is shown in Figure 2. In the no affirmation condition, the uncertainty prime condition had significantly higher religiosity scores than the control condition ( $F(1, 77) = 4.34, p = .041, \eta^2_{\text{partial}} = .053$ ). In the affirmation condition, however, there was no significant difference between uncertainty and no uncertainty conditions ( $F(1, 77) = 0.70, p = .40, \eta^2_{\text{partial}} = .009$ ). This result is consistent with uncertainty inoculation.

To further investigate the possible role of affect in bringing about these results, religiosity scores were regressed onto dummy coded uncertainty, self-affirmation, their interaction, and

standardized positive and negative affect. This analysis showed a simple main effect of positive affect on religiosity ( $t(1, 75) = 2.8$ ;  $B = .60$ ;  $p = .006$ ,  $\eta^2_{\text{partial}} = .095$ ). Greater positive affect was associated with *higher* claimed religiosity. This finding of higher positive affect predicting higher religiosity suggests that the religiosity findings in Study 1 were not due to uncertainty-induced negative affect. Further, this analysis showed that the interaction of self-affirmation and uncertainty remained significant ( $t(1, 75) = 2.2$ ;  $B = 1.70$ ;  $p = .034$ ,  $\eta^2_{\text{partial}} = .059$ ) when positive and negative affect were controlled. The fact that the self-affirmation X uncertainty effect remained essentially unchanged while controlling positive and negative affect, and the positive affect finding, which speaks against a negative affect compensation explanation for the religiosity effect, suggests that the uncertainty-religiosity effect may be cognitively mediated.

#### Discussion and Conclusion

In contrast to previous findings showing the malleability of religious attitudes (e.g. McGregor et al., 2008; van den Bos et al., 2006), the results of these studies suggest that religious attitudes may be able to withstand the influence of uncertainty. Whereas Study 1 found uncertainty compensation only in the negative event recall + uncertainty condition, the pilot study, and now Study 2 have demonstrated that uncertainty alone resulted in compensation attempts as measured by increases in self-report religiosity.

Previous work has examined the role of dispositional self-esteem as a pre-existing influence on responses to uncertainty (McGregor et al., 2001), but has not investigated how changes in the situation, before exposure to uncertainty, can prevent uncertainty compensation effects all-together. This finding marks the first observation of a solely pre-uncertainty manipulation that can eliminate uncertainty compensation effects, and experimentally rules out the possibility that post uncertainty distraction might be responsible for the apparent role of self-

affirmation manipulations in eliminating these effects. Inoculation against uncertainty threat is possible.

The finding in Study 2 showing that positive affect was associated with greater religiosity suggests that self-affirmation exercises as used to control uncertainty do not need to exert their influence via affect. The observed influence of positive affect is the opposite of what one would expect if uncertainty-induced negative affect, or self-affirmation induced positive affect, were responsible for these findings. Given the missing PANAS scores in Study 1, one cannot be certain if affect played the same role in Study 1 as in Study 2, but it seems reasonable to conclude that self-integrity repair tasks need not operate through affective mechanisms.

These data therefore appear to rule out affect as a cause of uncertainty effects on religiosity. Implicit positive affect still might be a possibility (e.g. Koole, Smeets, van Knippenberg, & Dijksterhuis, 1999), although previous research suggests that uncertainty primes are unrelated to implicit affect (Wichman, Brunner, & Weary, 2008). Given the lack of support for affect as a causal factor and the efficacy of the self-esteem related manipulations in the current experiments, it appears that self-esteem, either as a manipulated variable or as a consequence of successful goal pursuit, might be a fruitful focus of investigation (although see Tesser, 2001 for an argument on the substitutability of self-protective processes).

One desirable goal is to discover what makes uncertainty so potent in influencing judgment and behavior. Fortunately, existing theoretical perspectives on uncertainty offer a conceptual starting point. This starting point appears to be the degree to which different types of uncertainty threaten central goals. Indeed, different areas of research have demonstrated the effects of uncertainty for a variety of important goals. For instance, goals for prediction and control are served by attribution processes (Heider, 1958), and the effects of uncertainty in

relationship to these goals are the focus of work on Causal Uncertainty (CU; Weary & Edwards, 1994). In addition to prediction and control, other important goals threatened by uncertainty include group identification (the focus of Uncertainty Identity Theory; Hogg, 2007). Identity consolidation theory (McGregor, 2004) is perhaps the most inclusive perspective; it focuses on personally important uncertainty, accepting that such uncertainty can stem from many sources. These perspectives suggest that a focus on the link between uncertainty and goal pursuit may be fruitful.

In general, research suggests that unless uncertainty is aversive and relevant, it probably will not cause compensatory responding (see, e.g. van den Bos, 2004). This previous emphasis on uncertainty as a threat has yielded many insights, but a full understanding of uncertainty should take into consideration not only uncertainty-threat, but also the meaning of uncertainty in different contexts. When does uncertainty lead to doubt, when to compensatory conviction?

Among others, one factor influencing the role of uncertainty might be mindfulness. A variety of mindfulness related approaches have been used to help manage psychological disturbance (e.g. Hayes, Strosahl, & Wilson, 1999, Linehan, 1993), and these might offer ways to deal with uncertainty threat. Increased mindfulness should decrease uncertainty reactivity, and related constructs, such as self-compassion (Neff, 2003) may also provide insights into how uncertainty can be effectively managed.

The current work indicates that temporary self-affirmation related manipulations can protect against uncertainty effects on religious attitudes. It is ironic that some effects of uncertainty on religious faith can be reduced by bolstering the same self-system that religion ideally transcends.



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## Footnotes

<sup>1</sup>Paper questionnaires were destroyed in error before PANAS scores could be recorded.

Author Note:

The last two studies in this article were prepared and executed by students in my advanced research methods classes during 2006 and 2007. I thank them for their help with this project.

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Figure Captions

*Figure 1.* Interaction of Uncertainty Induction and Directed Recall Task predicting Religiosity.

*Figure 2.* Interaction of Uncertainty Induction and Self-Affirmation Task predicting Religiosity.