

UNCERTAINTY ORIENTATION AND AFFECTIVE EXPERIENCES

Individual Differences Within and Across Cultures

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This study examined whether people with the same self-regulatory style of coping with uncertainty differed in their affective experiences as a function of what may be the dominant coping style of their culture. Two hundred twenty men and women from universities in Japan and Canada described the extent to which they experienced various emotions. Consistent with their expectations, the authors found that participants whose uncertainty orientation matched that of their country (i.e., uncertainty-oriented students in Canada, certainty-oriented students in Japan) experienced more active emotions than mismatched participants (i.e., certainty-oriented students in Canada, uncertainty-oriented students in Japan), who experienced more passive emotions. Moreover, those who matched their country's coping style also reported experiencing more positive and fewer negative emotions than mismatched students. These results suggest that the theory of uncertainty orientation has important implications for research on affective experiences within and across cultures.

Keywords: emotions; uncertainty orientation; individual differences

Uncertainty orientation refers to individual differences in how people handle uncertainty. Such behavior can be described on a continuum with endpoints of uncertainty oriented and certainty oriented. Persons who are uncertainty oriented are characterized by direct responses to uncertainty, for example, obtaining information that resolves the uncertainty. In contrast, persons who are certainty oriented are characterized by indirect responses to uncertainty, for example, relying on the opinions of others to resolve uncertainty. Moreover, the normative expectations for uncertainty orientation may vary across cultures. In some societies, an uncertainty-oriented style of coping may be the norm, whereas in others, a certainty-oriented style may be the norm. Although uncertainty

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orientation is considered an informational variable dealing with attaining or maintaining clarity, the theory of uncertainty orientation (Sorrentino & Roney, 2000; Sorrentino & Short, 1986) distinguishes between various forms of affective experiences as a consequence of engaging in situations that match or do not match one's preferred mode of coping with uncertainty. This study examined how individual and cultural levels of uncertainty orientation combine to shape people's affective experiences. Participants in Japan, a country in which a certainty-oriented style may be more normative than an uncertainty-oriented style, and in Canada, a country in which an uncertainty-oriented style may be more normative than a certainty-oriented style, provided measures of their individual uncertainty orientation and of their dispositional affect.

The idea that Japan may have a more normative certainty-oriented style is alluded to by many theorists and researchers. Beginning with Hofstede's (1980) seminal research on ecological differences between cultures, it has been argued that Eastern and Western cultures should differ in how they handle uncertainty. In particular, Eastern cultures such as Japan should be more uncertainty avoidant than Western cultures such as Canada (e.g., Arrindell et al., 1997; Hofstede, 1980; Ryan, McFarland, Baron, & Page, 1999; Shane, Venkataraman, & MacMillan, 1995). With regard to uncertainty avoidance, Hofstede (1991) defined it as the extent to which the members of a culture feel threatened by uncertain or unknown situations. High uncertainty-avoidance cultures view uncertainty as negative and emphasize the use of rules and regulations to maintain predictability in the social environment. In contrast, cultures that are low in uncertainty avoidance are generally tolerant of ambiguity and uncertainty. Less emphasis is placed on rules and regulations in these societies than in high uncertainty-avoidance societies (Hofstede, 1980).

Similarly, Triandis (1989, 1990) elaborates on cultural differences in the norms of handling uncertainty through his discussion of loose and tight cultures. He explains that loose cultures, such as Canada, encourage freedom and deviation from norms, whereas in tight cultures, such as Japan, norms are promoted and deviation from those norms is punished. Therefore, individuals in tight cultures prefer predictability, certainty, and security, and individuals from loose cultures prefer creativity and diversity (Triandis, 1989). Others point out how countries like Japan promote a self-regulatory style consistent with maintaining certainty. For example, Weisz, Rothbaum, and Blackburn (1984) discussed differences between Japan and the United States with regard to control. They explained that compared with American organizations, Japanese organizations are more likely to possess a clear and visible hierarchy among the various levels within a company. Weisz et al. (1984) further suggest that this distinction of status within Japanese organizations serves to minimize uncertainty, anxiety, and disappointment. Compared with American workers, Japanese workers gain control by maintaining certainty surrounding their workplace situations. Finally, Vishwanath (2003) performed an online study where interactants in high uncertainty-avoidance cultures, such as Japan, seem to exhibit drastic behavioral changes when faced with limited information within an ambiguous decision context as compared with similar participants in Germany and the United States.

Although we agree with many of the above authors that the Japanese culture may differ in how it copes with uncertainty as compared with a North American or Canadian culture, we do not agree that this difference is necessarily affective. Whereas Hofstede's (1980) ecological measure of uncertainty avoidance is considered by Hofstede (1980, 1991) to be an affective measure of a society's anxiety concerning uncertainty (see also Matsumoto, 1989), our construct of uncertainty orientation is an individual difference variable concerned with the informational properties of uncertainty. Many of the findings cited above can just as easily be interpreted as a positive means of coping with uncertainty by constructing

a predictable tight environment, rather than an illustration of anxiety over uncertainty. This is important to us, as the distinction between affect (feeling good or bad) and informational value (attaining clarity or maintaining clarity) plays a key role in much of the research testing the theory of uncertainty orientation (cf. Sorrentino & Roney, 2000). It may also play a key role when it comes to examining cross-cultural differences in the way individuals and cultures handle uncertainty.

The hypothesis of this study was informed by the general expectation that people's dispositional affect would be more active than passive when their individual uncertainty orientations matched the orientations of their cultures rather than when their orientations did not match. When these two orientations match, people are processing information in a fashion that is more similar to how the other members of their society are processing information than when these orientations do not match. Such agreement should lead to more involvement of the self in the situation and, by extension, more active affective experiences than when societal and individual orientations do not agree. This rationale is based on the theory of uncertainty orientation (Sorrentino & Short, 1984; Sorrentino, Smithson, Hodson, Roney, & Walker, 2003), a theory of self-regulation that asserts that people differ in important ways in terms of how they handle uncertainty. At opposite ends of a continuum are those considered uncertainty oriented (UOs) and those considered certainty oriented (COs). UOs are high in the desire to attain clarity but low in the desire to maintain clarity. Their preferred method of handling uncertainty is to seek information and engage in activities that will directly resolve the uncertainty. Such people can be described as having a strong "need to know." They are people who try to understand and discover aspects of the self and the environment about which they are uncertain. In contrast, COs are low in the desire to attain clarity but are high in the desire to maintain clarity. When confronted with uncertainty, COs resolve uncertainty using indirect methods such as relying on others or heuristic devices such as leadership status or source expertise (Hodson & Sorrentino, 1997; Sorrentino, Bobocel, Gitta, Olson, & Hewitt, 1988).

The theory of uncertainty orientation relies on a broad definition of uncertainty, as specified by Kagan (1972). Kagan thought of uncertainty reduction as a primary motive, with uncertainty originating from the inability to predict the future or from an incompatibility between two cognitions, a cognition and an experience, or a cognition and a behavior.¹

In Figure 1, relationships among the uncertainty orientation of the individual, the uncertainty and the personal relevance of the situation, and relevant approach and avoidance motives (in this illustration, we have achievement-related motives) are shown. This model by Sorrentino et al. (2003) was developed as a result of numerous studies demonstrating that when situational demands and personal uncertainty orientations are matched (i.e., uncertain situations for UOs, certain situations for COs), people are more actively engaged in processing information and perform more consistently with their motivational states (e.g., success-oriented persons perform better than failure-threatened persons) than when situational demands and personal orientations are mismatched. In mismatched situations, people decrease their information processing and become less actively engaged in the situation. Such differences are also associated with behavior differences. For example, in mismatched situations, UOs will process information less systematically than COs and failure-threatened persons will often perform better than success-oriented persons. Such differences led Sorrentino et al. to propose that when situations do not match individual uncertainty orientation, people react passively. If they are success oriented, they may become disinterested or bored, whereas if they are failure threatened, they may experience feelings of relief.

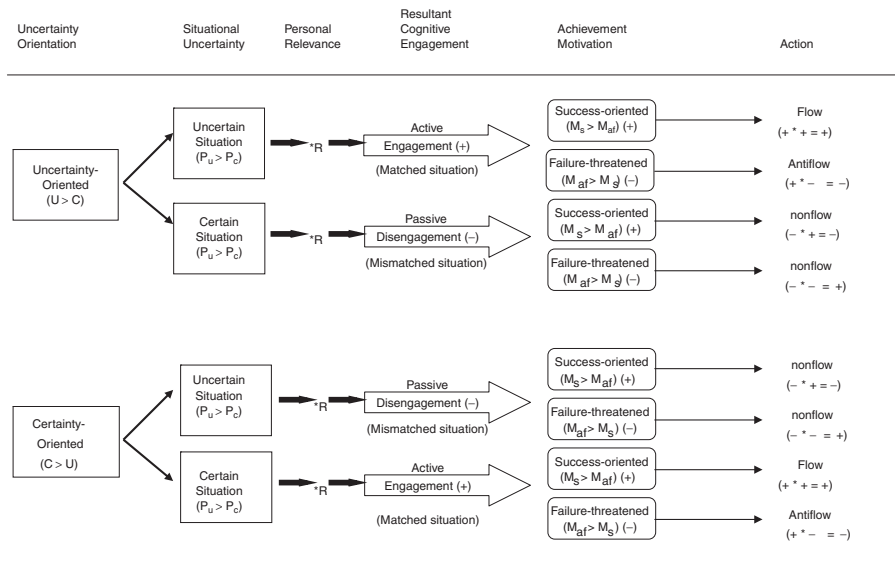


Figure 1: A Multiplicative Model of Thought and Action.

SOURCE: Adapted with permission from Sorrentino, R. M., Smithson, M. L., Hodson, G., Roney, C. J. R., & Walker, M. A. A (2003). Theory of uncertainty orientation: A Mathematical Reformulation. *Journal of Mathematical Psychology*, 47(2) 132-149.

The full, formal model was developed by Sorrentino et al. (2003).² This model states that when situations are uncertain, compared to when they are certain, UOs experience active engagement. This means they will increase their systematic processing of information and decrease their use of heuristic information processing. In contrast, in situations that are characterized by certainty, UOs will be passively engaged and will rely on heuristics or other non-systematic means of processing information. COs are just the opposite. In situations that are characterized by certainty, they will be actively engaged and will increase their systematic processing. In contrast, in situations that are characterized by uncertainty, they will passively engage and increase their use of heuristic processing. Moreover, such differences become bigger as situations become more personally relevant (e.g., Sorrentino et al., 1988).

Uncertainty orientation can also be understood in terms of flow experiences. Drawing on Csikszentmihalyi (1975), Sorrentino et al. (2003) state,

Flow is feeling good about the self while concentrating on the activity at hand. It occurs when the person engages in a situation that has positive information value (attaining or maintaining clarity for uncertainty-oriented vs. certainty-oriented persons, respectively) and the person is positively motivated to undertake the activity; in other words, when positive information value and positive motivation are matched. (p. 145)

It is important to note that uncertainty orientation is neither domain specific nor affectively based. Rather, it interacts with the uncertainty of the situation and with affectively based motives to predict differences in flow behavior. For example, success-oriented persons, those who are motivated by anticipating pride in accomplishment, are more actively engaged in and have more flow experiences in achievement-oriented situations that match their uncertainty orientation than in achievement-oriented situations that do not match their orientation (Sorrentino et al., 2003). It is in these situations that they perform best and enjoy the

activity the most. Failure-threatened persons, those who are motivated by anticipating shame over failure, are also actively engaged in achievement situations, although they are more likely to have anti-flow experiences in achievement-oriented situations that match their uncertainty orientation than in achievement-oriented situations that do not match their uncertainty orientation (e.g., Roney & Sorrentino, 1995; Sorrentino, Short, & Raynor, 1984). Sorrentino et al. (2003) define *anti-flow* as follows: "The person in anti-flow feels badly about the self while acting in or attempting to avoid a situation that he or she fears" (p. 145). He or she exhibits the worst performance and the greatest fear of failure in these situations.³

In matched situations, people are in either flow or anti-flow. In contrast, in mismatched situations, people are in nonflow because mismatched situations do not activate the self-system. Nonflow activities do not activate the self-system because there is no real importance to the self attached to them. For example, Raynor and McFarlin (1986) distinguished between the self and behavioral systems. We perform some activities because our self-image is involved, whereas we perform other activities because of extrinsic incentives that are not considered part of the self. Such activities are performed because of necessity. A professor may view the success or failure of his or her research to be a reflection of the self, whereas he or she views taking out the garbage as having nothing to do with the self. Nonflow activity may be aligned with the behavioral system but not with the self-system.

Sorrentino et al. (2003) cite Russell's (1980) circumplex model as a way of distinguishing the emotions experienced in flow and nonflow situations. In flow states (either flow or anti-flow), people are more likely to experience active emotions (both positive and negative) such as excited, astonished, alarmed, and angry. In contrast, when they are in nonflow states, people are more likely to experience passive emotions (both positive and negative) such as satisfied, content, bored, and gloomy.

One further distinction between uncertainty orientation and other cognitively related measures such as need for cognition (see Petty & Cacioppo, 1986), need for control (e.g., Burger, 1989), and need for closure (Kruglanski, 1989) is that the latter measures are static, whereas uncertainty orientation is dynamic. A person high in the need for cognition, for example, always likes to think, more or less. UOs, however, engage in systematic processing of information only when uncertainty needs to be resolved, and COs engage in systematic processing only when certainty needs to be maintained (see Hodson & Sorrentino, 2001; Shuper & Sorrentino, 2004; Sorrentino et al., 1988). Similarly, although people high in need for closure or control always have this need, UOs and COs only demonstrate these needs when made to feel uncertain or certain, respectively (see Walker & Sorrentino, 2000).

This study was designed to examine cross-cultural differences in uncertainty orientation and its relationship to affective experience. We assume that UOs and COs in different countries resolve uncertainty similarly. This assumption is based on research conducted in Japan and in Canada. In a study involving Japanese participants, Yasunaga and Kouhara (1995) found that UOs preferred to find out new information about the self; that is, they chose items from a test that would resolve uncertainty about a new and important ability. In contrast, COs preferred nondiagnostic items; that is, they chose items that would tell them nothing new about the self. This finding partially replicated the results of a study by Sorrentino and Hewitt (1984) that involved Canadian UOs and COs.

In a second study by Yasunaga and Kouhara (2006), Japanese participants were asked how much information they wanted about a new disease. When the disease was life-threatening, UOs wanted to know more information about the disease when it was not certain if there was a cure than when it was certain there was a cure. In contrast, COs wanted more information when a cure was certain, regardless of threat. This study is a conceptual replication of Brouwers and Sorrentino (1993), which found similar results among Canadians.

This research suggests that Japanese and Canadians with similar orientations to uncertainty process information the same way. Nevertheless, the cultural norm in Canada may be much more consistent with being uncertainty oriented than it is in Japan, where being certainty oriented may be the cultural norm. Such differences are suggested by the results of Shuper, Sorrentino, Otsubo, Hodson, and Walker (2004) and Szeto (2005). They found that Japanese participants were more certainty oriented than they were uncertainty oriented, whereas Canadian participants were more uncertainty oriented than they were certainty oriented. This suggests that UOs in Japan and COs in Canada are in mismatched environments, whereas COs in Japan and UOs in Canada are in environments that match their individual orientations.

It is interesting that Shuper et al. (2004) also found that mismatched people in both countries seem to have higher levels of unrealistic optimism than their counterparts and exhibited what the investigators interpreted as anxiety and feelings of a lack of freedom in the workplace, as compared with matched participants. These results suggest that living in a culture where the normative way of coping with uncertainty does not match that of the individual may have negative effects on mismatched individuals. This study tests these implications and is guided by what can be predicted directly from the theory of uncertainty orientation. Returning to Figure 1, it can be seen that in situations in which personal and situational/cultural uncertainty orientation match, people should be actively engaged in the situation. Whether this engagement is positive or negative depends on their other motives. Positively motivated people (e.g., success-oriented persons, affiliation-oriented persons) are predicted to be in flow, and negatively motivated people (e.g., failure-threatened persons, rejection-threatened persons) are predicted to be in anti-flow, in motivationally relevant situations (e.g., achievement or social, respectively). In situations that do not match their uncertainty orientation, people will react more passively and be in a state of nonflow. As a result of this, the following hypothesis was deduced.

People in matched situations (i.e., those who live in cultures in which the dominant orientation is similar to their own orientation) should experience more active emotions (both positive and negative) than individuals who are in mismatched situations (i.e., those who live in cultures in which the dominant orientation is different from their personal orientation). The latter category of people should experience more passive positive and negative emotions than people in matched situations. To the extent that Canada is predominantly UO-centric and Japan is predominantly CO-centric, UOs in Canada will show more active and fewer passive emotions than COs in Canada, whereas the reverse will occur in Japan, where COs will show more active and fewer passive emotions than UOs. The theory of uncertainty orientation does not provide for broad predictions concerning positive versus negative affect. Nevertheless, the results of Shuper et al. (2004) suggest that positive emotions will be stronger in matched situations, and negative emotions will be stronger in mismatched situations; thus, we investigated valence of affect as well as activation. Finally, gender and achievement-related motives were included in the analyses for exploratory purposes.

METHOD

PARTICIPANTS

Participants were 202 undergraduate students in Canada and Japan. Students from the University of Western Ontario in Canada participated for course credit, whereas students

from Kurume University and Yamaguchi Prefectural University in Japan volunteered to participate. The final analysis dropped students who were moderately oriented in uncertainty orientation ($n = 68$), only including those clearly uncertainty or certainty oriented (see below). Those with missing data ($n = 11$) were also dropped. The final sample included 122 participants: 39 Canadian women, 19 Canadian men, 45 Japanese women, and 19 Japanese men. The mean age of the Canadian sample was 19.90 years ($SD = 4.84$) and the mean age of the Japanese sample was 18.95 ($SD = 1.31$). Although it was not possible to collect economic status data,⁴ all students were in introductory psychology courses and from provincially funded (whole or in part) universities. Thus, other than culture, the two samples appear to be comparable in many respects.

PROCEDURE

Participants were first administered the individual difference measures followed by the measure of affective experiences.

MEASURES OF INDIVIDUAL DIFFERENCES

All materials were translated into Japanese and back-translated to English to check for their face validity.

Uncertainty orientation. Uncertainty orientation was assessed using the resultant measure of uncertainty orientation (Sorrentino, Hanna, & Roney, 1992). This measure includes two independent components: *n*Uncertainty and Authoritarianism. *n*Uncertainty assesses an individual's need to resolve uncertainty within the self and the environment, whereas authoritarianism assesses an individual's desire to maintain clarity. The rationale for assessing uncertainty orientation using two separate measures is based on Atkinson and Feather's (1966) research on the development of approach and avoidant measures of personality dimensions. Their research demonstrated that two uncorrelated measures used in combination have greater predictive validity than a single measure meant to measure the same constructs. Following this approach, Sorrentino and Short (1986) established that one's desire to resolve uncertainty is independent of the desire to maintain clarity. Hence, one could be simultaneously high or low on one or both of these dimensions. These researchers felt that a resultant measure of uncertainty orientation, one that controls for both desires, would offer a more precise assessment than any single measure. This assumption has been borne out in numerous studies (see Sorrentino, Roney, & Hanna, 1992, for a review).⁵

The scoring system for the resultant uncertainty measure is similar to that used by Atkinson (1958) to assess achievement. Following the standardized procedure recommended by Atkinson (1958) and adapted by Sorrentino et al. (1984), uncertainty was assessed by having participants generate stories from a series of four-sentence leads, presented one sentence at a time. The leads were as follows: (a) "Two people are working in a laboratory on a piece of equipment," (b) "A person is sitting, wondering about what may happen," (c) "A person is seated at a desk with a computer and books," and (d) "A person is thinking: An image of a crossroads is in the person's mind." The sentences were followed by a series of "prompt" questions to facilitate story writing. Prompt questions included the following: (a) "What is happening? Who is (are) the person(s)?" (b) "What has led up to the situation? That is, what has happened in the past?" (c) "What is being thought? What is wanted? By whom?" and (d) "What will happen? What will be done?"

A composite score of uncertainty was calculated based on imagery scores obtained from the four stories. Stories were scored for uncertainty imagery if they contained reference to the goal of resolving or approaching uncertainty. If the stories met this criterion, they were then scored on 10 subcategories. A range of scores between -1 (*no uncertainty imagery*) and 11 (*highest possible amount of uncertainty imagery*) were possible for each story. Scores for the four stories were summed together to come up with a total score for each individual. The interrater reliabilities of the summary scores used in this study were above .90 in terms of the scoring manual (Sorrentino, Hanna, & Roney, 1992) and a second expert scorer.

Authoritarianism was assessed using Cherry and Byrne's (1977) acquiescence-free measure of authoritarianism. This measure can be used to infer certainty, given that those who score high on authoritarianism tend to orient toward familiar and certain situations (Kirscht & Dillehay, 1967). The measure has 21 items, rated on 6-point scales. Test-retest reliability above .90 has been demonstrated for both men and women (Sorrentino, 1987).

Participants' scores on the authoritarianism measure were transformed to z -scores and subtracted from n Uncertainty z -scores to produce the resultant measure of uncertainty orientation (see Sorrentino, Hanna, & Roney, 1992). A tertile split then divided the sample into an uncertainty-oriented group (those scoring in the highest third on the resultant measure), a certainty-oriented group (those scoring in the lowest third), and moderates (those scoring in the middle third). Those in the middle tertile were excluded from the analyses.

The exclusion of participants in the middle tertile was based on previous research (e.g., Sorrentino & Short, 1977) that has found that individuals with moderate scores on a number of different motive measures (e.g., n Power, n Affiliation, n Achievement, test anxiety, fear of social rejection) behave inconsistently. That is, the behavior of moderate scorers is sometimes similar to high scorers and sometimes similar to low scorers, and it has not been possible to predict such similarities. Most important, similar results have been found with the measure of uncertainty orientation used in this study (Sorrentino, Roney, & Hanna, 1992). The unpredictability of those with moderate uncertainty scores has recently been supported by computer simulations of the mathematical formulation of the theory (Sorrentino et al., 2003). Based on the evidence indicating that the inclusion of moderate scores may produce unreliable results, this article focuses on individuals in the high and low groups (i.e., UOs and COs).⁶

Achievement motivation. Although this measure was included for exploratory purposes, preliminary analyses revealed that it was important to use the measure of resultant achievement motivation as a covariate (see Results). As with uncertainty orientation, separate measures were used to infer the motive to succeed and the motive to avoid failure (e.g., Atkinson & Raynor, 1974). The motive to succeed was assessed from a projective measure (n Achievement) that is scored from the same stories as those scored for n Uncertainty. Scoring for n Achievement was done by an expert scorer whose scoring correlated .90 or better with materials provided by Smith and Feld (1958) and with another expert scorer. The criteria for scoring n Achievement were outlined by McClelland, Atkinson, Clark, and Lowell (1958). In general, these criteria involve a character showing affective concern about attaining an achievement goal (e.g., striving to succeed in competition with others or some standard of excellence such as a good grade in a course).

Fear of failure was assessed by the Test Anxiety Questionnaire (Mandler & Sarason, 1952), involving 12 items answered on 6-point scales. This measure assesses the extent to which anxiety is experienced in testing situations and has been shown to have good test-retest reliability, $r(94) = .71$, $p < .001$ (Sorrentino, 1987).

The resultant measure of achievement motivation was formed by standardizing test-anxiety scores and subtracting them from standardized n Achievement scores. Normally,

people would be categorized in terms of achievement motives as they were for uncertainty orientation. People scoring in the upper tertile would be categorized as success oriented, and those in the bottom tertile would be categorized as failure threatened. Extensive research attests to the validity of this measure of achievement-related motives (e.g., see Atkinson & Feather, 1966; Atkinson & Raynor, 1974; Sorrentino & Roney, 1986; Sorrentino, Short, & Raynor, 1984).

PRINCIPAL DEPENDENT MEASURE

Emotions were measured following a circumplex model (e.g., Feldman Barrett & Russell, 1998), and the quadrants of this model were measured individually. Participants rated active emotions: how enthusiastic, happy, proud, alert, and excited they were (positive activation [PA]) and how nervous, stressed, tense, upset, and embarrassed they were (negative activation [NA]). They also rated passive emotions: how calm, satisfied, relaxed, peaceful, and content they were (positive deactivation [PD]), and how depressed, sluggish, sad, bored, and disappointed they were (negative deactivation [ND]). For each item, participants responded to the question, "How much do you usually feel this way?" using a 7-point scale (1 = *not at all*, 7 = *very much*).

RESULTS

The primary analysis was a 2 (Country) \times 2 (Uncertainty Orientation) \times 2 (Sex) \times 2 (Active vs. Passive Emotions) \times 2 (Positive vs. Negative Emotions) analysis of covariance with achievement motivation as a covariate. Although we were not interested in sex differences per se, sex was included as a between-subjects factor because of the unequal numbers of men and women in both samples. If sex had not been included, differences in the numbers of men and women would have contributed to the results. Achievement motivation was included because preliminary analyses indicated that achievement-related motives did contribute significantly when used as a covariate. This was in the interaction with positive-negative emotions, $F(1, 107) = 4.51, p < .05, \eta^2 = .04$. Because achievement-related motives are concerned with pride in accomplishment and shame over failure (Atkinson & Feather, 1966), this result is not surprising but indicated that the variable should be retained in the principal analyses to reduce error variance. There also were several higher order interactions with sex, which are too complicated to present here but did not alter the meaning of the principal findings. The principal hypothesis was tested by comparisons of specific cells using *t* tests, based on the appropriate within-cell error term of the above analysis of variance (Kirk, 1995). The prediction was directional, and one-tailed tests were performed (Kirk, 1995).

Figure 2 presents the mean combinations for the above factors collapsed across Positive and Negative Emotions, and Figure 3 presents the mean residual scores so that the true interaction independent of main effects and lower order interactions (see Rosnow & Rosenthal, 1989) may be viewed. As can be seen in the figures, the pattern of interaction was as predicted: Canadian UOs reported more active emotions than Canadian COs, $M = 3.80, SD = .17$, versus $M = 3.66, SD = .25$, but Japanese UOs reported fewer active emotions than Japanese COs, $M = 3.34, SD = .18$, versus $M = 3.63, SD = .18$. In contrast, Canadian UOs reported fewer passive emotions than Canadian COs, $M = 3.72, SD = .14$, versus $M = 3.86, SD = .21$, whereas Japanese UOs reported more passive emotions than Japanese COs, $M = 3.52, SD = .15$, versus $M = 3.28, SD = 0.15$. Moreover, the test of this

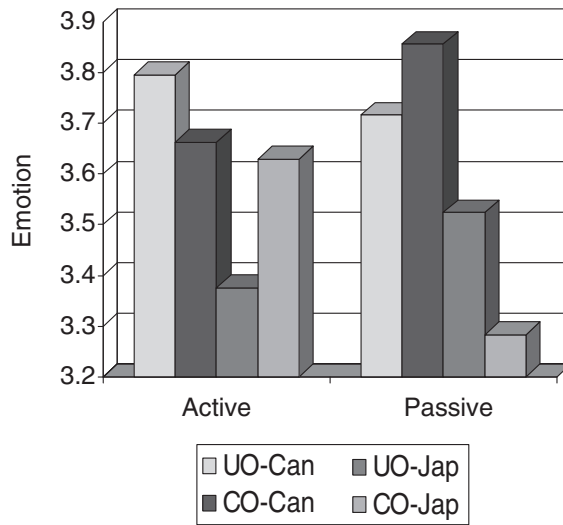


Figure 2: Mean Active vs. Passive Emotion Scores as a function of Country.

NOTE: Can = Canada; Jap = Japan; and Uncertainty Orientation (UO = Uncertainty-Oriented, CO = Certainty-oriented).

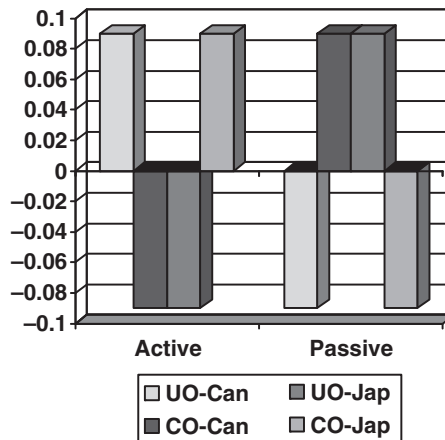


Figure 3: Mean Residual Active vs. Passive Emotion Scores as a Function of Country.

NOTE: Can = Canada; Jap = Japan; and Uncertainty Orientation (UO = Uncertainty-Oriented, CO = Certainty-oriented).

interaction was significant, $t(1, 107) = 2.65, p < .005, T_2 = .045$. Tests of significance within this pattern of interaction revealed that the Uncertainty Orientation \times Country interaction was also significant for both active, $t(1, 107) = 1.89, p < .05$, and passive, $t(1, 107) = 1.87, p < .005$, emotions. Individual comparisons revealed that the differences in active and in passive emotions between COs and UOs in Japan were significant, $t(1, 107) = 2.26, p < .01$, and $t(1, 107) = -2.13, p < .025$, respectively, but not in Canada, $ts < 1.00$.

The overall analysis of variance on which this test of the hypothesis was based produced a significant Uncertainty Orientation \times Country \times Active–Passive interaction,

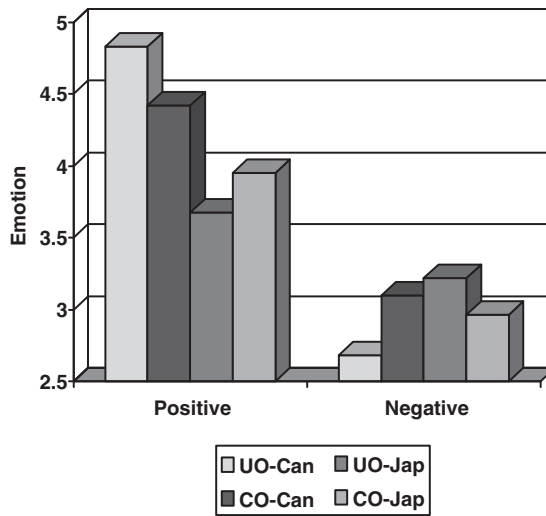


Figure 4: Mean Positive vs. Negative Emotion Scores as a Function of Country.

NOTE: Can = Canada; Jap = Japan; and Uncertainty Orientation (UO = Uncertainty-Oriented, CO = Certainty-oriented).

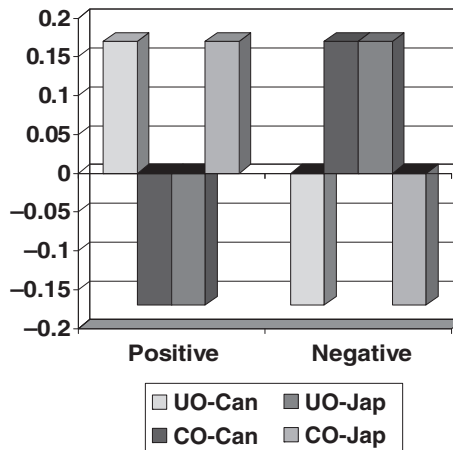


Figure 5: Mean Residual Positive vs. Negative Emotion Scores as a Function of Country.

NOTE: Can = Canada; Jap = Japan; and Uncertainty Orientation (UO = Uncertainty-Oriented, CO = Certainty-oriented).

$F(1, 107) = 5.09, p < .05, \eta^2 = .045$, reflecting the above test of the hypothesis, and a significant Uncertainty Orientation \times Country \times Positive-Negative Emotions interaction, $F(1, 107) = 4.47, p < .05, \eta^2 = .040$, which is illustrated in Figures 4 and 5. Note that the pattern of interaction here is similar to the one shown in Figures 2 and 3, but for positive versus negative emotions. Canadian UOs reported more positive emotions than Canadian COs, $M = 4.83, SD = .19$, versus $M = 4.42, SD = .28$, but Japanese UOs had fewer positive emotions than Japanese COs, $M = 3.70, SD = .21$, versus $M = 3.95, SD = .20$. In contrast,

Canadian UOs reported fewer negative emotions than Canadian COs, $M = 2.68$, $SD = .20$, versus $M = 3.10$, $SD = .29$, but Japanese UOs had more negative emotions than did Japanese COs, $M = 3.22$, $SD = .28$, versus $M = 2.96$, $SD = .21$. Within this pattern of interaction, a posteriori t tests (two-tailed), based on the within-cell error term of analysis of variance, revealed that the Uncertainty Orientation \times Country interaction was marginally significant for both positive, $t(1, 107) = 1.77$, $p < .10$, and negative, $t(1, 107) = -1.76$, $p < .10$, emotions. Individual comparisons within this interaction showed no significant effects.

Other effects included a significant Active versus Passive emotions main effect, $F(1, 107) = 62.5$, $p < .001$, $\eta^2 = .37$, with Active emotions reported more than Passive ones, $M = 4.22$, $SD = .11$, versus $M = 2.29$, $SD = .11$, and a significant Active versus Passive Emotions \times Country interaction, $F(1, 107) = 10.2$, $p < .002$, $\eta^2 = .087$, where Canadian students reported more Active and fewer Passive emotions, $M = 4.63$, $SD = .17$, versus $M = 2.90$, $SD = .18$, than Japanese students, who fell in between, $M = 3.81$, $SD = .14$, versus $M = 3.09$, $SD = .15$, respectively.⁷

DISCUSSION

This study is not only the first to offer direct support for the affective predictions inferred from the theory of uncertainty orientation (Sorrentino & Short, 1986; Sorrentino et al., 2003) but does it as a function of cultural differences. As illustrated in Figure 2, matched participants, or those whose primary method of uncertainty resolution matches that of their counterparts (UOs in Canada, COs in Japan), will show evidence of experiencing more active and fewer passive emotions than mismatched participants (COs in Canada, UOs in Japan). The latter will report more passive than active emotions. Performed in a cross-cultural context, it also raises some interesting questions for further research in this area.

Although the predicted pattern of interaction shown in Figure 2 is significant, the actual mean differences are small, ranging only from 3.38 to 3.86 on a scale from 1 (*not at all*) to 7 (*very much*). This is due to the significant interaction of uncertainty orientation and country on positive versus negative emotions. Just as matched participants evidence more active and fewer passive emotions, they report experiencing more positive than negative emotions, and just as mismatched participants evidence more passive than active emotions, they display more negative than positive emotions (see Figure 3).⁸ These findings concerning positive versus negative emotions could well be due to the cumulative effects of passively responding to a mismatched environment. That is, where a society endorses and encourages a means of handling uncertainty in a manner consistent with one's own uncertainty orientation, people will be more actively engaged in these everyday life experiences and have more positive affect. Where it is not consistent, they will be more passively engaged and have more negative affective experiences.

These findings are reminiscent of statements by Triandis (2005) concerning idiocentrism in allocentric societies and allocentrism in idiocentric societies:

People in each culture vary on these dimensions (Individualism, Collectivism) too. Those who are like members of individualist cultures we call idiocentric; those who are like members of collectivist cultures we call allocentric. There are idiocentrism and allocentrism in all cultures. Those who are extremely idiocentric are narcissists and poorly adjusted. Also, idiocentrism in collectivist cultures find their culture oppressive and wish to leave it. Those who are extremely allocentric are super-conformists, like robots. Also, allocentrism in individualist cultures find that the culture does not afford enough opportunities for "togetherness" and join whatever groups might be found—communes, gangs, unions, associations. Thus, the "culture fit"

hypothesis is that allocentrics will be adjusted best in collectivist cultures and idiocentrics in individualist cultures. But in any case healthy individuals are both idiocentric and allocentric. These tendencies are like “tools” that individuals use with different probabilities in different situations. A well-adjusted individual can use these tendencies optimally in many situations, and sometimes act allocentrically and at other times idiocentrically. In short, “nothing in excess” describes the optimal pattern. (pp. 208-209)

Although it is premature and must await further research, it is interesting to speculate that our UOs are akin to idiocentrics and COs are akin to allocentrics. It is certain that the research building up to examination of the theory of uncertainty orientation strongly suggested that this is the case. Much of the research has shown a tendency for UOs to be predominantly individualistic or self oriented (see Brouwers & Sorrentino, 1993; Roney & Sorrentino, 1997; Sorrentino et al., 1988; Sorrentino, Brouwers, Hanna, & Roney, 1996; Sorrentino & Hewitt, 1984; Sorrentino & Roney, 1986; Sorrentino et al., 1984; Walker & Sorrentino, 2000), whereas COs appear to be predominantly group oriented (see Hanna & Sorrentino, 2002; Hodson & Sorrentino, 1997, 2001; Huber, Sorrentino, Davidson, Eppler, & Roth, 1992). In addition, the cross-cultural research so far suggests that there is somewhat of a problem of cultural fit for COs in Canada and UOs in Japan. This study shows that mismatched people report more passive than active emotions and more negative than positive emotions, unlike their counterparts. The earlier study (Shuper et al., 2004) also shows that they are more likely than matched participants to have higher levels of unrealistic optimism and possibly more likely to fear anxiety and a lack of freedom in the workplace.

As with Triandis (2005), we suspect that most of these individuals have a healthy balance of idiocentrism and allocentrism, and the differences we are discussing are small, albeit significant. These are, after all, university students. Nevertheless, the predictions we made in this study were theoretically driven and theoretically consistent with the theory of uncertainty orientation. So, it is quite possible that the manner in which one confronts uncertainty, along with the manner in which one's culture advocates uncertainty resolution, may undertake even greater importance as a dimension of significant study. Whereas Hofstede (1980, 1991) delineated cultures along the affective dimension of uncertainty avoidance, it may be more precise, or at least an additional contribution to cross-cultural research, to examine informational aspects of resolving uncertainty (i.e., attaining clarity versus maintaining clarity) as well.

Insofar as we can tell, the two samples from Japan and Canada are similar in most respects with regard to age and educational status. Given the small sample size, one may wonder if some other demographic variable might account for the differences presented here. Given that the interaction between uncertainty orientation, culture, and active versus passive emotions was predicted a priori and that we can think of no variable that could alter the nature of this interaction (i.e., why UOs and COs would differ in the direction of their emotions in the two countries), we do not think this is a problem. However, a note of caution in accepting these results without further data is expressed here.

It is important to note that we are only assessing the affective experiences of university students in Canada and Japan, and much research needs to be done before we can equate uncertainty orientation of a country with the context of university students. In addition to problems of external validity that require more sample differentiation and other means of examining affective experiences, however, this research raises some intriguing research questions. As we have found with Canadian and U.S. samples (Sorrentino, Holmes, Hanna, & Sharp, 1995; Sorrentino, Roney, & Hanna, 1992), although education and uncertainty orientation are positively related, we would expect that the lay population in Japan

would be lower in uncertainty orientation than the student population. People with a strong desire to find out new things about the self or the environment have no better place to go than to a university; however, this and the Shuper et al. (2004) study suggest that those who are UO or CO may be better off in a situation that has a cultural fit more conducive to active engagement and positive affect. In other words, UOs in Japan and COs in Canada may be better off if they move to some place with a better fit. Until the goals of the culture, in this case, resolving uncertainty by finding out new things about the self and the environment, match the goals of the UO in Japan and possibly other East Asian countries, there is not likely to be an increase in this dimension, nor may it be desirable. Similar arguments may be made for COs in North America.

Finally, further research should provide some intriguing avenues for further tests of the theory of uncertainty orientation. As suggested by Figure 1, more precise predictions with regard to emotional reactions to success or failure at achievement activity as well as at social or affiliative activity can be made, where a larger sample is used to test these possibilities. It would be interesting, for example, to see how achievement-related motives and affiliation motives combine to determine emotional behavior in both Canada and Japan as well as elsewhere and how these experiences may fit with individual differences in one's orientation toward uncertainty. It would also be interesting to see what happens to UOs in Japan and COs in Canada. We suspect that they would attempt to find contexts within their culture that match their uncertainty orientation, allowing them to have more active and positive affective experiences than they would have in mismatched contexts. Perhaps, alternatively, they might have some effect on the uncertainty orientation of their cultures. This, too, would be a fascinating area of research.

CONCLUSION

Taken together with the Shuper et al. (2004) study, results from this study suggest that uncertainty orientation may be a critical individual difference variable that has important implications for examining differences between and within cultures. Within cultures, the data from Shuper et al. suggest that those people who match the predominant style of coping with uncertainty of their society have a better sense of self, perceive more freedom and less anxiety in work situations, and are more realistic about what their future holds than those who do not match their societal values. The results from this study suggest that matched individuals also are more actively involved and have greater flow of emotional experiences than their mismatched counterparts. With regard to our university samples, students in Canada appear representative of a UO-centric society, whereas students in Japan appear representative of a CO-centric society. Controversy currently rages with regard to whether individualism and collectivism truly distinguish Eastern and Western societies (e.g., Matsumoto, 1999; Oyserman, Coon, & Kimmelmeier, 2002); a plausible alternative explanation is that East–West differences might be a function of how these societies cope with uncertainty.

NOTES

1. An interesting but yet to be explored possibility, suggested by a reviewer, is an incompatibility between a cognition and an emotion.

2. See Sorrentino, Smithson, Hodson, Roney, and Walker (2003) for the mathematical formulation, which is too complex to be presented here.

3. It should be pointed out that because someone is negatively motivated in one domain does not imply that he or she is negatively motivated in others. For example, a failure-threatened uncertainty-oriented individual might also be affiliation oriented; consequently, he or she might derive more positive affect from uncertain social situations than uncertain achievement-oriented ones.

4. An interesting phenomenon, stated by one of our coauthors, is that Japanese parents do not reveal their incomes to their children.

5. Research on the measure of uncertainty orientation has long examined its correlation with other measures (see Sorrentino, Roney, & Hanna, 1992, for a review). Other than its correlation with the measure of openness ($r = .43$) from the Big Five (Costa & McCrae, 1988; McCrae, 1996), as found by Hodson and Sorrentino (1999), no reliable results have been found with various measures such as dogmatism, self-esteem, repression-sensitization, and need for cognition, causal uncertainty, need for structure, and need for closure.

6. Separate analyses of the results of this study show such "moderates effects" in students from both cultures.

7. In terms of specific emotions, significant uncertainty orientation \times country interactions were found on enthusiastic, $F(1, 107) = 4.46, p < .04, O^2 = .040$, depressed, $F(1, 107) = 3.64, p < .06, O^2 = .033$, proud, $F(1, 107) = 3.96, p < .05, O^2 = .036$, bored, $F(1, 107) = 6.28, p < .01, O^2 = .055$, and sad, $F(1, 107) = 3.73, p < .06, O^2 = .034$. All of these results are consistent with predictions. For the positive-active emotions of enthusiastic and proud, Canadian uncertainty-oriented individuals (UOs) had higher scores than Canadian certainty-oriented individuals (COs), $M = 5.09, SD = 0.29$ versus $M = 4.36, SD = 0.42, M = 4.47, SD = 0.32$ versus $M = 3.29, SD = 0.47$; but Japanese COs had higher scores than Japanese UOs, $M = 3.69, SD = 0.30$ versus $M = 3.38, SD = 0.31, M = 3.18, SD = 0.23$ versus $M = 2.88, SD = 0.35$. On the negative-passive emotions of depressed, bored, and sad, Canadian UOs had lower scores than Canadian COs, $M = 2.46, SD = 0.31$ versus $M = 3.49, SD = 0.46, M = 2.43, SD = 0.29$ versus $M = 3.67, SD = 0.42$, and $M = 2.32, SD = 0.27$ versus $M = 2.83, SD = 0.35$. Japanese COs, however, had lower scores than Japanese UOs on these measures, $M = 2.82, SD = 0.32$ versus $M = 3.17, SD = 0.34, M = 2.81, SD = 0.30$ versus $M = 3.26, SD = 0.31, M = 2.68, SD = 0.28$ versus $M = 3.39, SD = 0.39$.

8. Although not shown here, the combined influence of these two dimensions shows a far greater difference where means vary from 2.56 to 4.87.

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