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## Uncertainty Orientation: A Theory of Self-Regulation Within and Across Cultures as Related to Cognition

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**Andrew C. H. Szeto**, *The University of Western Ontario, Canada*,  
aszeto3@uwo.ca

**Richard M. Sorrentino**, *The University of Western Ontario, Canada*

**Satoru Yasunaga**, *Kurume University, Japan*

**Yasunao Otsubo**, *Fukuoka University of Education, Japan*

**John Nezlek**, *College of William and Mary, USA*

Erich Fromm once said “the quest for certainty blocks the search for meaning. Uncertainty is the very condition to impel man to unfold his powers.” For some, this quote is unmistakably true, impelling them to great discoveries of nature and the mind. For others, uncertainty is the very essence of confusion and ambiguity, offering nothing more than reason to retreat to more predictable and certain times. In this chapter, we explore the theory of uncertainty orientation as related to cognition and cognitive processes, including research that was conducted in Canada, Japan, and China. First, we discuss the characteristic uncertainty self-regulation styles that distinguish uncertainty-oriented individuals from certainty-oriented individuals. Next, we discuss the uncertainty orientation framework which integrates one’s uncertainty self-regulation style, the uncertainty present in the situation, and one’s characteristic motivations (e.g., achievement motivations) to predict performance outcomes in the related motivation domain. After discussing these basic tenants of our framework, we examine some of the cross-cultural research that has directly tested the predictions of the theory of uncertainty orientation. Concluding, we contrast our conceptualization of culture with how culture is commonly conceived in cross-cultural research.

Consider the following scenario: “A high school student is confronted with a major life decision, one that has innumerable consequences for the future. It is the spring and near the end of the final year of her high school career. This student has achieved good grades in school and many universities have offered major scholarships to attend their school. Some of these offers are from universities out of the country and in places where she has never traveled to or know much about, essentially, in places that are new, unknown, and non-established for the student. Alternatively, she has a very stable and happy life in the small town where she was brought up in. Her parents own a very successful restaurant in town, where she enjoys serving the customers and taking care of the everyday details involved in running a restaurant. Eventually, her parents will let her take over the restaurant if she would like to. What should she do? Should she venture into the unknown and attend university in a place she has not been or know anyone? Or should she stay in with what is known and work in the family restaurant, someday becoming the owner of it?”

### **Differential cognitive processes in uncertainty-oriented and certainty-oriented individuals**

We propose that what this student decides to do is dependent on the individual difference variable called uncertainty orientation. Uncertainty orientation is a self-regulatory style that focuses on how one approaches and handles uncertainty (Sorrentino & Roney, 2000; Sorrentino & Short, 1986; Sorrentino, Smithson, Hodson, Roney, & Walker, 2003). Uncertainty, within our conceptualization, is neither aversive, nor inherently positive. Rather, uncertainty is viewed as a cognitive variable, specifically informational rather than affective (Sorrentino & Roney,

2000; Raynor & McFarlin, 1986). Individuals exist on a bipolar continuum, from those who are uncertainty-oriented (UO) to those who are certainty-oriented (CO). UOs approach uncertainty and uncertain situations in an attempt to resolve it in a direct and effortful manner. They are especially engaged by new information about the self and environment and the prospects of learning from such situations (e.g., Roney & Sorrentino, 1995; Sorrentino & Hewitt, 1984). Conversely, COs do not approach uncertainty, opting for the maintenance of certainty and clarity by resorting to what they already know about themselves and their environment, or relying on heuristics (e.g., Hodson & Sorrentino, 1997, 2001; Sorrentino & Hewitt, 1984).<sup>1</sup> Therefore, UOs and COs characteristic uncertainty regulations styles lead them to have different cognitions and divergent cognitive processes.

*Uncertainty orientation and self-relevant cognitions.* In the seminal study on uncertainty orientation, Sorrentino and Hewitt (1984) investigated the different approaches that UOs and COs take when given the opportunity to seek self-knowledge. First, participants were given a new test that could distinguish between people, low, moderate, or high on a novel mental ability. Then, participants were given false feedback on the test, being told they were either not in the low range (i.e., either high or moderate) or not in the high range (i.e., either moderate or low) on this mental ability. Participants were given an opportunity to help construct a second test that can further discriminate their ability by selecting items to go into this new test. Three types of items were available to be chosen. The first type of items was *ascending* items that could discriminate between someone moderate or high on this mental ability. The second type of items was *descending* items that could distinguish between those low or moderate on this mental ability. The last type was a constant type, which is neither indicative of low nor high mental ability. In general, UOs chose items on the second test that would further discriminate their ability. Specifically, UOs given feedback that they were either moderate or high on this mental ability chose, on the second test, items that discriminated between moderate and high ability. Analogously, UOs told they were either low or moderate in ability, chose items that discriminated between low and moderate ability. However, COs, tended to choose items that were not diagnostic of their abilities. Therefore, COs that were given feedback as to being either moderate or high in ability chose items that discriminated between low and moderate ability, while they told they were either low or moderate in ability chose items that discriminated between moderate and high ability. Moreover, both UOs and COs chose their preferred items types regardless of positive (i.e., moderate or high ability feedback condition) or negative outcome (i.e., low or moderate ability feedback condition).

A recent study, conducted by Haynes, Olson, Sorrentino, Szeto, Wirkki, and O'Connor (2007), further accentuates the differences that UOs and COs manifest for cognitions about the self. Specifically, these authors tested to see if one's uncertainty orientation would have an effect on the generation of counterfactual thoughts after positive and negative events. Counterfactuals are thoughts about how events might have turned out differently, and are generated as a way to prepare for the future (Mandel & Lehman, 1996; Roese, 1994, 1997; Roese & Olson, 1995). Moreover, this type of cognitions comes in two forms: an upward and a downward type. Upward counterfactuals are thoughts of how things could have turned out better (e.g., "only if I studied more, I would have aced the test"). Whereas, downward counterfactuals are thoughts about how things could have turned out worse (e.g., "if I hadn't crammed last night, I would have received a lower mark"). Nasco and Marsh (1999) have demonstrated that upward counterfactuals are especially useful in serving a preparatory function,

<sup>1</sup> Our measure of individual differences in uncertainty orientation might appear on the surface to be similar to other variables such as novelty seeking. However, uncertainty orientation is informational, dealing with resolving uncertainty by different ways of handling it. Novelty seeking is a variable that is affective, dealing with preference for specific situations and emotional responses (e.g., anger and frustration) to stimuli (e.g., Cloninger, Svrakic, & Przybeck, 1993).

as they identify the factors that lead to the outcome and what can be done to aid future occurrences. Many researchers have found that negative outcomes generate much more counterfactuals, especially upward counterfactuals (e.g., Roese, 1994; Roese & Olson, 1997; Sanna & Turley, 1996). Haynes et al. (2007) predicted that UOs and COs might generate upward counterfactuals differentially, as this process involves considering hypothetical outcomes. As predicted, UOs generated more upward counterfactuals than COs for recent negative events. COs probably refrained from generating upward counterfactuals as doing so involves a self-appraisal process that would have evoked uncertainty and confusion about the self. In contrast, UOs had no problems dealing with such uncertainty, and therefore demonstrated their characteristic self-regulation style with generating more upward counterfactuals than their CO counterparts.

The above findings have also been replicated in a more applied setting, specifically within a health context. In a study by Brouwers and Sorrentino (1993), it was found that UOs and COs sought different amounts of information as a function of response efficacy (and threat). UOs that read a pamphlet describing a highly threatening (i.e., high personal relevance, see later section), but easily self-diagnosable disease (i.e., high self-efficacy), made more requests for more information about the disease and asked to obtain the self-diagnosis test more often than COs. However, this pattern was reversed when the self-diagnosis test was unreliable and hard to use (i.e., low self-efficacy). In other words, COs made more requests for information and test kits than their UO counterparts. The authors suggest that in the high efficacy condition, UOs can easily make a self-diagnosis, in other words learn something new about themselves. In contrast, COs made more requests than UOs in the low efficacy condition because the test is not very reliable and hard to use. This offers the CO an opportunity to maintain their knowledge about themselves. These divergent uncertainty approach styles, not only lead to differences in regard to cognitions about the self, but it also leads to divergent cognitions when thinking about groups or within a group context.

*Uncertainty orientation and group-relevant cognitions.* Hodson and Sorrentino (1997) was one of the first studies to demonstrate differences in functioning under a group context across UOs and COs. The authors believed that leadership style in a group, open vs. closed, would affect how UOs and COs functioned leading to differences in group processes and the decisions the group would arrive at. In an open-leadership style, the leader encourages expression of ideas, encourages voicing of divergent opinions, and facilitates voicing of opinions throughout the course of discussion (Janis, 1972). In contrast, closed-leaders tend to express their own opinion at the beginning of discussion, leading to the formation of group norms and expectation of conformity (Janis, 1972). Hodson and Sorrentino predicted that a closed-leadership style would create more certainty within the discussion context, while open-leaders encouraged new information, and thus uncertainty. Therefore, COs under the closed-leadership style would reach a biased decision (i.e., defer to the leader's opinions) to a greater extent than UOs. As predicted, the authors found that COs did defer to the leader under the closed-leadership style, more than their UO peers. Specifically, under a closed leadership style, COs reached a biased decision 82% of the time in a mock trial paradigm, compared to 60% for UOs. The authors believed that COs aligned with the group norms created by closed-leaders' expression of their opinions early. Additionally, the more certain environment created by these leaders' less consideration of objectives and risks was also preferred by COs. In the open-leader condition, UOs, again, agreed with the leader's decision about 60%. Perhaps UOs did not differ between conditions because they favored the leader's decision to go to court (this was held constant) as it contained the most uncertainty. However, COs only deferred to the leader 39% of the time in this condition. Hodson and Sorrentino believed that COs were more hesitant in this condition because their leader did not express an opinion early in the discussion. Moreover, COs, in this condition, also exerted more pressure to members who did not agree with the group consensus.

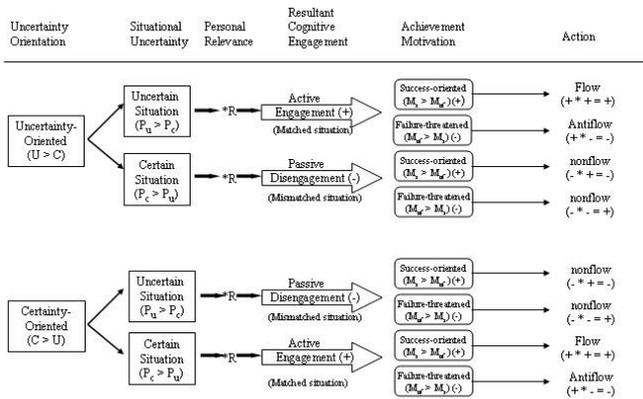
In general, this study demonstrated that COs prefer to rely on the group for direction, like a heuristic device, when compared to their UO peers, especially for a leader that will create an environment of certainty and clarity.

Continuing this theme, Sorrentino, Seligman, and Battista (2007) examined UOs and COs when need for assimilation and differentiation were aroused. Brewer's (1991) optimal distinctiveness theory suggests that social identifications will be adjusted to match one's currently aroused motivations. When one's need for assimilation is aroused, the person then feels a need to belong and include into the in-group. In contrast, when one's need for differentiation is aroused, then the person will feel a desire to feel unique and distinct from others. In support of this theory, Pickett, Silver, and Brewer (2002) found that when participants' need for assimilation was aroused (by asking participants to write about times they were similar to others), they rated their in-groups as more important than when their need for differentiation was aroused. Despite these findings, Sorrentino and colleagues believed that UOs and COs should differ on their reactions to these motives when they are aroused. Citing Hodson and Sorrentino (1997, 2001) who found that COs are influenced by leadership style and favor in-groups more than UOs, these authors felt that COs would rate their in-groups as more important than UOs, when the need for assimilation was aroused. However, when the need for differentiation is aroused, UOs and COs should not differ as UOs and COs do not seem to vary on their need to be unique. As predicted, COs gave higher group importance ratings than their UOs, when their need for assimilation was aroused. COs also rated their values more similarly to their group peers than UOs. When the need for differentiation was aroused, COs and UOs did not differ on their ratings of either group importance or values. These above studies point out the importance of uncertainty orientation as an individual difference variable, especially within the context of cognitions. We will now explore how individual differences in uncertainty orientation interact with other variables to determine behaviors.

#### **The Theory of Uncertainty Orientation: The Interface of Cognition and Motivation**

Presently, we have described the prototypical individual differences in cognition that characterize UOs and COs. However, the theory of uncertainty orientation is more complex than just these individual differences. It also incorporates situational uncertainty, as well as personal relevance and affective motivations (e.g., achievement motivation) to predict information processing and performance outcomes (see Figure 1). The latest form of our theory (i.e., Sorrentino et al., 2003) also predicts emotional experience as a function of uncertainty orientation and situational uncertainty.

*Information processing.* First and foremost, the theory of uncertainty orientation is a theory describing cognitive processes, specifically, information processing (e.g., Sorrentino, Bobocel, Gitta, Olson, & Hewitt, 1988). Alluded to previously, COs, when made to confront uncertainty (i.e., an uncertain situation), will engage in less effortful processing information, relying on heuristics. However, when COs are in a situation of certainty, in other words a match between uncertainty orientation and situational uncertainty, they become actively engaged by the situation and will process the information in a more careful and effortful manner. In contrast, the theory of uncertainty orientation posits the opposite for UOs. Specifically, when UOs are given an uncertain situation (i.e., a match between uncertainty orientation and situational uncertainty), they become actively engaged by the situation and will process information in a careful and effortful manner. When UOs are given a certain situation, rather than actively engaged, they become passively engaged and will process information with less effort, relying on heuristics over careful scrutiny of the information.



**Figure 1.** The Uncertainty Orientation Framework. Adapted with permission from Sorrentino et al. (2003).

*Personal relevance.* An important component of the uncertainty orientation framework was tested by Sorrentino et al. (1988). Specifically, these authors found that the type of processing one was engaged in is accentuated by the increasing personal relevance of the situation. This is contrary to dual processing theories of information processing that found personal relevance led to more effortful processing in all people, such as Petty and Cacioppo's (1986) elaboration likelihood model or Chaiken's (1980) heuristic-systematic model. Expanding on a study conducted by Petty, Cacioppo, and Goldman (1981), Sorrentino et al. (1988) examined the effects of personal relevance on information processing in UOs and COs. After assessing uncertainty orientation, first-year undergraduate students read an argument for the implementation of comprehensive exams for graduating students in either 1-2 years (i.e., high personal relevance condition) or 5-10 years (i.e., low personal relevance condition). In their study, Petty et al. found a greater difference in attitude scores between those receiving strong and weak arguments for those in the high personal relevance condition than those in the low personal relevance condition. Presumably, low personal relevance led participants to scrutinize the arguments with less effort, leading to less discrimination between strong and weak arguments and resulting in less difference on attitude scores between the two conditions. In contrast, high personal relevance led participants to scrutinize the arguments more carefully, leading to greater discrimination between strong and weak arguments and resulting in a greater difference on attitude scores between strong and weak conditions. Sorrentino and colleagues (1988) did replicate this finding. However, this was only true for UOs. COs, on the other hand, evinced the opposite pattern. There was a greater difference between attitude scores in the strong and weak arguments when COs were in the low personal relevance condition than they were in the high personal relevance condition. Sorrentino and Roney (2000) suggest that careful and effortful evaluation of arguments requires careful consideration of the arguments, potentially leading to new knowledge about the self and environment and possibly uncertainty about the self. This is something that UOs would gladly engage in. However, COs might not be so keen because their characteristic uncertainty self-regulation style is to maintain clarity and certainty. COs would rather maintain clarity and certainty by not scrutinizing arguments carefully, offering less chance for confusion and uncertainty. Therefore, high personal relevance

should increase the current processing style of COs, in this case less effortful processing, leading to a smaller difference between strong and weak arguments than when personal relevance is low.

*The integration of motivation and cognition.* The final component of the theory of uncertainty orientation deals with an individual's affective motivations (e.g., achievement motivation). Sorrentino, Short, and Raynor (1984) believed that Atkinson's (1964), along with Trope's (1975) and Weiner's (1970, 1972) analyses of task difficulty was incomplete. Atkinson argued that intermediate difficult tasks were the most motivating because easy tasks offer little value at success but difficult tasks offer little expectancy of success. In contrast, both Weiner and Trope believed that moderately difficult tasks were most engaging because these tasks were most diagnostic of one's ability. Sorrentino and colleagues (1984) objected to both sets of interpretations. They believed that intermediate difficult tasks contained the most uncertainty in outcome, as opposed to very easy and very difficult tasks that were the most certain in outcomes (i.e., certainty of success or failure, respectively). To support their supposition, these authors conducted a study that demonstrated that individual differences in uncertainty orientation interacted more with achievement motivation and situation (i.e., task difficulty) to predict performance, rather than influenced just performance as a function of one's achievement motivation and situation along. As stated previously, UOs are actively engaged by uncertainty and passively engaged by certainty, while COs are the opposite. Therefore, they predicted that UOs would be engaged by tasks of intermediate difficulty (i.e., probability of success of .5 because they were most uncertainty of success or failure. Analogously, COs would be most engaged by tasks that were very easy (i.e., probability of success of .8) or very difficult (i.e., probability of success of .2), as they contained either a certainty of success or a certainty of failure. In such matched situations, active engagement leads one's characteristic achievement-related motives to be activated and expressed. Specifically, if one was success-oriented (SO) they would outperform those who were failure-threatened (FT). In situations where uncertainty orientation is mismatched with task difficulty, such as UOs given easy and difficult tasks or when COs are given task of intermediate difficulty, the individual is passively engaged, resulting in non-expressed achievement motives and no performance differences between SOs and FTs. The results demonstrated that in matched situations (i.e., UOs in the intermediate and COs in difficult or easy conditions), characteristic differences in achievement-related motives were engaged, leading to SOs correctly answering more questions than FTs on a complex arithmetic task. When participants were mismatched (i.e., COs in the intermediate and UOs in difficult or easy conditions), characteristic differences in achievement motivation were not engaged, leading to similar performances by SOs and FTs. With this study, achievement motivation was demonstrated to be subsumed by one's uncertainty orientation. Therefore, performance outcomes were determined by the interaction of one's uncertainty orientation with the situation and one's achievement-related motive. In essence, uncertainty orientation can be considered the master motive in affecting an individual's outcomes in this case, and one's performance in achievement situations.

#### **Uncertainty orientation within the Japanese culture**

Thus far, we have discussed the basic cognitive and motivational components within the theory of uncertainty orientation and studies that have demonstrated support for its predictions. What about culture? Specifically, how does culture fit into the theory of uncertainty orientation? We do know that UOs and COs in Japan behave in the same way as they do in North America. Yasunaga and Kouhara (1995, in preparation) have conducted two studies in Japan that conceptually replicated findings in North American samples. In their partial replication of Sorrentino and Hewitt (1984), Yasunaga and Kouhara (1995) found that, UOs preferred to choose items on a personality test that were diagnostic of their abilities, whereas COs preferred

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to choose items that were not diagnostic of their abilities. Analogously, these authors also conceptually replicated Brouwers and Sorrentino (1993) finding that UOs sought more information about a life-threatening disease when a cure was uncertain (Yasunaga & Kouhara, in preparation). In contrast, COs sought more information when a cure was certain. With these findings, it was possible to examine the theory of uncertainty orientation across cultures, as the individual difference measure of uncertainty orientation was found valid in Japan.

One of the first studies to investigate cross-cultural differences in uncertainty orientation was conducted by Shuper, Sorrentino, Otsubo, Hodson, and Walker (2004). They reasoned that because UOs have been found to be more self-oriented, preferring to resolve uncertainty about the self (e.g., Brouwers & Sorrentino, 1993; Brouwers, Sorrentino, Roney, & Hanna, 2004; Sorrentino & Hewitt, 1984; Sorrentino et al., 1988), while COs are more group-oriented, preferring to defer to group norms and standards (e.g., Hodson & Sorrentino, 1997, 2001), uncertainty orientation might vary at the cultural level between East Asian and North American cultures due to the different values these cultures hold towards the self and the group. As predicted, Shuper and colleagues (2004) found that the Japanese sample was significantly more certainty-oriented than the Canadian sample. Moreover, chi-square analyses also showed that there was more COs than UOs in Japan, but vice versa in Canada. These results were subsequently replicated in two other studies (Sorrentino, Nezelek, Yasunaga, Kouhara, Otsubo & Shuper, 2008; Szeto, 2005) and further support the idea that Japanese culture is more certainty-oriented than North American culture. Exploratory measures were also included in this study, examining unrealistic optimism, individualism, and uncertainty avoidance. These measures yielded very interesting results. Specifically, those who did not match their culture's preferred way of uncertainty regulation (i.e., UOs in Japan and COs in Canada) reported higher levels of unrealistic optimism and uncertainty avoidance and lower levels of individualism. Shuper et al. (2004) suggest that the individualism and uncertainty avoidance scales probably tapped freedom and anxiety in the workplace, respectively. Therefore, these findings suggest, those who do not match their culture's preferred way of handling uncertainty, are worse off than their matched counterparts, engaging in more self-enhancement and experiencing less freedom and more anxiety.

In a second cross-cultural study in Japan, Sorrentino et al. (2008) found that affective outcomes varied as a function of uncertainty orientation and situational uncertainty (conceptualized at the cultural level), in accordance to the predictions of the theory of uncertainty orientation (Sorrentino et al., 2003). As discussed above, the type of information processing that one engages in, whether passive or active, is dependent on one's uncertainty orientation and its match or mismatch with situational uncertainty. We propose that not only is the type of information process the result of the interaction between uncertainty orientation and situational uncertainty but one's flow state can also be derived from this interaction (Sorrentino & Roney, 2000; Sorrentino et al., 2003; see also Kuhl, 1986). If there is a match between one's uncertainty orientation, positive motivation (e.g., SO), and the situation, then one might be absorbed and enjoying the experience or task he/she is engaged in, not at all worried about his/her performance. Conversely, if one is in a matched situation but negatively motivated (i.e., FT), then he/she might be preoccupied by his/her performance, in a state of worry and anxiety. These two types of experience are termed *flow* and *antiflow* experiences, respectively. On the other hand, if there is a mismatch between one's uncertainty orientation and the situation, one becomes disengaged from the task and situation, reacting in a passive manner. This is termed *nonflow*.

We also propose that, in addition to these flow states, one experiences affect that is congruent with the state he/she is currently in. Russell (1980) distinguished affective experiences along a two-dimensional classification (i.e., activation and valence), resulting in four different types of emotions: active-positive, active-negative, passive-positive, passive-negative. Those who are experiencing flow are actively engaged and positively motivated. This

should result in the experience of active-positive emotions (e.g., happy, excited) along Russell's classification. Analogously, those experiencing antiflow are actively engaged and negatively motivated, resulting in experiences of active-negative emotions (e.g., anger, alarm). For those in a nonflow state, they are passively engaged and experience either passive-positive (e.g., calm, relaxed) or passive-negative emotions (e.g., depressed, bored), depending on their motivation.

To test this hypothesis, Sorrentino et al. (2008) asked Japanese and Canadian participants to rate the extent they experience 20 different emotions (five for each of the four types) on a 7-point scale, ranging from 1 "very little" to 7 "very much". However, motivation was not examined because this was a study of general life experiences and not specific situations. Therefore, only hypotheses regarding emotions along the active-passive dimension were tested. Results indicated strong support for the theory of uncertainty orientation. Those whose uncertainty orientation was matched with their culture's preferred way of handling uncertainty (i.e., Japanese COs and Canadian UOs) experienced more active emotions than their mismatched peers (i.e., Japanese UOs and Canadian COs). For matched participants, being in a situation (in this case culture) that is congruent with their uncertainty orientation seems to lead them to more daily experiences of active emotions. In contrast, mismatched participants seem to live constantly in a situation that is not in synchronization with their uncertainty self-regulation style and this seems to lead them to more passive activation, resulting in more experiences of passive emotions.<sup>2</sup> The two cross-cultural studies discussed above point out the important role that culture plays in determining outcomes, especially in conjunction with uncertainty orientation. More importantly, these two studies demonstrate the psychological and emotional disadvantage that individuals face if their uncertainty orientation does not fit to their culture's valued way of uncertainty self-regulation.

#### Uncertainty Orientation in China: Children in a Changing Society

Thus far, the cross-cultural research in uncertainty orientation described has been conducted solely in Japan. Do the findings from Japan generalize to other East Asian countries? Also, what about children? Most uncertainty orientation research has been conducted on adult university student samples. To address these two questions, we conducted an exploratory study comparing uncertainty orientation and adjustment outcomes in a sample of Chinese and Canadian children (Szeto, Ye, Sorrentino, Chen, Wang, & Jin, in preparation). Shuper et al. (2004) and Sorrentino et al. (2008) both demonstrated the disadvantage that mismatched participants face. We also speculated that children whose uncertainty orientation does not match their society's way of handling uncertainty will be worse off than their matched peers in regard to performance in a school setting. With this said, we made no predictions regarding uncertainty orientation in the Chinese children. What we found was very interesting. First, regardless of culture, both Chinese and Canadian UO children were better adjusted than their CO peers. Overall, UOs had higher self-perceptions for their cognitive abilities, social competence, and global self-worth. Moreover, UOs also were rated by their teachers to be better academically in math and language, and to have less learning problems. Second, Chinese children, in general, were more uncertainty-oriented than Canadian children. This finding was also corroborated by a university sample (Study 2).

Although we acknowledge that China and Japan are very distinct cultures, they both, however, espouse similar sets of values regarding interpersonal harmony and the group (Markus & Kitayama, 1991; Triandis, 1989). If this is so, then what lead to these intriguing results? One possibility was suggested by Chen, Cen, Li, and He's (2005) 12-year longitudinal research on

<sup>2</sup> In addition to experiencing more passive emotions, mismatched participants also experienced more negative and less positive emotions than their matched peers. Although this is not directly predicted from the theory of uncertainty orientation, the authors do speculate that living in an environment that does not value one's preferred way of uncertainty regulation may lead to a cumulative build-up of negative experiences, resulting in more negative and less positive emotions.

shyness in Chinese children. In 1990, shyness was associated with better adjustment, such as, higher peer acceptance, higher teacher-rated leadership and competence, and superior scholastic performance. However, in 1998, this relationship between shyness and adjustment ceased to exist in the Chinese children. Finally, in the 2002, the previous relationship between shyness and adjustment had reversed. Now, shyness was related to peer rejection and depression, along with lower teacher-rated competence. Chen and colleagues (2005) proposed that this change in the relationship between shyness and adjustment mirrors the changes that have undergone within the Chinese socioeconomic system, from a communist political-economic structure to a western open-market economy. Shyness within the old system was valued, as demonstrated by its association with superior adjustment. However, within the context of the new Chinese society, shyness might not fit so well. Assertiveness and emphasis on the self, rather than shyness, is probably more effective in navigating through a more open and competitive economic setting. Analogously, uncertainty orientation might have been affected in the same way. Certainty-orientation might have been more valued in the old system, but with the change in political-economic systems, parents might encourage their children to behave more like UOs, as this more self-oriented regulation style might be more conducive to the new societal structure. It would seem that uncertainty orientation might have been affected by China's evolving social structure, much like shyness. However, this is only speculation. We did not assess uncertainty orientation over time nor across different cohorts. Therefore, more research is needed to ascertain the exact nature of this result. Nonetheless, this is an intriguing finding and affords some new insight into a dynamic society.

#### **Uncertainty Orientation, Culture, and the Future**

We feel that, in general, the theory of uncertainty orientation represents the conjunction of two psychological domains, namely social cognition and motivation, to form a complete and integrative description of individual behavior (see Sorrentino & Higgins, 1986). Rather than a limitation, culture offers new opportunities to expand and test our theory. Already, by incorporating culture within our research program and extant theoretical framework, many fruitful findings have surfaced. For example, a supportive finding for the theory of uncertainty orientation was conducted cross-culturally with a sample of Japanese and Canadian participants (i.e., Sorrentino et al., 2008). With this said, one of the most interesting and original aspects that is derived from cross-cultural uncertainty orientation research is our conceptualization of culture. Traditionally, culture is conceptualized more as a personality variable (e.g., Heine, Lehman, Markus & Kitayama, 1999; Kim & Markus, 1999; Markus & Kitayama, 1991). In Heine et al. (1999), culture's ultimate effect on the individual is described as the formation of "relatively autonomous psychological structure[s]" in the mind of the individual (p. 768). In other words, by engaging in affect, cognitions, and behaviors that resonate with the culturally accepted way of thinking, feeling and behaving, they are repeated and maintained, forming stable psychological structures as time passes. Within this conceptualization of culture, cross-cultural differences in affect, cognitions, or behaviors are a function of culture itself. For example, Kim and Markus (1999) examined differences in individuals' choice of colored pens as a function of East Asians' preference for majority rather than minority. It is interesting that East Asians chose pens that were the majority color, while Western participants chose pens that were the minority color. Although fruitful, these cross-cultural studies examining phenotypical differences have been well-documented.

Within the theory of uncertainty orientation, culture is conceptualized as a situational variable. This conceptualization offers a unique way of examining culture, allowing one to explore the processes that underlie cognition and motivation within divergent cultural contexts. Treating culture as a personality variable, rather than a situational variable, leads to homogenization of individuals within a culture. In other words, if one lives in an East Asian culture, then he or she is typecast and ascribed a set of specific traits. The theory of uncertainty

orientation takes into account individual differences beyond those ascribed by one's culture, accounting for individual motivations and cognitive styles. This allows our theory to make unique and novel predictions, where others do not. In Sorrentino et al. (2008), it was predicted and found that one's uncertainty orientation would interact with culture to predict specific types of emotions one would experience. Although UOs and COs in Japan approach uncertainty in the characteristic styles as they do in Canada (Yasunaga & Kouhara, 1995, in preparation), they do not, however, experience the same types of emotions on a daily basis as their Canadian peers. Specifically, the Japanese have created a society that is structured in a way that is most conducive for COs. They have instituted cultural norms, values, and beliefs that provide a cloak of certainty and predictability.<sup>3</sup> This is why Japanese COs experience more active emotions than passive emotions in Japan, while their peers in Canada actually experience more passive emotions than active ones. Of course, the cross-cultural research we have conducted so far is only the beginning. We have yet to examine the full tenants of our theory across cultures, such as the motivational component. Suffice it to say, the theory of uncertainty orientation offers a new and exciting vantage point for exploring culture, within an integrated framework of motivation and cognition.

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<sup>3</sup> Sorrentino et al. (2008) note that the Japanese cultural proclivity for certainty as a societal whole could be argued to be affect-based, such as uncertainty avoidance (Hofstede, 1980). For example, Japanese culture might have created a society of certainty and predictability to avoid the anxieties that might arise from uncertainty. Although these arguments are valid, Sorrentino et al. believe that this affective conception of uncertainty in Japanese culture can easily be interpreted within the theory of uncertainty orientation's cognitive components. That is, uncertainty is used in the informational sense, such as for attaining clarity for UOs and maintaining clarity in COs individuals, rather than affectively.

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