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Kimberly Rios¹, Keith D. Markman¹, Juliana Schroeder²,
and Elizabeth A. Dyczewski¹

Abstract

Building on findings that self-uncertainty motivates attempts to restore certainty about the self, particularly in ways that highlight one's distinctiveness from others, we show that self-uncertainty, relative to uncertainty in general, increases creative generation among individualists. In Studies 1 to 3, high (but not low) individualists performed better on a creative generation task after being primed with self-uncertainty as opposed to general uncertainty. In Study 4, this effect emerged only among those who were told that the task measured creative as opposed to analytical thinking, suggesting that the positive effects of self-uncertainty on performance are specific to tasks that bolster perceptions of uniqueness. In Study 5, self-uncertain individualists experienced a restoration of self-clarity after being induced to think about themselves as more (vs. less) creative. Implications for compensatory responses to self-uncertainty and factors that influence creativity are discussed.

Keywords

self-uncertainty, threat, creativity, individualism, distinctiveness

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In societies such as North America and Western Europe, where being unique is of paramount importance (Markus & Kitayama, 1991), creativity is highly valued. Indeed, a cursory glance at the content of prime-time television programs (e.g., *Glee*, *American Idol*, *The Voice*, *So You Think You Can Dance*), elective courses at secondary schools and universities (e.g., studio art, marching band, creative writing), and pop psychology books (e.g., *The Power of Thinking Differently* by Javy Galindo, *How To Think Like Leonardo Da Vinci* by Michael Gelb, *The Artist's Way* by Julia Cameron) serves to highlight the perceived importance of expressing oneself creatively and “thinking outside the box.” At the same time, increased feelings of uncertainty are a hallmark of the 21st century in light of the aging population, trying economic times, and an uptick in the number of people who are relocating and changing jobs (Hogg, 2007).

On consideration of the myriad theories and research findings suggesting that threat and uncertainty can hamper creative thought (e.g., the threat-rigidity hypothesis; Staw, Sandelands, & Dutton, 1981), the prevalence of uncertainty in the modern age might seem incompatible with societal attempts to encourage creativity. However, we argue in the present research that because the self-worth of many individuals is at least partially contingent on perceiving oneself

as unique and independent, uncertainty about the self—relative to other forms of uncertainty—may *facilitate* creative self-expression among such individuals. Because we are interested in examining distinctiveness-seeking tendencies, the aspect of creativity on which we have elected to focus in the present work is *originality*—the generation of unique ideas, associations, and solutions (Guilford, 1950).

Determinants of Creativity

The question of what influences creativity has a decades-long research tradition in psychology. Much of this research has focused on delineating contextual factors that elicit creativity, such as positive affect (Isen, Daubman, & Nowicki, 1987), multicultural experiences (Leung & Chiu, 2010), and living abroad (Maddux & Galinsky, 2009). In addition, recent scholarship has identified psychological need states that can constrain creativity. For example, high need for

¹Ohio University, Athens, USA

²University of Chicago, IL, USA

Corresponding Author:

Kimberly Rios, Ohio University, 219 Porter Hall, Athens, OH 45701, USA.

Email: kimberly.m.rios@gmail.com

closure (Chirumbolo, Livi, Mannetti, Pierro, & Kruglanski, 2004) tends to inhibit creative performance relative to low need for closure, as does high (vs. low) personal need for structure (Schultz & Searleman, 1998; but see Rietzschel, De Dreu, & Nijstad, 2007). Moreover, people who are prevention-focused, or sensitive to potential risks and losses, tend to be less creative than their promotion-focused counterparts, who are sensitive to potential gains and rewards (De Dreu, Nijstad, & Baas, 2011; Friedman & Förster, 2001).

Both need for closure (Webster & Kruglanski, 1994) and personal need for structure (Neuberg & Newsom, 1993) are associated with a preference for order and certainty and, hence, with an aversion to ambiguous and uncertain situations. Similarly, a prevention focus is associated with vigilance and attempted avoidance of environmental threats (Higgins, 1998). As such, these constructs are theorized to inhibit one's motivation to think in novel and relatively unstructured ways (Chirumbolo et al., 2004; Schultz & Searleman, 1998) and thereby appear to align with the threat-rigidity hypothesis—the notion that uncertainty and threat are debilitating and evoke closed-minded thinking (Staw et al., 1981).

However, it could be that the relationship between uncertainty and creativity depends on the nature of the uncertainty. People can feel uncertain not only about the world at large (e.g., how a particular crisis will be resolved), but also about matters that are directly *self-relevant* (e.g., job prospects, physical appearance, social relationships). The experiential state associated with elevated feelings of uncertainty about self-relevant things has been referred to as *self-uncertainty* (Hogg, 2007) or *personal uncertainty* (McGregor, Zanna, Holmes, & Spencer, 2001; van den Bos, 2009). Although it is generally assumed that uncertainty impedes creativity (e.g., Staw et al., 1981), it may be that the uncertainty-related constructs that have been linked to creativity in previous studies are not necessarily construed as self-relevant. For instance, the item “I don't like situations that are uncertain” (Personal Need for Structure Scale; Neuberg & Newsom, 1993) could refer to situations that evoke self-uncertainty, general uncertainty, or both.

In the present research, and in line with recent conceptualizations of how the self responds to threat (e.g., Proulx & Inzlicht, 2012; Proulx, Inzlicht, & Harmon-Jones, 2012), we propose that experiencing uncertain feelings about the self can motivate palliative efforts to reduce these aversive feelings. In contrast to the threat-rigidity formulation, we hypothesize that some individuals compensate for their feelings of self-uncertainty by expressing themselves creatively. In so doing, such individuals may manage to restore their feelings of self-certainty.

Compensatory Responses to Uncertainty

Recent work has demonstrated that when people are made to experience self-uncertainty, they also experience diminished *self-concept clarity* (Hogg, Sherman, Dierselhuis, Maitner, & Moffitt, 2007), defined as the perception of having a clear

and consistent sense of self (Campbell, 1990). Notably, manipulations of self-uncertainty decrease self-concept clarity without affecting general mood or state self-esteem (McGregor et al., 2001). To compensate for lowered self-concept clarity, people often attempt to bolster core self-aspects to regain certainty. For example, self-uncertainty leads people to defensively claim conviction in their social attitudes (McGregor et al., 2001; Nash, McGregor, & Prentice, 2011), to express stronger religious beliefs (McGregor, Nash, & Prentice, 2010; van den Bos, van Ameijde, & van Gorp, 2006), to derogate others who violate cultural norms and values (van den Bos, 2009), and to identify more strongly with groups that are cohesive (Hogg et al., 2007) or extreme (Hogg, Meehan, & Farquharson, 2010).

These effects are generally less pronounced for threats that pertain indirectly to the self, such as uncertainty about the world in general (Morrison & Johnson, 2011; Rios, Wheeler, & Miller, 2012) and perceived lack of control over events external to the self (Shepherd, Kay, Landau, & Keefer, 2011). Although less directly self-relevant threats may motivate attempts to restore one's sense of control over external events, for instance, they are less likely to trigger attempts at restoring the self specifically.

Some empirical work suggests that reactions to uncertainty are especially evident in behaviors thought to differentiate the self from others, including expressions of minority opinions (Rios et al., 2012) and identification with distinctive groups (Grant & Hogg, 2012). It is presumed that people living within individualistic societies where self-expression and uniqueness are valued define themselves primarily in terms of their distinctive characteristics (Markus & Kitayama, 1991; Triandis, 1995). In such societies, uncertainty about the self is most effectively resolved by asserting one's distinctiveness. It should be noted that although the research on minority opinion expression (Rios et al., 2012) and distinctive group identities (Grant & Hogg, 2012) has not explicitly examined individualism, all of this work has been conducted thus far within an individualistic context (i.e., the United States; Markus & Kitayama, 1991).

Providing more direct support for the importance of individualism in understanding responses to self-uncertainty, the results of several recent studies suggest that individualism moderates the relationship between self-uncertainty and subsequent compensatory efforts (Morrison & Johnson, 2011; Morrison, Johnson, & Wheeler, 2012). In one representative set of studies (Morrison & Johnson, 2011), participants were primed to feel uncertain either about themselves as individuals or about a current event of their choosing that was not directly related to the self (e.g., a news story, a celebrity scandal). They then rated the extent to which various personal possessions (e.g., their car, their favorite pair of blue jeans) were representative of their identity and values. The results indicated that individualists, whether operationalized in terms of ethnicity (i.e., European American) or dispositional characteristics (i.e., responses to a trait measure of individualism), rated their possessions as more

expressive of themselves following self-relevant uncertainty priming than following general uncertainty priming. The ratings of collectivists (i.e., Asian Americans or those who scored high on a trait measure of collectivism), however, were unaffected by self-uncertainty priming. Moreover, for individualists but not collectivists, imbuing possessions with one's distinctive personal characteristics ultimately restored self-certainty.

Restoring the Individual Self Through Creative Generation

Based on findings that self-uncertainty can increase distinctiveness tendencies (Grant & Hogg, 2012; Rios et al., 2012), especially among individualists (Morrison & Johnson, 2011; Morrison et al., 2012), is it possible that feelings of uncertainty about the self—relative to uncertainty in general—can also stimulate creative generation? Because creative generation involves re-conceptualizing and generating novel solutions to problems (Baas, De Dreu, & Nijstad, 2008; Guilford, 1950; Markman, Lindberg, Kray, & Galinsky, 2007), it may hold particular value for those who define the self as unique and independent. Indeed, groups with individualistic norms tend to be more creative than groups with collectivistic norms (Goncalo & Staw, 2006), and people who adopt a differentiation mind-set (as evidenced by high individualism or uniqueness motives) tend to be more creative than people who do not adopt such a mind-set (Kim, Vincent, & Goncalo, 2013). Notably, however, the relationship between self-uncertainty and individualism with regard to levels of creative generation has yet to be investigated.

In the present research, we hypothesize that elevated feelings of self-uncertainty should elicit more creative generation than should elevated feelings of general uncertainty among those who score high on measures of individualism—that is, among those who perceive creative generation as an effective means of restoring self-clarity when threatened. Among those who score low on measures of individualism, by contrast, elevated feelings of self-uncertainty should either exert no effect on creative generation, or should perhaps even elicit less creative generation than should elevated feelings of general uncertainty. Because they have lower distinctiveness needs, such individuals should be less likely to perceive creative generation as a means of regaining self-clarity.

As noted earlier, the present work would demonstrate that self-uncertainty enhances creative output to a greater extent than do more general forms of uncertainty. In addition, this work would extend earlier investigations of self-uncertainty to performance-based outcomes. The empirical work conducted thus far has examined outcomes such as attitude change (e.g., McGregor et al., 2001; McGregor et al., 2010; van den Bos et al., 2006), opinion expression (Rios et al., 2012), and emotional experience (Morrison et al., 2012; Nash et al., 2011). If self-uncertainty is also found to influence task performance, however, this would significantly broaden the range of consequences that it has been demonstrated to elicit.

A critical assumption underlying the current work is that creative generation is a means by which individualists can potentially reduce, or buffer themselves against, aversive feelings of self-uncertainty. Given that we have conceptualized creative activity as a compensatory response to threatened self-certainty (Proulx & Inzlicht, 2012), we would also suggest that other people need not be aware of one's enhanced creative output in order for the act of generating that output to have restorative effects on one's perceived self-clarity. Consistent with the notion that creative generation need not occur in public to have palliative effects, related research has shown that merely learning that one holds a minority opinion (without actually having to publicly express that opinion; Morrison & Wheeler, 2010), and merely thinking about personally meaningful possessions (without actually having to publicly display those possessions; Morrison & Johnson, 2011) can effectively bolster self-concept clarity.

Research Overview

Across five studies, we examined the influence of uncertainty threats on creative generation as moderated by self-reported levels of individualism. In Studies 1 to 3, participants were made to feel either self-uncertain or generally uncertain prior to performing a creative generation task. We hypothesized that among those high in individualism, self-uncertainty would elicit more creative output than would general uncertainty. In Study 4, participants were made to feel self-uncertain or self-certain prior to completing a task described as measuring either creative thinking or analytical thinking. Because creative thinking is construed as more relevant to establishing a distinctive sense of self than is analytical thinking (Kim et al., 2013), we hypothesized that individualists in the self-uncertainty condition would outperform individualists in the self-certainty condition, but only if the task had been described as a measure of creative thinking. In Study 5, after exposure to either a self-uncertainty or general uncertainty prime, participants were induced to perceive themselves as either relatively creative or relatively uncreative. They then completed a measure of self-concept clarity. We predicted that self-uncertain individualists who had been induced to perceive themselves as creative would exhibit higher self-concept clarity than those who had not been so induced, thereby providing evidence for the restorative effects of creativity.

Study 1

Method

Participants. Forty-three University of Chicago students and staff members participated in an online study (41% male; $M_{\text{age}} = 20.6$, $SD = 3.7$). To manipulate uncertainty type, participants were randomly assigned to either the self-uncertainty condition ($n = 20$) or the general uncertainty condition

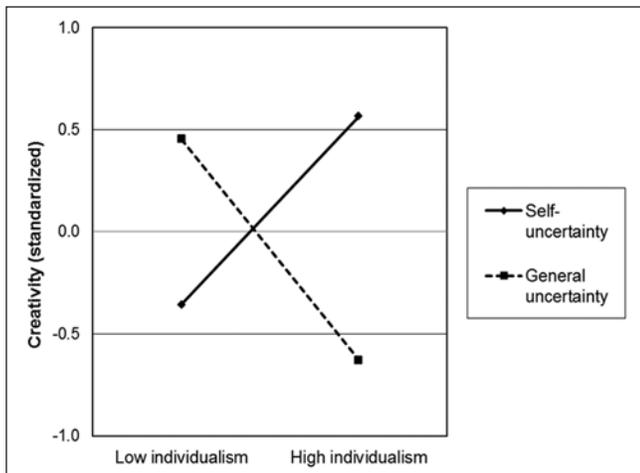


Figure 1. Creativity (standardized) as a function of uncertainty condition (self vs. general) and individualism (± 1 SD), Study 1.

($n = 23$). To measure creativity, participants were randomly assigned to complete either Guilford's (1967) Alternative Uses Task (AUT; $n = 19$) or Mednick's (1962) Remote Associates Test (RAT; $n = 24$).

Procedure. The study was described as an investigation of thinking and reasoning, and all materials were presented online. First, participants completed the uncertainty manipulation (Hogg et al., 2007; Morrison & Johnson, 2011). In the self-uncertainty condition, participants wrote a brief essay about the three aspects of their lives that made them feel most uncertain about themselves, their lives, and their futures. In the general uncertainty condition, participants wrote a brief essay about the three aspects of a current event or social issue that made them feel the most uncertain. Previous research has shown that manipulations of self-uncertainty, relative to general uncertainty, lower people's perceptions that they have a consistent and coherent sense of self (Morrison & Johnson, 2011).

Next, participants completed the creativity task they had been assigned. Participants who completed the AUT generated as many novel uses for a brick as they could. Each use generated by a participant was rated for its creativity on a 5-point scale (1 = *not at all creative*, 5 = *very creative*) by two independent judges. A judge's creativity score for a particular participant was computed by summing the judge's average creativity rating of each use that the participant generated and dividing that sum by the total number of uses that the participant generated (e.g., Friedman & Förster, 2001; Markman et al., 2007). Creativity ratings did not correlate with total number of uses ($r = .03$, $p = .92$). Judges' ratings were significantly correlated ($r = .71$, $p < .001$) and were averaged together.

Participants who completed the RAT received 10 sets of three related words (e.g., *broken*, *clear*, *eye*) and were instructed to generate a fourth word that was related to each

of the words in the set (e.g., *glass*). These particular word sets were chosen because they have been used in prior research (Kray, Galinsky, & Wong, 2006). A creativity score for each participant was computed by counting the number of word sets solved correctly. These scores were then standardized to create a single index of creativity.¹

Finally, all participants completed the 32-item individualism-collectivism (INDCOL) scale (Triandis & Gelfand, 1998). On a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*), they indicated their agreement with 16 statements assessing individualism (e.g., "I often do 'my own thing'"), as well as 16 statements assessing collectivism (e.g., "To me, pleasure is spending time with others"). Their responses were averaged into separate composites ($M = 5.08$, $SD = 0.70$, $\alpha = .79$ for individualism; $M = 4.80$, $SD = 0.86$, $\alpha = .87$ for collectivism). Participants' individualism and collectivism scores were not affected by uncertainty condition, $F_s < 1$.

Results

We hypothesized that participants primed with self-uncertainty would perform better on the creativity task than participants primed with general uncertainty, but only if they expressed high levels of individualism. To test this prediction, we submitted participants' creativity scores to a multiple regression analysis with uncertainty condition (0 = self-uncertainty, 1 = general uncertainty), individualism (mean-centered continuous variable), and their interaction term as predictors (Aiken & West, 1991). The effects of uncertainty condition and individualism were entered and interpreted in the first step of the regression, and the two-way interaction was added to and interpreted in the second step of the regression (Cohen, Cohen, West, & Aiken, 2003).

The only significant effect to emerge was the predicted interaction between uncertainty condition and individualism ($b = -1.47$, $SE = .40$, $t(39) = -3.69$, $p = .001$, total $R^2 = .27$ (see Figure 1). To decompose this interaction, we used the Johnson-Neyman technique, which identifies regions of the moderator variable (individualism) where the independent variable (uncertainty condition) is significant (Hayes & Matthes, 2009). We did so because participants' mean individualism scores varied across studies, and we wanted to gain a more comprehensive understanding of the minimum level of individualism at which self-uncertainty—relative to general uncertainty—would enhance creative generation.

Decomposition of the interaction revealed that participants performed better on the creative generation task in the self-uncertainty than general uncertainty condition when their individualism score was at least 5.35, or 0.51 SD above the mean ($b = -.59$, $SE = .29$, $t(39) = -2.02$, $p = .05$, 95% confidence interval (CI) = $[-1.19, 0]$). By contrast, participants performed better in the general uncertainty than self-uncertainty condition when their individualism score was 4.45 (0.88 SD below the mean) or lower ($b = .72$, $SE = .36$, $t(39) = 2.02$, $p = .05$, 95% CI = $[0, 1.45]$).

A parallel analysis conducted on collectivism scores revealed no significant effects. In particular, the Uncertainty condition \times Collectivism interaction failed to reach significance ($b = .19$, $SE = .37$), $t(39) < 1$, total $R^2 = .01$. This suggests that the critical interaction was driven by individualists, who value distinctiveness, and not by collectivists, who value group memberships. In addition, when an Uncertainty condition \times Individualism \times Creativity task (0 = brick, 1 = RAT) multiple regression analysis was conducted, the three-way interaction with creativity task was nonsignificant ($b = -1.28$, $SE = .81$), $t(35) = -1.58$, $p = .12$, total $R^2 = .37$, but the two-way Uncertainty condition \times Individualism interaction remained significant ($b = -1.52$, $SE = .41$), $t(35) = -3.67$, $p = .001$, total $R^2 = .32$. Thus, participants' performances on the AUT and RAT were similarly affected by uncertainty condition and individualism.

Discussion

The results of Study 1 supported our hypothesis that self-uncertainty, relative to general uncertainty, would enhance creative generation among high individualists. Moreover, and unexpectedly, self-uncertainty elicited less creative generation than did general uncertainty among low individualists. One likely explanation for this pattern of findings is that threats to self-certainty lead people to convey what they believe are their core values (e.g., McGregor et al., 2001; McGregor et al., 2010; Morrison & Johnson, 2011). For those who value distinctiveness more (i.e., high individualists), creative generation is an optimal means of doing so. For those who value distinctiveness less (i.e., low individualists), however, creative generation may be less helpful because it does not reflect a core value.

Study 2

Although the results of Study 1 confirmed our predictions, a limitation is that the measure of individualism was administered after the creativity task. As noted earlier, participants' individualism scores were not affected by the experimental manipulation. Nevertheless, to alleviate any potential concerns about the impact of the manipulation on the moderating variable of interest, we measured individualism at the beginning of the study rather than at the end.

Another objective of Study 2 was to replicate our results with a different creativity measure (Scattergories Task) and sample (adults). The Scattergories task has been used in previous research as a measure of creative generation as it involves generating novel exemplars for various categories of objects (Markman et al., 2007).

Method

Participants. Thirty-five individuals of various demographic backgrounds, all native English speakers, were recruited

from a database of people who had expressed an interest in completing paid online studies. The database, sponsored by a private U.S. university, recruited potential participants through classified ad websites such as Craigslist. Participants were randomly assigned to either the self-uncertainty condition ($n = 16$) or the general uncertainty condition ($n = 19$) and received US\$5 as compensation.

Procedure. The study was described as an investigation of the relationship between self-perceptions and thinking styles. First, participants completed the shortened (eight-item) individualism scale (Triandis & Gelfand, 1998). Participants responded to each item on a 5-point scale (1 = *strongly disagree*, 5 = *strongly agree*), and their responses were averaged ($M = 3.61$ out of 5, $SD = 0.65$; $\alpha = .79$).

Next, participants completed either the self-uncertainty or general uncertainty priming manipulation from Study 1, followed by the Scattergories task (Markman et al., 2007). The ostensible purpose of this task was to pre-test it for future research. Participants were given four lists that contained 5 different categories each (e.g., sandwiches, musical instruments, stones, and gems) for a total of 20 categories. For each of the four lists, participants were instructed to generate one member of each of the 5 categories that began with a given letter. The lists were taken directly from Markman et al. (2007), and a random number generator was used to select both the 5 categories and the letter for each list. Two creativity scores were computed. First, the total number of responses (i.e., sensible category members) that participants generated (ranging from 0 to 20; $M = 13.89$, $SD = 6.23$) was computed. Second, as in the AUT, we had two independent judges (who were blind to experimental condition) rate each response on a 5-point scale (1 = *not at all creative*, 5 = *very creative*), averaged the judges' ratings ($r = .86$, $p < .001$), and divided the sum of the ratings by the total number of category members generated ($M = 2.29$, $SD = 0.46$). Total number of responses correlated significantly with judged creativity ($r = .75$, $p < .001$).²

Results

We predicted that participants high in individualism would perform better on the Scattergories task (i.e., generate more creative responses, a higher total number of responses, or both) in the self-uncertainty than general uncertainty condition. To test this prediction, total responses and judged creativity were submitted to Uncertainty condition \times Individualism multiple regression analyses. There were no overall effects of uncertainty condition or individualism on either measure ($ps > .33$). However, the predicted Uncertainty condition \times Individualism interactions were significant (judged creativity: $b = -8.73$, $SE = 2.84$), $t(31) = -3.07$, $p < .005$, total $R^2 = .27$, (total responses: $b = -9.64$, $SE = 2.90$), $t(31) = -3.32$, $p < .005$, total $R^2 = .28$ (see Figure 2).

For judged creativity, decomposition of the interaction using the Johnson–Neyman technique revealed that self-uncertainty

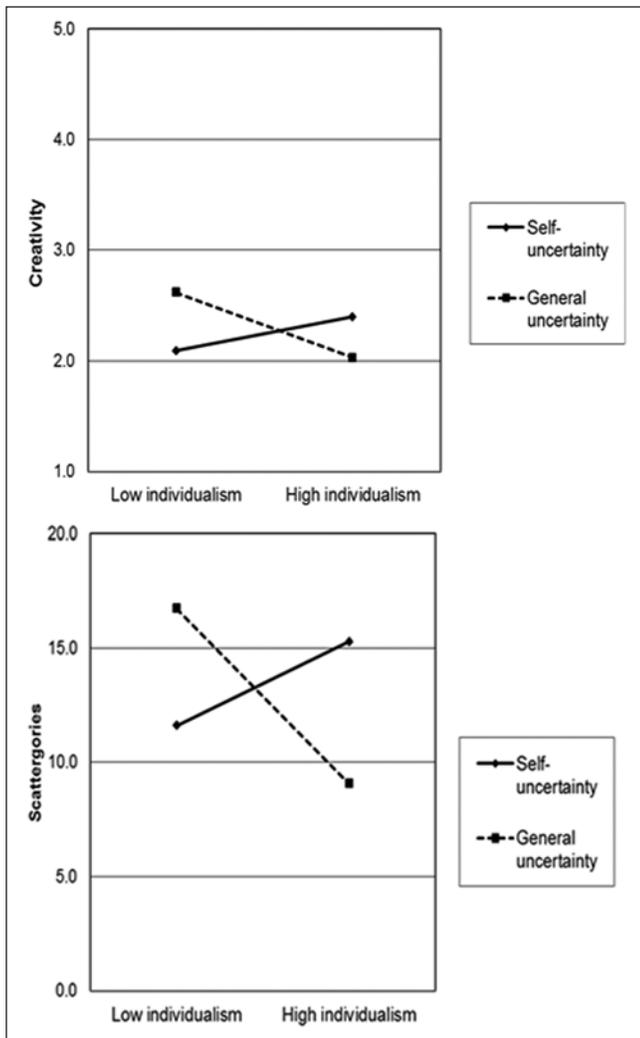


Figure 2. Judged creativity and total Scattergories responses as a function of uncertainty condition (self vs. general) and individualism (± 1 *SD*), Study 2.

elicited more creative responses than general uncertainty among participants whose individualism scores were at least 4.36 (1.15 *SD* above the mean; $b = -.43$, $SE = .21$), $t(31) = -2.04$, $p = .05$, 95% *CI* = $[-0.87, 0]$. By contrast, general uncertainty elicited more creative responses than self-uncertainty among participants whose individualism scores were lower than 3.26 (0.54 *SD* below the mean; $b = .32$, $SE = .16$), $t(31) = 2.04$, $p = .05$, 95% *CI* = $[0, 0.65]$. For total responses, the effect of uncertainty was significant at individualism scores above 4.12 (0.78 *SD* above the mean; $b = -4.84$, $SE = 2.38$), $t(31) = -2.04$, $p = .05$, 95% *CI* = $[-9.69, 0]$; and below 3.11 (0.77 *SD* below the mean; $b = 4.86$, $SE = 2.38$), $t(31) = 2.04$, $p = .05$, 95% *CI* = $[0, 9.72]$.

Discussion

The results of Study 2 conceptually replicated those of Study 1 with a different measure of creativity. As in Study 1, individualists generated more creative responses when primed

with self-uncertainty than general uncertainty. Therefore, self-uncertainty (relative to general uncertainty) appears to elicit more creative responses among people who tend to define themselves as distinctive from others, whereas general uncertainty (relative to self-uncertainty) appears to elicit fewer creative responses among people who tend not to define themselves as distinctive from others.

A limitation of Studies 1 to 2 is that the sample sizes (43 and 35, respectively) were fairly small for the purpose of detecting two-way interactions. Thus, we ran Study 3 to determine whether the effects would be obtained in a larger sample. In addition, we used the AUT exclusively, as the RAT (used in Study 1) is not universally considered to be an indicator of creative generation (Markman et al., 2007).

Study 3

Method

Participants. One hundred forty-six native English speakers (48% male; $M_{age} = 28.7$, $SD = 11.9$) were recruited through either Amazon's Mechanical Turk website ($n = 81$) or a database of University of Chicago students and staff members ($n = 65$). The Mechanical Turk participants received US\$0.50 as compensation, and the University of Chicago participants were entered into a drawing to win one of several US\$25 Amazon gift cards. Participants were randomly assigned to either the self-uncertainty ($n = 68$) or general uncertainty ($n = 78$) condition. Seven participants were omitted due to suspicion, leaving 139 individuals in the final sample.

Procedure. The procedure was the same as Study 1, with two modifications. First, participants completed the 32-item INDCOL scale ($M_{IND} = 4.74$ out of 7, $SD = 0.68$, $\alpha = .79$; $M_{COL} = 4.90$, $SD = 0.70$, $\alpha = .83$) before the uncertainty manipulation, rather than at the end of the study. Second, all participants in the study completed the AUT; the mean number of uses generated was 6.53 ($SD = 3.63$). As in Study 1, the creativity ratings of two independent judges were well correlated ($r = .73$, $p < .001$), so they were averaged ($M = 2.43$ out of 5, $SD = 0.56$). Creativity correlated positively with total number of uses generated ($r = .46$, $p < .001$).

Results

Participant sample (Mechanical Turk vs. University of Chicago) did not interact with uncertainty condition and individualism to predict either judged creativity ($p = .52$) or total uses ($p = .32$).

We hypothesized that participants high (but not low) in individualism would generate more creative responses under self-uncertainty than general uncertainty. To test this prediction, we regressed judged creativity and total uses separately onto uncertainty condition, individualism, and the two-way interaction term. On judged creativity, there were no overall

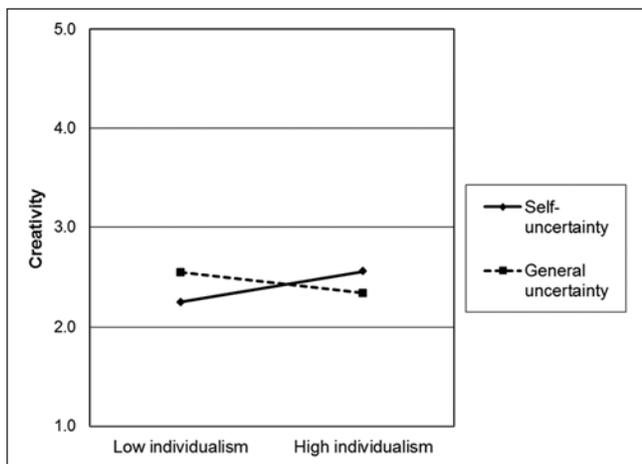


Figure 3. Judged creativity as a function of uncertainty condition (self vs. general) and individualism (± 1 SD), Study 3.

effects of condition or individualism ($ps > .22$), but the Uncertainty condition \times Individualism interaction was significant ($b = -.38$, $SE = .14$), $t(135) = -2.76$, $p < .001$, total $R^2 = .07$ (see Figure 3). On total uses, no effects reached significance ($ps > .62$).

Decomposition of the interaction on judged creativity using the Johnson–Neyman technique revealed that self-uncertainty elicited more creative responses than general uncertainty among participants whose individualism scores were at least 5.62 (1.29 SD above the mean; $b = -.30$, $SE = .15$), $t(135) = -1.98$, $p = .05$, 95% CI = $[-0.60, 0]$. By contrast, general uncertainty elicited more creative responses than self-uncertainty among participants whose individualism scores were lower than 4.23 (0.75 SD below the mean; $b = .22$, $SE = .11$), $t(135) = 1.98$, $p = .05$, 95% CI = $[0, 0.44]$.

When collectivism was used as the moderator instead of individualism, there was a marginal positive effect of collectivism on judged creativity ($b = .12$, $SE = .07$), $t(136) = 1.80$, $p = .07$, but no effect of uncertainty or two-way interaction ($ps > .11$). There were no effects on total uses ($ps > .16$).

Discussion

Using a larger sample than that used in Studies 1 to 2, Study 3 demonstrated that high individualists are more creative under self-uncertainty than general uncertainty, whereas low individualists are less creative under self-uncertainty than general uncertainty. Thus, Studies 1 to 3 provided convergent evidence for the effects of self-uncertainty on creative generation as moderated by levels of individualism. In contrast to Study 2, there were no effects of uncertainty and individualism on total number of uses generated in Study 3. This may have been because the task instructions for Study 3 (but not Study 2) explicitly asked participants to generate *novel* responses, which dissuaded participants from listing too many (non-novel) uses.

Study 4

The primary goal of Study 4 was to demonstrate that it is the *perception* that a task provides an opportunity for creative generation, rather than the specific content of the task itself, that motivates self-uncertain individualists to perform well. Thus, Study 4 sought to rule out the alternative explanation that self-uncertainty simply increases individualists' motivation to achieve in all domains. According to our conceptualization, self-uncertain individualists should especially want to restore certainty in domains that highlight their distinctiveness. As such, relative to individualists who do not feel self-uncertain, they should exhibit heightened performance on tasks described as assessing creative generation, but not on tasks that are not so described.

To demonstrate that the effects of self-uncertainty for individualists are stronger on tasks that purport to provide an opportunity to highlight distinctiveness than on tasks that do not purport to provide such an opportunity, in Study 4 we manipulated the task description. Specifically, participants were told that the task was designed to assess either creative or analytical thinking. We hypothesized that individualists who had been made to feel self-uncertain, relative to individualists who had been made to feel self-certain, would perform better on the task if it had been described as a measure of "creative thinking," but not if it had been described as a measure of "analytical thinking."

Study 4 also used a different control condition. In Studies 1 to 3, control participants were induced to feel generally uncertain. Although this comparison was informative, in that we were able to show how self-uncertainty relative to uncertainty about the world in general elicits creative generation, it left open the possibility that *any* activation of self-related content can motivate individualists to be more creative (see Hollenbeck & Williams, 1987). To address this possibility, in Study 4 we manipulated either self-uncertainty or self-certainty so as to directly compare the effects of different types of accessible self-related content on creative generation.

Method

Participants. Seventy University of Chicago students and staff members (46% male; $M_{age} = 21.4$, $SD = 6.4$), all native English speakers, participated in the study. As compensation, they were entered into a drawing to win one of several US\$25 gift cards for a major online retailer. Participants were randomly assigned to either the self-uncertainty ($n = 34$) or self-certainty ($n = 36$) condition, and to either the creative ($n = 37$) or analytical ($n = 33$) task description condition. Two participants were omitted because they did not complete the uncertainty manipulation, and one participant was omitted for being a statistical outlier on multiple indicators (studentized deleted residual = -2.98 , Cook's $D = .13$, standardized DfFit = -1.07), leaving 67 individuals in the final sample.

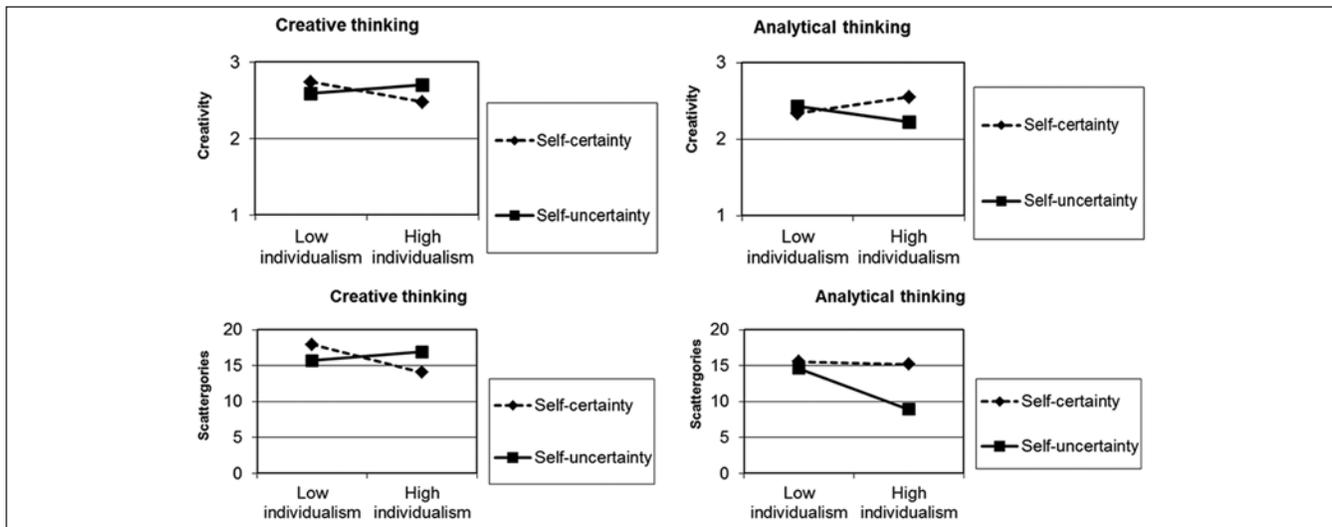


Figure 4. Judged creativity and total Scattergories responses as a function of task description (creative vs. analytical), uncertainty condition (self-uncertainty vs. self-certainty), and individualism (± 1 SD), Study 4.

Procedure. The study was administered online and described as an investigation of self-perceptions and thinking styles. First, participants completed the eight-item individualism measure ($M = 4.81$ out of 7, $SD = 0.84$; $\alpha = .70$), followed by the uncertainty manipulation. The self-uncertainty condition was identical to that used in Studies 1 to 3, but the general uncertainty condition was replaced by a self-certainty condition in which participants wrote about the three aspects of themselves and their lives that made them feel most certain (see Hogg et al., 2007; Morrison & Johnson, 2011; Rios et al., 2012).

After the uncertainty manipulation, participants completed the 20-item Scattergories task from Studies 2 to 3 ($M_{\text{total responses}} = 15.76$, $SD = 3.91$), and the creativity ratings of two independent judges blind to condition ($r = .60$, $p < .001$) were averaged to form a 5-point composite ($M = 2.51$, $SD = 0.27$). As in Studies 2 to 3, creativity correlated significantly with total responses ($r = .32$, $p < .01$).

The task instructions differed by experimental condition. In the *creative task description* condition, participants read that the task was designed to assess creative thinking—that is, tendencies to think in unique ways and generate novel solutions to problems. In the *analytical task description* condition, participants read that the task was designed to assess analytical thinking—that is, tendencies to think in logical ways and generate relationships between concepts. These descriptions were based on a distinction drawn by Markman et al. (2007) between creativity and analytical reasoning tasks.

Results

We predicted that participants high in individualism would perform better on the Scattergories task under self-uncertainty than self-certainty, but only when the task was

described as a measure of creative (vs. analytical) thinking. We did not predict any effects of uncertainty condition or task description for participants low in individualism. To test these predictions, we submitted judged creativity and total responses to Uncertainty condition (0 = self-uncertainty, 1 = self-certainty) \times Task description condition (0 = creative thinking, 1 = analytical thinking) \times Individualism (mean-centered continuous variable) multiple regression analyses (Aiken & West, 1991). All overall effects were interpreted in the first step, all two-way interaction terms were added to and interpreted in the second step, and the three-way interaction term was added to and interpreted in the third step of the regression (Cohen et al., 2003).

On judged creativity, participants generated more creative Scattergories responses when they believed the task measured creative than analytical thinking ($b = -.16$, $SE = .07$), $t(63) = -2.39$, $p = .02$, total $R^2 = .08$. No other lower order effects were significant. On total responses, the only lower order effect to emerge was a significant Uncertainty condition \times Task description condition interaction ($b = 4.55$, $SE = 2.06$), $t(60) = 2.21$, $p = .03$, such that self-uncertain participants tended to produce more responses in the creative than analytical task description condition, whereas the opposite was true for self-certain participants. More germane to our hypothesis, the three-way interaction between uncertainty condition, task description condition, and individualism was significant on both judged creativity ($b = .47$, $SE = .18$), $t(59) = 2.69$, $p < .01$, total $R^2 = .21$, and total responses ($b = 7.89$, $SE = 2.41$), $t(59) = 3.28$, $p < .005$ (see Figure 4). The interactions were decomposed by examining the effects of uncertainty and individualism within both the creative and analytical thinking conditions. Consistent with the results of Studies 1 to 3, on both dependent measures, an Uncertainty \times Individualism interaction emerged in the creative thinking

condition ($b = -.22$, $SE = .12$), $t(59) = -1.84$, $p = .07$ for judged creativity; ($b = -3.73$, $SE = 1.65$), $t(59) = -2.27$, $p < .03$ for total responses. An Uncertainty \times Individualism interaction also emerged in the analytical thinking condition, but in the opposite direction ($b = .25$, $SE = .13$), $t(59) = 1.95$, $p = .055$ for judged creativity; ($b = 4.16$, $SE = 1.76$), $t(59) = 2.36$, $p = .02$ for total responses. Thus, we decomposed each of these two-way interactions.

In the creative thinking condition, decomposition of the Uncertainty \times Individualism interaction on judged creativity using the Johnson–Neyman technique revealed that self-uncertainty elicited more creative responses than self-certainty when individualism scores were at least 6.35, or 1.83 SD above the mean ($b = -.37$, $SE = .19$), $t(59) = -1.98$, $p = .05$, 95% CI = $[-0.75, 0]$. By contrast, there was no range of individualism scores at which self-certainty elicited more creative responses than self-uncertainty. On total responses, the effect of uncertainty condition was significant at individualism scores above 5.61, or 0.95 SD above the mean ($b = -3.28$, $SE = 1.64$), $t(59) = -2.00$, $p = .05$, 95% CI = $[-6.56, 0]$, and below 2.11; or 3.21 SD below the mean ($b = 9.81$, $SE = 4.91$), $t(59) = 2.00$, $p = .05$, 95% CI = $[0, 19.61]$.

In the analytical thinking condition, decomposition of the Uncertainty \times Individualism interaction on judged creativity using the Johnson–Neyman technique revealed that self-uncertainty elicited fewer creative responses than self-certainty when individualism scores were at least 5.39, or 0.69 SD above the mean ($b = .26$, $SE = .13$), $t(59) = 2.00$, $p = .05$, 95% CI = $[0, 0.51]$, whereas there were no significant effects at low levels of individualism. On total responses, the effect of uncertainty condition was significant at individualism scores above 4.59, or 0.26 SD above the mean ($b = 2.88$, $SE = 1.44$), $t(59) = 2.00$, $p = .05$, 95% CI = $[0, 5.76]$; whereas it was not significant at low levels of individualism.

Discussion

The results of Study 4 generally supported our hypothesis that self-uncertain (relative to self-certain) individualists would exhibit better performance on the Scattergories task when it purported to measure creative thinking, but not analytical thinking. Although the mean judged creativity elicited by self-uncertainty as compared with self-certainty was only significantly different at very high levels of individualism (1.83 SD above the mean), it is notable that within the self-uncertainty condition, participants with individualism scores of at least 4.16 (0.77 SD above the mean) did generate more creative responses when the task was described as measuring creative rather than analytical thinking ($b = -.19$, $SE = .10$), $t(59) = -2.00$, $p = .05$, 95% CI = $[-0.38, 0]$. Moreover, the effect of self-uncertainty on the total responses measure was stronger among high than low individualists. Overall, then, the findings indicate that self-uncertain individualists are particularly likely to perform well on tasks that they perceive as opportunities for affirming their distinctiveness.

One surprising finding was that among high individualists, self-uncertainty elicited *lower* levels of performance (i.e., lower judged creativity, fewer total responses) than self-certainty when the Scattergories task was described as a measure of analytical thinking. Although this finding should be interpreted with caution until replicated, a possible explanation is that the threat of self-uncertainty by default led individualistic participants—who are particularly sensitive to such uncertainty (Morrison et al., 2012)—to exhibit rigidity in their thinking (Staw et al., 1981) because they did not view the analytical thinking task as an opportunity to affirm their distinctiveness.

Study 5

Having demonstrated that self-uncertainty elicits creative generation among individualists, the goal of Study 5 was to show that creative activity can restore clarity when the self-concept is threatened. To this end, participants were primed with either self-uncertainty or general uncertainty, after which they were induced to perceive themselves as either relatively creative or relatively uncreative. Participants then completed a measure of self-concept clarity. We hypothesized that individualists who had been made to feel self-uncertain (but not generally uncertain) would exhibit higher clarity scores after being led to perceive themselves as relatively creative than after being led to perceive themselves as relatively uncreative.

Method

Participants. Two hundred twenty-four native English speakers (50% male; $M_{\text{age}} = 28.8$, $SD = 11.6$) were recruited through either Mechanical Turk ($n = 152$) or the University of Chicago participant database ($n = 72$). The Mechanical Turk participants received US\$0.50 as compensation, and the University of Chicago participants were entered into a drawing to win one of several US\$25 Amazon gift cards. Participants were randomly assigned to either the self-uncertainty ($n = 117$) or general uncertainty ($n = 107$) condition, and to either the more creative ($n = 121$) or less creative ($n = 103$) self-perception condition. Two participants were excluded because they did not follow the directions for the uncertainty manipulation, leaving 222 individuals in the final sample.

Procedure. All materials were presented online. As in Studies 3 to 4, participants were told that the purpose of the study was to examine the relationship between self-perceptions and thinking styles. They first completed the eight-item individualism measure ($M = 4.65$ out of 7, $SD = 0.76$; $\alpha = .69$), followed by the self-uncertainty or general uncertainty manipulation from Studies 1 to 3.

Based on a paradigm developed by Salancik and Conway (1975), participants next completed the creative self-perception

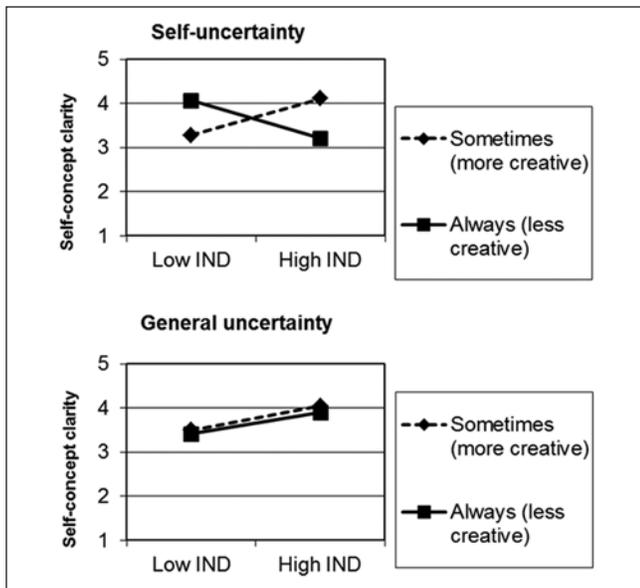


Figure 5. Self-concept clarity as a function of uncertainty condition (self vs. general), self-perception condition (more creative vs. less creative), and individualism (± 1 SD), Study 5.

manipulation by responding to six items that assessed self-reported creativity (taken from Marsh & O'Neill, 1984). The wording of the items varied according to condition. In the *more creative self-perception* condition, all items contained the word “sometimes” (e.g., “I sometimes have originality”), whereas in the *less creative self-perception* condition, the word “sometimes” was replaced with the word “always” (e.g., “I always have originality”). Salancik and Conway (1975) demonstrated that responding to “sometimes” statements elicited greater overall agreement with those statements than did responding to “always” statements (Bem, 1973). Similar manipulations have been used, for instance, to induce perceptions of the self as being unprejudiced (i.e., by having participants respond to potentially offensive statements about an out-group that begin either with the phrase “most members of X group . . .” or the phrase “some members of X group . . .”; Monin & Miller, 2001). A one-way ANOVA conducted with self-perception condition as the independent variable and average agreement with the items as the dependent variable revealed that participants did in fact agree more with the “sometimes” statements ($M = 4.02$ out of 5, $SD = 0.59$) than they did with the “always” statements ($M = 3.53$, $SD = 0.80$), $F(1, 220) = 27.12$, $p < .001$.

Next, participants completed a state-based self-concept clarity scale (Gabriel, Renaud, & Tippin, 2007), which constituted the dependent measure. The scale consists of three items assessing participants’ perceptions that they have a clear self-concept at the moment (e.g., “Right now, I feel like I really know who I am”). Participants responded on a 5-point scale (1 = *strongly disagree*, 5 = *strongly agree*), and their responses were averaged into a composite ($M = 3.63$, $SD = 1.04$, $\alpha = .91$).

Results

Participant sample (Mechanical Turk vs. University of Chicago) did not interact with uncertainty condition, individualism, or self-perception condition ($p = .81$).

It was predicted that in the self-uncertainty condition, individualists would exhibit higher self-concept clarity if they had been led to perceive themselves as more creative than if they had been led to perceive themselves as less creative. No differences were predicted in the general uncertainty condition. To test these predictions, participants’ self-concept clarity scores were regressed onto uncertainty condition (0 = self-uncertainty, 1 = general uncertainty), individualism (mean-centered continuous variable), self-perception condition (0 = less creative, 1 = more creative), and all two- and three-way interaction terms, following the same analytic procedure used in Study 4.

Overall, participants high in individualism tended to have high self-concept clarity ($b = .17$, $SE = .08$), $t(218) = 2.01$, $p < .05$, total $R^2 = .02$. There was also a two-way interaction between individualism and self-perception condition ($b = -.44$, $SE = .17$), $t(215) = -2.58$, $p = .01$, total $R^2 = .05$, suggesting that perceiving oneself as more creative (relative to less creative) increased self-concept clarity among high individualists but decreased self-concept clarity among low individualists.

Most important, the predicted three-way interaction between uncertainty condition, individualism, and self-perception condition was significant ($b = .75$, $SE = .33$), $t(214) = 2.24$, $p < .03$, total $R^2 = .07$ (see Figure 5).³ Because we were interested in comparing self-uncertain individualists who were induced to perceive themselves as more creative versus less creative, we decomposed this interaction by looking at the effects of individualism and creative self-perception in both the self-uncertainty and general uncertainty conditions.¹ The Individualism \times Self-perception condition interaction was significant among participants primed with self-uncertainty ($b = -.75$, $SE = .22$), $t(214) = -3.44$, $p = .001$, but not among participants primed with general uncertainty ($b = .08$, $SE = .25$), $t(214) = 0.31$, $p = .76$. Thus, only the former interaction was decomposed.

Decomposition of this interaction revealed that participants with individualism scores of at least 5.09 (0.78 SD above the mean) exhibited higher self-concept clarity after being led to perceive themselves as more creative (i.e., in the “sometimes” condition) than less creative (i.e., in the “always” condition; $b = -.41$, $SE = .21$), $t(214) = -1.97$, $p = .05$, 95% CI = $[-0.82, 0]$. By contrast, participants with individualism scores at or below 4.02 (0.49 SD below the mean) exhibited *lower* self-concept clarity in the more creative self-perception condition than in the less creative self-perception condition ($b = .48$, $SE = .24$), $t(214) = 1.97$, $p = .05$, 95% CI = $[0, 0.96]$.

Discussion

Study 5 built on Studies 1 to 4 by showing that self-perceptions of creativity can in fact help restore self-certainty, at least among individualists who define themselves by their distinctive characteristics. In this study, individualists who had been led to see themselves as creative were buffered against the negative effects of uncertainty on self-concept clarity. Thus, individualists appear to be able to compensate for the aversive feelings that stem from threats to self-certainty by reflecting on the extent to which they engage in creative expression. In so doing, individualists presumably restore their sense of self-clarity by bolstering their perceptions of themselves as creative and, thereby, unique.

General Discussion

What motivates people to generate creative ideas? Building on both the uncertainty/threat and creativity literatures, we examined this question by distinguishing between different forms of threat and different types of individuals. Our studies showed that creative performance is elicited by feelings of uncertainty about the self (relative to feelings of uncertainty in general or certainty about the self) and moderated by tendencies to define the self as unique from and independent of others. Moreover, our final study demonstrated that perceiving oneself as more (vs. less) creative can actually help individualists restore their self-clarity in the face of threat. In all, then, the present findings extend previous research on determinants of creativity by suggesting that not all forms of uncertainty elicit negative effects on creative generation. Rather, our results demonstrate that some forms of threat (i.e., uncertainty about the self) can elicit *more* creative responses than others (i.e., general uncertainty), so long as the creative activity is seen as a means of restoring and clarifying one's self-definition. Although the effects of self-uncertainty and individualism on creative generation emerged without other people explicitly being aware of one's creativity, our results may have been even stronger if participants had believed they were publicly expressing their originality.

Our results were strongest on tasks described as assessing novelty and uniqueness of thought—in other words, on tasks that purportedly allow individuals to affirm their distinctiveness. Tasks that were described instead as assessing analytical and logical thinking did not elicit the same effects, presumably because individualists saw such tasks as a less effective means by which to restore their distinctive sense of self. Notably, in Study 4, the exact same task (Scattergories) elicited different levels of performance depending on how it was described, suggesting that participants' *perceptions* of the level of creativity required to perform well on a task may contribute as much to task performance as whatever "objective" levels of creative output would be optimal. Indeed, future studies might examine whether threatened individualists are particularly apt

to *choose* to engage in activities that they believe offer opportunities for creative expression.

In our studies, we found effects on both judged creativity (Study 1–AUT, Studies 2–4) and the total number of solutions that participants generated (Study 1–RAT, Study 2, and Study 4). However, with the exception of Study 2 (which was underpowered in comparison with the others), all results on judged creativity held even after controlling for total responses (see Footnote 2). This suggests that self-uncertainty and individualism, rather than merely influencing creative performance through effort alone, motivate people to become truly engaged and absorbed in the task at hand, so long as they perceive the task as creative. As suggested above, examining whether self-uncertain individualists actively choose to pursue creative tasks would shed light on this issue.

Relative to other forms of uncertainty, self-uncertainty appears to trigger compensatory attempts among some to re-establish "who they are" (e.g., Morrison & Johnson, 2011; Rios et al., 2012; Shepherd et al., 2011). For individualists, who define themselves in terms of their distinctiveness, creative expression is an effective means of coping with such feelings of uncertainty. However, for low individualists, who tend not to define themselves in terms of their unique characteristics, creative expression is less relevant and perhaps even incongruent with their sense of self. As a result, in the present studies, self-uncertainty—relative to general uncertainty—either had no effect on (Study 4) or actually diminished (Studies 1–3) creative generation among low individualists. Because we did not include uniqueness-seeking measures in our studies, it is difficult to determine whether self-uncertainty actually enhances uniqueness motivation in comparison with general uncertainty, and such a possibility should be tested in the future. However, the results of Study 4—in which self-uncertainty increased performance on a task purported to measure creative thinking (relative to a task purported to measure analytical thinking)—suggest that uniqueness motives do in fact play a role in individualists' responses to uncertainty.

One limitation of our results is that the effect of self-uncertainty (vs. general uncertainty or self-certainty) on creativity did not always reach significance at the conventional cutoff (i.e., 1 *SD* above the mean) for high individualism. This may have occurred because mean individualism scores varied across our samples. Thus, additional studies should experimentally manipulate high (vs. low) levels of individualism or measure ethnicity (e.g., East Asian vs. European American), both to minimize the issues associated with continuous individual-differences moderators and to increase generalizability.

On a practical level, it is not our intent to imply that inducing self-uncertainty is the most effective way to encourage creativity. For one, although self-uncertainty does elicit more creative responding than does general uncertainty among individualists, it does not produce such effects among those

who define themselves less by their distinctiveness (i.e., low individualists) and more by their relationships and group memberships (i.e., collectivists). It is therefore important to bear in mind that self-uncertainty does not exert positive effects on creative performance for all people and across all situations. After all, uncertainty is often experienced as threatening and uncomfortable (e.g., McGregor et al., 2001; Morrison et al., 2012). Does self-uncertainty still elicit creative generation when feelings of uncertainty about the self are framed as challenging (i.e., as a source of personal growth and knowledge-enhancement) rather than threatening? Assuming that people are motivated to respond to both challenging and threatening forms of uncertainty, we speculate that self-uncertainty would trigger more creative generation than other forms of uncertainty in individualists regardless of its challenging versus threatening nature.

Overall, the present research suggests that uncertainty need not always have negative consequences for creativity. In determining whether and how uncertainty affects creativity, it is critical to consider the type of uncertainty involved—namely, whether or not it is focused specifically on the self. It is also important to consider individual differences in the extent to which creativity and uniqueness are valued. In light of our finding that perceptions of the self as creative helped individualists restore self-certainty (Study 5), it seems appropriate to speculate that actual engagement in various forms of creative generation (e.g., in the classroom, at work, at home) may have positive downstream consequences for the self in terms of enhancing perceptions of self-clarity and feelings of uniqueness. These possibilities have important practical implications and await future investigation.

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Notes

- Both the Alternative Uses Task (AUT) and Remote Associates Test (RAT) have been used in previous research to measure creative generation. High AUT scores are achieved by generating solutions that deviate from convention (e.g., “grind it up and use it as makeup” for a brick) and, similarly, high RAT scores are achieved by generating novel words that link three other words together, through processes that have been shown to be more closely linked to creative than analytical thinking (Ansborg & Hill, 2003).
- The Uncertainty condition \times Individualism interaction on judged creativity was reduced to non-significance after controlling for total number of responses ($b = -.22$, $SE = .19$), $t(30) = -1.16$, $p = .26$. However, controlling for total number of responses did not change the significance of this interaction in Study 3 ($b = -.35$, $SE = .13$), $t(134) = -2.79$, $p < .01$, or the Uncertainty condition \times

Task description condition \times Individualism interaction in Study 4 ($b = .39$, $SE = .19$), $t(58) = 2.03$, $p < .05$.

- The three-way interaction could also be decomposed by examining the Self-uncertainty \times Individualism interactions within the more creative and less creative self-perception conditions. In this decomposition, the Self-uncertainty \times Individualism interaction term was significant in the less creative condition ($b = .55$, $SE = .24$), $t(214) = 2.35$, $p = .02$, but not in the more creative condition ($b = -.26$, $SE = .24$), $t(214) = -1.07$, $p = .29$. In the less creative condition, high individualists tended to feel less self-certain after being primed with self-uncertainty than general uncertainty, whereas low individualists tended to feel *more* self-certain after being primed with self-uncertainty than general uncertainty.

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