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The Effects of Individualism-Collectivism on Brainstorming:
A Comparison of Canadian and Taiwanese Samples

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A Thesis

in

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ABSTRACT

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Louis Ho

The present study tests the general hypothesis that individualism-collectivism orientation influences creative performance in a brainstorming context. This is explored from both an individual and group perspective. Individualists were represented by Canadians, while collectivists were represented by Taiwanese. It was predicted that the collectivistic nature of the Taiwanese would hinder their brainstorming performance. Inversely, the individualistic nature of the Canadians would help them in their brainstorming performance. As predicted, the Canadians produced significantly more ideas. However, it was found that the Taiwanese produced ideas that were, on average, higher in originality. It is hoped that the results from the present study will encourage further research into cross-cultural differences along the creativity dimension.

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Dedications

I would like to dedicate this thesis to my Mother, Father, and loving Wife.

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I. Introduction

Over the past few decades, Asians (the Chinese and Japanese in particular) have earned the reputation of being very strong in science and mathematics. From this perspective, they are highly regarded for their academic abilities and technical skills. Rushton, in his very controversial 1985 study on brain size and IQ, encourages this viewpoint by arguing that the larger brain size of the Mongoloid race directly attributes to their superior intelligence. However, there are those who point out that while Asians excel in the more logical and scientific domains, they are relatively weaker in the more abstract domains which require greater creativity. Yamada (1991) points out that the Japanese have many obstacles in their society that suppress innovation and individual creative talent. American scholars have typically regarded the Japanese as copyists and adapters, not as truly creative, original thinkers (Torrance & Sato, 1979). On the other hand, there are those who feel that this reputation for being less creative is unfounded, and that the creative aspect of Asians is simply misunderstood. For example, Torrance & Sato (1979) found, using the figural portion of the *Torrance Test of Creative Thinking*, that the Japanese performed better overall than their American counterparts. As well, there are those who point to the tremendous new product innovations of the Pacific Rim as evidence that Asians can in fact be very creative. Erez (1992) asserts that there is less awareness in the West of the increasing level of innovation in Japan. Since there is insufficient empirical evidence to arrive at any solid conclusions, this remains an area that merits investigation. Moreover, this area of research seems especially pertinent given the current economic dilemma of the Pacific Rim nations. During the 1980's,

Japan along with other Asian countries established themselves as formidable economies. In fact, the Japanese way of doing business often became the "ideal model" for discussion among business scholars. However, with Japan's economic bubble bursting in 1992 and the ensuing Asian economic crisis, the tides have turned. It has been suggested that while these Asian countries may produce individuals who are proficient in the technical domains, they may lack the creativity of their North American counterparts. Perhaps, this creativity aspect is one of the key components that is missing in the Asian model.

It would be difficult to argue against the importance of creativity. Without new ideas, new inventions, new ways of thinking, there would be no progress. Without progress, societal evolution would stumble to a standstill. Despite its importance, creativity has been difficult to conceptualize. As will be further discussed in this study, the mere definition of creativity is an issue that remains elusive among researchers. It is not the intent of the present study to undertake this issue. However, determining better ways to manage our creative efforts is an area of research that is both worthwhile and pragmatic.

According to Hostede (1980), social systems can only exist because human behavior is not random, but to some extent predictable. Thus, the investigation of patterns in social behaviors stands as a legitimate basis for expanding our understanding of different cultures. Research has continued to focus on how cultural values play significant roles in molding our behaviors in a variety of contexts. In particular, the concept of individualism-collectivism (IC) has been used by researchers on numerous occasions as a

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key determinant of how culture influences dynamics in the workplace (Earley, 1993). In spite of the interest along the IC dimension, there has yet to be any empirical investigations to indicate whether IC can influence creativity. By investigating how cultural dimensions such as IC can influence creativity, we may be able to pin point those behaviors, which might be conducive to creativity. An elucidation of the relationship between creativity and culture may contribute to an important understanding of how creativity tasks should be managed in organizations. Moreover, the results may pave the way for further research into creativity management.

The present study will examine the effects of IC on creative performance in both solo and group brainstorming sessions. An experiment will be conducted to test the general hypothesis that IC influences creative performance in a brainstorming context. More specifically, it is predicted that not only will IC have an influence over creative performance on an individual level, but also that this effect will become larger when carried over to a group setting. Moreover, it is predicted that IC will have an influence over group members' propensity to openly disagree during the group interactions.

Since the foundation of the present study is founded on a combination of more than one area of research, the literature review will be divided into three separate sections. The individual sections consist of one on cultural orientation (individualism-collectivism), one on brainstorming, and one on creativity.

II. Individualism-Collectivism

According to Triandis, Bontempo, & Villareal (1988), culture is a fuzzy construct. In order to understand the manner by which culture relates to social psychological phenomena, it is necessary to analyze it by determining dimensions of cultural variation. Several researchers have attempted to define such dimensions. Parsons and Shils (1951), in their "General Theory of Action", argued that all human action is determined by five "pattern variables," which they see as choices between pairs of alternatives:

1) Affectivity (need for gratification) versus Affective neutrality (restrain of impulses)

2) Self-orientation versus Collectivity-orientation

3) Universalism (applying general standards) versus Particularism (taking particular relationships into account)

4) Ascription (judging others by who they are) versus Achievement (judging others by what they do)

5) Specificity (limiting relations to others to specific spheres) versus Diffuseness (no prior limitations to nature of relations)

Hofstede (1980) empirically demonstrated four dimensions along which cultures varied:

1) Power Distance — A measure of the interpersonal power or influence between the boss and the subordinate. The basic issue involved is human inequality in such areas as prestige, wealth, and power. Different societies put different weights on status consistency among these areas.

2) Individualism — The relationship between the individual and the collectivity which prevails in a given society.

3) Masculinity — The duality of the sexes is a fundamental fact with which different societies cope in different ways.

4) Uncertainty avoidance — Uncertainty of the future is a basic fact of human life with which societies try to cope through the domains of technology, law, and religion. The tolerance for uncertainty varies considerably among people in subsidiaries in different countries.

Of the numerous dimensions, the IC distinction has been viewed by contemporary researchers as one of the most important (Meindl, Hunt, & Lee, 1989). The IC continuum has shown promise with respect to explaining cross-cultural social phenomena. Previous work on IC suggests that the content of the construct has recurring, widely recognized themes. For instance, Hui & Triandis (1986) asked social scientists on every continent to respond to 70 questions as if they were collectivists and individualists. They found considerable consensus among the social scientists for the belief that collectivists, *more so than individualists*, (a) give high consideration to the implications of their own behavior for others, (b) share material and nonmaterial resources with others, (c) have a willingness to accept the opinions and views of others, (d) are controlled by shame, (e) share both good and bad outcomes with others, and (f) feel that they are part of the lives of others. In addition, IC's influence has been linked to a variety of social, economic, religious, and political concepts and processes (Meindl, Hunt, & Lee, 1989).

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Individualism-collectivism can be conceptualized as a dimension of culture at the societal level. Wagner (1995) describes individualism-collectivism as an analytical dimension that captures the relative importance people accord to personal interests and to shared pursuits. A collectivist or an individualist orientation is said to be deeply anchored in the values and norms systems of the members of a cultural group and has implications in a large variety of behavior settings. Individualism-collectivism is a high-level psychological concept that explains cross-cultural differences in behavior over a wide range of situations (Fijneman, Willemson, & Poortinga, 1996). Hofstede (1980) found the U.S. and the English-speaking countries to be particularly high on individualism, and the countries of East Asia and Latin America to be particularly low. Furthermore, he also demonstrated a relationship between this dimension of culture and a country's level of economic development and wealth. Individualism was found to be positively related to the Gross National Product (GNP) of a country. According to Triandis, Bontempo, & Villareal (1988), a country's GNP is likely to be both an antecedent and a consequent of individualism. Interestingly, they noted that affluence implies the ability to "do one's own thing," but "doing one's own thing" implies more creativity for the society, hence more innovation and more economic development. This notion falls very much in line with the general hypothesis forwarded in the present study.

An important component of collectivist cultures is that individuals may be induced to subordinate their personal goals to the goals of some collective, called an ingroup (e.g., family, friends, workgroup). Many authors have argued that collectivism is associated with a heightened ingroup and outgroup distinction (e.g., Leung & Bond, 1984; Triandis,

1986). Specifically, collectivists emphasize interpersonal harmony with ingroup members, but may be businesslike or even antagonistic toward outgroup members. An ingroup can be defined as a set of people with whom one shares some attribute that contributes to one's positive social identity (Triandis, Bontempo, & Villareal, 1988). Similarly, Earley (1993) defined an ingroup as an aggregate of people sharing similar trait and background characteristics. Hence, an outgroup simply consists of all those not belonging to the ingroup. Much of the behavior of collectivists may concern goals that are consistent with the goals of their ingroup(s). In collectivist cultures, the relationship of the individual to the ingroup tends to be stable. Even when the ingroup makes costly demands, the individual is more likely to stay with the group. Those from individualist cultures, on the other hand, often drop those ingroups that make costly demands and form new ingroups. Consequently, ingroups in individualist cultures make demands on individual contributions that are highly segmented, requiring contributions only at a certain time and place, or of a certain kind. In contrast, ingroups in collectivist cultures make demands that are more diffuse (Triandis, Bontempo, & Villareal, 1988).

In collectivist cultures, one attempts to avoid conflict within the ingroup. This is often accomplished by hiding one's true feelings from ingroup members. In individualist cultures, one is more likely to bring conflict into the open. This would help explain why there are more lawsuits in North America than in other collectivist-oriented countries. In particular, the collectivist societies of the Far East emphasize ingroup harmony. According to Kawashima (1963), Chinese and Japanese societies usually seek harmony toward ingroup members, but may have strong emotional antagonism or even

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unrestrained violence toward outgroup members. One implication here is that collectivists only behave in a "collectivist" manner when dealing within their ingroups. The more obvious implication is that confrontation is highly undesirable. Based on the aforementioned reasons, we can see how conformity can occur more frequently in collectivist cultures.

There is overwhelming evidence indicating differences in basic psychological processes between collectivistic and individualistic contexts. Differences have been noted in such basic psychological processes as learning and reinforcement (Haruki et al., 1984) and social perception (Bond & Forgas, 1984). In Forgas & Bond (1985), perception of social episodes was found to be affected, with Chinese subjects emphasizing communal feelings, social usefulness, and acceptance of authority, with Australian subjects emphasizing competitiveness, self-confidence, and freedom. Gabrenya et al. (1985) found that social loafing occurs less in collectivistic than in individualistic cultures owing to "group orientedness". Extreme forms of individualism are suspected to be related to such social problems as high crime rates, suicide, divorce, child abuse, emotional stress, and physical and mental illness rates (Cobb, 1976; Naroll, 1983). Others have identified relationships between individualism-collectivism and the willingness of people to violate norms, their coping styles, their social interactions, their ingroup and outgroup relationships, and their rewarding and punishing behaviors (Morris et al., 1993). In addition to being conceptualized at the societal level, it has also been suggested that individualism-collectivism can be conceptualized at the organizational level. For instance, Triandis, Bontempo, & Villareal (1988) discuss the need for corporate

education programs directed at employees who bring a particular orientation, which may be incongruent with that of the organization. Wagner and Moch (1986) argue that individualism-collectivism is implicit in organizational science, but has received inadequate attention. Moreover, they suggest that overly individualistic corporate cultures may be inappropriate for contemporary organizations in which highly interdependent methods of production, just-in-time inventory systems, and matrix structures are employed.

Because issues of collectivism versus individualism are tied to value systems shared by the majority, they carry strong moral overtones (Hofstede, 1980). Americans see their own culture as very individualistic. This individualism is interpreted by the Americans as a major contributor to the greatness of their country. However, a very different moral position is found in China. For the schools of thought emanating from Mao Tse-tung's communist philosophies, individualism is considered evil. Individualism and liberalism, for Mao, are manifest in the selfishness and aversion to discipline which is characteristic of the petty bourgeoisie (Hofstede, 1980). Mao's anti-individualistic, pro-collectivistic ethos is deeply rooted in the Chinese tradition. Collectivism, in this sense, does not mean a negation of the individual's well being; rather, it is implicitly assumed that maintaining the group's well-being is the best guarantee for the individual (Ho, 1978). In the collectivistic Chinese society, the individual is controlled by a need for not losing "face". "Face" is lost when the individual, either through his action or that of people closely related to him, fails to meet essential requirements placed upon him by virtue of the social position he occupies (Ho, 1976).

Table 1 provides a very clear perspective of the individualism-collectivism dimension.

Table 1. The Individualism-Collectivism Dimension

Collectivism	Individualism
Ingroup regulation of behavior.	Individual regulation.
Interdependence.	Self-sufficiency.
Subordination of personal goals to goals of the ingroup.	Ingroup and personal goals are unrelated.
Harmony is important.	Confrontation within the ingroup may be good.
Shame control.	Guilt control.
Sense of shared fate.	Personal fate.
Group is center of psychological field.	Person is center of psychological field.
Ingroup is an extension of self-concept.	Self-concept is distinct from the ingroup.

Adapted from Triandis, Leung, Villareal, and Clark (pp. 397-398, 1985)

At this point, it should be clear that individualism and collectivism are, in essence, on opposite sides of the cultural spectrum. Individualism refers to a self-orientation, an emphasis on self-sufficiency and control, the pursuit of individual goals that may or may not be consistent with ingroup goals, a willingness to confront members of the ingroup to which they belong, and a culture where people derive pride from their own accomplishments. Collectivism, alternatively, involves the subordination of personal interests to the goals of the larger ingroup, an emphasis on sharing, cooperation and group harmony, a concern with group welfare, and hostility toward outgroup members (Morris et al., 1993).

Education plays a significant social environmental role in influencing who and what we become. After all, many of us spend a good portion of our lives as students in various forms of academic institutions. That which we acquire from our education influences not only our professional lives, but also our perception of the world. Thus, it would also be useful to look at the cultural differences between collectivists and individualists from an educational perspective. Studies have shown that the academic performance of American students consistently lags behind that of their Chinese and Japanese peers (Stevenson et al., 1993). In particular, the Asians have academically dominated in mathematics. Actually, none of this should be very surprising given the Asian's well-known societal emphasis on education (Stevenson, 1992). Students in Japan and Taiwan spend much more time on homework than students in the United States. Students in Japan and Taiwan also attend school for more weeks of the year and have a five and a half day school week as opposed to only a five-day school week. Moreover, it is more common for parents in Japan and Taiwan to spend more time helping their children with their homework (Stigler et al., 1982). On the other hand, American students have a greater motivation for economic independence and broad social experience than their Asian peers do (Stevenson et al., 1993). Consequently, American students engage in more extracurricular activities such as part-time jobs, dating, sports, and various hobbies. The consequences to this are two-fold. First, they end up devoting less time to their school studies. On the other hand, they are exposed more than their Asian counterparts to other aspects of life, which may play a role in nurturing creativity. Thus, it can be effectively argued that a society's cultural orientation is deeply embedded in its educational system. In turn, the educational system will produce individuals fitting into the society's mold.

Thus, the contention is that in the West, the individualist education systems produce students that are generally encouraged to think independently and are consequently more creative. Conversely, students in the East are expected to accept norms set by the collective and are rewarded for conformity to these norms both at home and at school. As described, this is unlikely to be a prescription for nurturing creativity. From Yamada (1991), it is suggested that despite the Japanese people's high level of education, the education itself discourages children from innovation from a very young age. Thus, from an educational perspective, individuals educated in collectivist systems are generally less creative than those educated in individualist systems.

III. Brainstorming

In 1957, Osborn introduced a creative problem-solving technique termed brainstorming. A brainstorming group's sole purpose is to generate ideas. The brainstorming procedure attempts to maximize group member ideational output by restricting the evaluation of ideas until all possible ideas have been suggested. Osborn's contention was that the brainstorming technique increases the quality and quantity of ideas generated by group members. By engaging in brainstorming, Osborn argued that the average person can think up twice as many ideas when working with a group than when working alone. Since then, an abundance of research has demonstrated the failure of brainstorming to live up to Osborn's claim. Taylor, Berry, & Block (1958) were the first to reject the claim. They showed that nominal groups (individuals working alone) outperformed

interacting groups of the same number by producing more ideas. Numerous researchers (cf., Jablin, 1981; Barkowski & Lam, 1982) have consistently replicated this finding over a period of three decades since Osborn's introduction of brainstorming. However, it should be noted that results have been more equivocal with regard to the quality of ideas. This seemed to be mainly due to the fact that different studies use different measures of quality. For instance, some studies used a measure of total quality by summing the quality ratings of the ideas produced by a given subject or group (cf., McLeod, Lobel, & Cox, 1996). Other studies have assessed the number of unique or original ideas, having used the frequency with which the idea is suggested as a criterion (cf., Wallach & Kogan, 1965).

There has also been considerable research aimed at explaining why real groups are repeatedly less productive than nominal groups of the same number. Diehl & Stroebe (1987) identified three potential group effects, which may account for the poor results of group brainstorming; production blocking, evaluation apprehension, and social loafing. *Production blocking* refers to the problem that only one member of a group of N individuals can talk at a given moment, while N-1 listen (or, at least, remain silent). The silent majority appears to self-censor, forget, or get talked out of some significant number of ideas. *Evaluation apprehension* is the reluctance of members to offer poorly developed or unpopular ideas that might elicit negative responses from others. Finally, *social loafing* is the well-documented tendency of individuals to invest less effort in group projects than they do in equivalent individual work. On this account, individuals brainstorming alone work harder and produce more ideas than do individual group

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members, who can lie back and leave the work to others. Upon exploring these three mechanisms, Diehl & Strobe (1987) concluded that production blocking accounts for most of the productivity loss of brainstorming groups.

A more recent group idea-generation technique called *electronic brainstorming* has met with more encouraging findings (Nunamaker, Applegate, & Konsynski, 1987; Gallupe, Bastiautti, & Cooper, 1991). With electronic brainstorming, members use computers to interact and exchange ideas. This format of brainstorming alleviates some of the problems associated with the traditional verbal brainstorming. Since ideas are recorded electronically and are available for inspection whenever a participant chooses, a participant is freed from the need to listen to external inputs. This greatly reduces production blocking. Also, since participants interact only with the ideas generated (and not directly with the participants), the problem of evaluation apprehension is alleviated. Moreover, the use of anonymous input in electronic brainstorming would further reduce, if not eliminate, the problem of evaluation apprehension (Siau, 1995).

The apparent weaknesses of the brainstorming technique are acknowledged in this study. However, since it is not the purpose of this study to compare nominal group performance to real group performance, the limitations of brainstorming should be of little significance to the findings.

Despite the shortcomings of brainstorming, it is still the most frequently used creativity technique (Fernald & Nickolenko, 1993). According to Jablin & Sussman (1978),

brainstorming is still widely used in both industry and academia. Moreover, organizations that practice participative decision making are most likely to utilize the group brainstorming procedure (Comadena, 1984). Dillon, Graham, & Aidells (1972) argued that while brainstorming does not appear to be an efficient way of generating ideas, it is unlikely that organizations will suddenly stop using groups for tasks which require productive thinking. Typically, group participation in idea generation is employed when needed information is distributed across a number of individuals and when there is concern for group acceptance at the idea implementation stage (Comadena, 1984). If it is the case that pressures exist for social organizations to employ group brainstorming procedures, then research is needed that (1) identifies factors that inhibit individual performance in brainstorming groups and (2) develops methods for reducing the effects of these inhibitory factors.

Group size is yet another factor, which is purported to have significant influence on the performance of individuals in groups. In the performance of problem solving by groups of two and four, evidence of a size effect was found by Taylor & Faust (1952). Measured as a percentage of the output of individuals performing in the task singly, the average member performance in groups of two was 68%, and in groups of four, 40%. Moreover, brainstorming studies using a number of group sizes (cf., Bouchard & Hare, 1970; Renzulli et al., 1974) showed that the output of creative ideas on a per-person basis was found to decrease as group size increased. In groups of five, seven, and nine, the average output was 66, 44, and 40 ideas, respectively. In reversing the analysis, it is found that creative performance improves with a decrease in group size until it reaches the group

size of two, or dyads. It was found that in dyads, the output of group members equals, or exceeds that of individuals (Thornburg, 1991).

Another perspective relating to group ideation stems from the premise that diversity in a group, or group member heterogeneity, stimulates creativity. Rubenson & Runco (1992) suggest that individuals of different backgrounds contribute to a group in different ways. For example, experienced individuals bring more knowledge and experience with them. However, along with this knowledge and experience, comes a certain degree of rigidity. On the other hand, those individuals with less knowledge may possibly bring with them greater flexibility, responsiveness, and a "fresher" approach to things. Thus, including group members with diverse amounts of experience can bring the benefits of both knowledge and flexibility to a group. According to Falk & Johnson (1977), diverse groups are generally seen as having more potential in developing alternative directions for approaching a problem by cross-fertilizing members' ideas and promoting creative thinking. Hoffman & Maier (1961) found groups that were heterogeneous in personality and gender to produce higher quality problem solutions on several problem types than did homogeneous groups. Triandis, Hall, & Ewan (1965) found that dyads that were heterogeneous in social attitudes produced solutions to various social problems that were judged higher in originality and practicality than the ideas produced by the homogenous dyads. Murray (1989) showed that demographic heterogeneity within top management teams has been shown to be related to firm innovativeness. In a study that spanned several industries, Murray found that heterogeneous top management teams (on the variables age, organizational tenure, functional area, and education) were more adaptive

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than were firms with homogeneous top management teams. Thornburg (1991) provides a single term, "orientations", to describe diversity in a creative context. Thus, diversity is defined as the number of orientations brought to bear on a problem and to interact in a problem situation.

Because diverse perspectives are said to be a contributor to creativity, it is one of the contentions of this study that culture can be one of those orientations. First of all, in a society where conformity is a prevailing norm, people do not develop to be as "distinctive" as they would be if they were to have been socialized in an individualist society. Therefore, a group of collectivists is a group consisting of homogeneous units; whereas a group of individualists is a group consisting of real distinctive units. In addition, from a group interaction standpoint, if conformity is to be the prevailing norm, then any effects of group heterogeneity, which is probably low to begin with, is diminished. In other words, the group of collectivists is a group of relatively similar people who are reluctant to be different from one another. This is in contrast with the group of individualists, which is a group of relatively dissimilar people who are not afraid to be different from one another. This argument is moderately supported by the findings of McLeod, Lobel, & Cox, Jr. (1996). In this study, the authors found that ideas produced by ethnically diverse groups in brainstorming tasks were judged to be of higher quality (i.e., more effective and feasible) than the ideas produced by the ethnically homogenous groups.

IV. Creativity

The process of conceptualizing a construct as abstract as creativity is a difficult one. In many ways, creativity is still a mystery. Those deemed creative in our society can at best speculate how their original ideas arise. Intuition is often suggested, but no one can really say how it works. According to Boden (1994), the apparent unpredictability of creativity seems to prohibit any systematic explanation, whether scientific or historical. So how does one define creativity? Moreover, if there can be one definition, is its nature essentially the same cross-culturally? The definitions of creativity in Western psychological literature are numerous. Stein (1953) offered a popular definition of creativity as that process that results in a novel work that is accepted as tenable or useful or satisfying by a group at some point in time. Webster's Ninth New Collegiate Dictionary similarly defines creativity in terms of the production of something new through "imaginative skill". Ford & Harris, III (1992) contend that creativity is a modifiable, deliberate process that exists to some degree in each of us. Moreover, it proceeds through an identifiable process and is verified through the uniqueness and utility of the product created.

Csikszentmihalyi (1996) argues that the term "creativity" as commonly used covers too much ground, thus causing a great deal of confusion. To clarify the issues, Csikszentmihalyi distinguishes between three different phenomena, which he considers can be legitimately called creativity. In the first usage, creativity refers to persons who are interesting and stimulating. A brilliant conversationalist, a person with varied

interests and a quick mind, may be called creative in this sense. In the second usage, creativity refers to people who experience the world in novel and original ways. These are individuals whose perceptions are fresh, whose judgements are insightful, and who may make important discoveries that only they know about. In the third case, creativity refers to individuals who, like Da Vinci, Edison, Picasso, or Einstein, have changed our culture in some important respect.

Torrance (1971) theorized that creativity is a combination of ability, skills, and motivation. Relative to ability, Torrance proposed that we are born with abilities that tend to be specific to a domain. Consequently, some people may be more talented in art, music, writing, or a number of other creative areas. Because he viewed creativity as a skill, Torrance argued that it is teachable. Thus, when children are taught creatively, they learn to perform creatively. Finally, he asserted that motivation is essential for creative behavior. Thus, children who are uninterested in performing creatively cannot produce creative products. Similarly, Piaget (1962) theorized that creativity, which he referred to as "creative imagination" is gradually integrated into intelligence as children age. During the developmental process, the creative imagination does not diminish, but rather increases. Piaget held that the nature of the creative process is malleable – it changes as the child progresses through the developmental stages.

Although it may not be intuitively obvious that creativity should be related to certain personality traits, the notion that creative genius is related to madness goes back to at least the times of Plato and Aristotle (Ochse, 1991). The conclusion that the incidence of

mental disorder is higher among creative achievers in the general population is supported by a number of studies (cf., Andreasen 1987; Juda 1949; Karlsson 1970). The incidence of different types of mental disorder differed according to area of creative endeavor. Judah (1949) found artists to be characterized by schizophrenic disorders more frequently, scientists by manic-depressive disorders. Karlsson (1970), on the basis of biographical material, claimed to have found the rate of psychosis to be 30% for great novelists, 35% for great poets, 35% for great painters, 25% for great mathematicians, and 40% for great philosophers. He further noted that the rate of psychosis among the general population was purported to be only around 2%. Andreasen (1987), in a controlled study of thirty eminent writers, found that no less than 80% of the writers had experienced an episode of affective disorder, whereas only 30% of the control group had done so.

Creative products are often in the form of tangible objects such as a work of art or a scientific discovery. However, creativity can also manifest itself in intangible forms such as ideas and leadership. Whether intangible or not, a seemingly important feature of Western creativity is its relationship to an observable product, which is assessed by an appropriate group of judges, either peers or experts (Hughes & Drew, 1984). From this perspective, creativity is very much a social judgement. According to Csikszentmihalyi (1996), there is no way to tell whether a thought is new except with reference to some standards. Moreover, there is no way to tell whether a thought is valuable until it passes social evaluation. Thus, from this perspective, creativity does not happen in people's heads, but in the interaction between a person's thoughts and a sociocultural context. It is

a systematic rather than an individual phenomenon. Csikszentmihalyi also asks the question of who is right: the individual who believes in his or her own creativity, or the social milieu that denies it? He contends that to side with the individual means that creativity becomes a subjective phenomenon. From this perspective, all it would take to be creative is an inner assurance that what *I* think or do is new and valuable. On the other hand, if it is decided that social confirmation is necessary for something to be called creative, the definition must encompass more than the individual. From this perspective, what counts is whether the inner certitude is validated by the appropriate experts.

The Eastern definition of creativity does not appear to focus primarily on innovative products. For example, the Indian culture appears to look towards one's self-growth as a means to creativity. In Hinduism, creativity is viewed as a state of unboundedness that has a biological basis in the relaxed coherent patterns of the nervous system (Lubart, 1990). In other words, Hinduism views creativity as a spiritual or religious state rather than as an innovative solution to a problem. Similarly, Zen Buddism also looks towards one's self as a means to enlightenment and creativity. In Zen Buddism, there are no sacred books or dogmatic tenets. Whatever teachings there are in Zen, they come out of one's own mind (Wonder & Blake, 1992). From this regard, the Eastern and Western perspectives on creativity have a fundamental difference in orientation. However, it is interesting to note that over the divergent cross-cultural definitions of creativity, all conceptualizations view creativity as a positive construct (Boden, 1994). Brown (1991) makes an interesting commentary on this aspect. He notes that little consideration is given to the possibility that creativity can be, at times, both unnatural and dysfunctional.

It can be unnatural in the sense that much of which is natural to us is automatic, reproductive, and routine. It can be dysfunctional because to constantly generate alternative idea for every act one might consider undertaking, would result in inaction.

According to Ford & Harris (1992), the initial problem in defining creativity reflects the fact that our society respects creativity less than intelligence and academic ability. This bias is particularly evident in the school systems, where even standardized tests tend to ignore creativity (Ford, Harris, & Winborne, 1990). A general decrease in creativity appears to be a result of the structure that children encounter upon entering school. For example, they learn to be convergent thinkers and to accept only one answer as correct. The tendency to think in divergent ways ultimately becomes inhibited, and creativity development is hindered. If it is the case that creativity is less respected in individualist societies, then it may be that creativity is even less respected in collectivist societies. This stands to reason when one considers the heavy emphasis placed on academic skills and the lack of creativity development in the Asian school systems, as was previously discussed.

By now, it is evident that the concept of creativity is an elusive one. As previously mentioned, it is by no means the intent of the present study to pursue this avenue of research. For the purposes of the present study and to avoid confusion, "creative performance" will substitute for the word "creativity". Thus, in the context of this study, creativity will simply be regarded as the creative performance of subjects within the brainstorming sessions.

Just as there are complications in conceptualizing creativity, there are likewise issues with regards to how it can be measured. Imagine the difficulty of determining what is "more creative" when the concept of creativity itself is still in many ways a mystery. Eysenck (1994) notes that although many have doubted whether it is possible to measure such psychological variables, most psychologists believe that "everything that exists, exists in some quantity and can therefore be measured". According to Torrance (1984), for centuries the Buddhists have used creativity tests (known as koans) to select gifted and talented candidates for training, and the ancient Chinese and Japanese identified their geniuses by asking them to create poems. Treffinger (1986) identified more than 60 instruments for identifying creativity. This implies that no single instrument for assessing creativity has been universally accepted. What may be considered creative in one culture may not be considered creative in another. For the purposes of the present study, it will not be the intention to establish that one will be categorically "more creative" than the other. Rather, within the parameters of the study, it can only be established that one will or will not have better creative performance than the other within the context of brainstorming. Now the only question that remains is: By which criteria are we going to judge creative performance? Traditionally, most brainstorming studies have used the number of unique (nonredundant ideas) as the primary measure of brainstorming performance (e.g., Bouchard & Hare, 1970; Dennis & Valacich, 1993; Gallupe et al., 1994). In addition to looking at the quantity of ideas, some studies have also looked at the quality of ideas. In Furnham and Yazdanpanahi (1995), ideas were also rated according to originality. However, Brown (1991) comments that creativity is still often confused with mere originality. According to Brown, there are numerous

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original acts that one can carry out – many of which would be considered totally unacceptable by society. Abra (1988) supports this view, arguing that originality seems a necessary but hardly sufficient characteristic. The implication here is that the criteria for creativity should include originality *plus* some other criterion that would be appreciated by others. In accordance with both Brown and Abra's contention, Diehl and Stroebe (1987; 1991) used both originality and feasibility to measure the quality of ideas. Buyer (1988) used originality and practicality. McLeod, Lobel, and Cox Jr. (1996) used effectiveness and feasibility. In the context of the present study, since the nature of both brainstorming tasks is highly fictitious, it would not make much sense to rate the ideas on pragmatism. For this reason, the quality of the ideas in the present study will be judged solely on originality.

V. Hypotheses

Based on the literature review, it should be apparent how one's orientation on IC could have an effect on one's behavior in both an individual and a group context. According to von Oech (1990), it is the crazy, foolish, and impractical ideas, which are the stepping stones to practical new ones. He argues that one should break the rules occasionally, and explore for ideas in unusual outside places in order to find those non-conformist ideas. With this in mind, suppose an individualist-oriented group and a collectivist-oriented group are each told to conduct a brainstorming session over a certain problem. In the collectivist group, members may be relatively more reluctant to make comments and/or

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propose ideas which may stand out too much. Furthermore, the collectivist group's inclination towards conformity and the reluctance to push the boundaries are likely to function as blocks to creativity. In the individualist group, members may feel relatively more comfortable bringing conflict and controversy out into the open and would consequently be more likely to break the traditional boundaries to come up with something more innovative.

Let us now investigate the big picture by putting all the different theoretical components together. Let us take a Chinese subject from Taipei, Taiwan. Let us call him Mr. C (C for Collectivist). And let us compare him to Mr. I (I for Individualist) who is a Caucasian subject of Western European descent from Montreal, Canada. Suppose we give them both a task, that requires some degree of creativity within the context of a brainstorming task. Who will perform better? During Mr. C's high school days, he had to put in the extra hours of studying everyday in order to be competitive and get into a university. A large proportion of his studies consisted of straight memorization with a heavy emphasis on mathematics. He literally had no time for extracurricular activities. Mr. I was also a studious individual. However, his study subjects were more diverse and placed greater emphasis on individual thinking. Moreover, the workload was lighter which allowed him the time to pursue and develop some extracurricular interests. Perhaps Mr. C will approach the task with a more structured method by attempting to fit the requirements of the task to some formulaic process. Perhaps Mr. I will use a "softer" and more flexible approach to come up with some unconventional ideas that might actually work. If this hypothetical description is accurate, then chances are that Mr. I will perform better than

Mr. C. Let us say that Mr. I will outperform Mr. C by some amount x. Now, what happens if you put Mr. C together with a few of his fellow Taiwanese peers in a group and you put Mr. I with a few of his fellow Canadian peers in a group? Which of these two groups would have the better creative performance? The prediction is that again, Mr. I and company will prevail. However this time, they should outperform Mr. C and company by a margin greater than x. As previously discussed, the expectation is that for each of the collectivists, when placed into an ingroup situation, their tendency to conform, avoid open conflict and experience evaluation apprehension will be heightened. Consequently, their creative performance will worsen. The theoretical reasoning behind the individual effect and group effect is essentially the same. The only distinction is that in a group context, all the factors that define a collectivist are heightened. Since it is precisely these factors that put them at a creative disadvantage as individuals, it is only logical to reason that as a group, these heightened collectivist factors will contribute to a worsening of creative performance. Essentially, an inverse relationship between collectivism and creative performance is posited. Now suppose that the two groups were then told to choose their one best idea. If the theory developed through this study is veridical, then we should be able to confirm the predicted behavior of the collectivist groups by analyzing their verbalizations. Since the collectivist groups are more likely to stress harmony and avoid open conflict, the amount of negative verbalizations coming from their group interactions should be less than those of the individualists. Interestingly, Wagner (1995) found evidence that IC influences cooperation in groups in such a way that collectivists will cooperate more than will individualists. However, since cooperation is not considered an operating factor of brainstorming, Wagner's finding

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should not refute the proposed theory. Of greater relevance is Collaros and Anderson's 1969 study. In their study, perceived expertise was shown to make a brainstorming group less effective with regards to originality, practicality, and creativity. Subjects felt more inhibited in the All Experts condition than in the One Expert condition because they felt intimidated or inhibited by the presumed superior knowledge of others. This supports the present study's hypothesis that inhibition (in this case, due to one's cultural orientation) may reduce one's performance within a brainstorming context.

Based on this discussion, the following research hypotheses are posited:

H1: Individualism-collectivism will have an influence over individual creative performance in a brainstorming context.

> **H1a:** Individualists will perform better than collectivists by producing a greater number of ideas.

> **H1b:** Individualists will perform better than collectivists by producing more original ideas.

H2: Individualism-collectivism will have an influence over group creative performance in a brainstorming context.

> **H2a:** Individualists will perform better than collectivists by producing a greater number of ideas.

> **H2b:** Individualists will perform better than collectivists by producing more original ideas.

H3: The individual versus group context will have a moderating effect on IC's influence over creative performance.

> **H3a:** Individualists' margin of higher performance with respect to quantity of ideas will be wider in the group setting than in the individual setting.

> **H3b:** Individualists' margin of higher performance with respect to originality of ideas will be wider in the group setting than in the individual setting.

During group interactions, subjects are likely to produce negative verbalizations. This provides a unique opportunity to observe any cross-cultural differences in the quantity of negative verbal cues used during the group tasks.

A negative verbalization refers to any comment intended for disagreement. For example, "No way can that work!" or "I don't think so!" are strong negative verbalizations. Examples of milder negative verbalizations are, "That may not work because..." or "Hhmmm, I'm not so sure about that".

It is predicted that the collectivists will not utter as many negative verbalizations during the group interactions, in order to promote harmony within the ingroup (as stated in Hypothesis 4a). Moreover, the negative verbalizations that they utter are expected to be weaker in valence (as stated in Hypothesis 4b). A confirmation of these hypotheses would serve to strengthen the theory behind Hypotheses 2a and 2b, which predicts that the individualist groups will have better creative performance than the collectivist groups. This is because the cultural trait that would make collectivists less apt to openly disagree with one another during the group interaction is precisely the same as that which would serve as a block to creativity.

H4: Individualism-collectivism will have an influence over group members' propensity to openly disagree with one another. Individualists will be more apt to openly disagree than collectivists during the group interaction.

> **H4a:** Individualists will utter more "negative" verbalizations than collectivists.

> **H4b:** The "negative" verbalizations uttered by individualists will have a stronger valence than those uttered by the collectivists.

It has been shown that under broad conditions, people are overconfident in the correctness of their answers to general knowledge questions. Overconfidence in general knowledge is currently a topic of great interest, with numerous proposed accounts for the phenomenon under debate (cf., Griffin & Tversky, 1992; Erev, Wallsten, & Budescu, 1994). The logistics of the present study provide a good opportunity to further investigate this intriguing phenomenon.

Specifically, subjects generally report average probability judgments that substantially exceed the proportions of items they actually answer correctly (cf., Lichtenstein, Fischhoff, & Phillips, 1982; Yates, 1990, Chap. 4). For instance, it would not be unusual to have a person correctly answer 65% of the items that are presented, yet on average indicate 75% certainty in the correctness of his or her chosen answers. The term "overconfidence" seems appropriate because such people appear to believe that their knowledge is better than it really is (Lee et al., 1995). Interestingly, overconfidence has typically been found to be greater for Asian than for non-Asian subject groups (cf., Phillips & Wright, 1977; Wright et al., 1978, Lee et al., 1995). This finding is surprising to many, given the common assumption that Asian cultures encourage personal modesty as opposed to bragging, while Western cultures do not (Lee et al., 1995). An exception to this surprising pattern is the finding by Yates et al., (1989). They found that Japanese subjects were no more overconfident than American subjects and were significantly less overconfident than those from mainland China.

There is some circumstantial evidence, which suggests that members of individualist societies would be more overconfident than members of collectivist societies. In Heine & Lehman (1995), levels of unrealistic optimism were compared for Canadians and Japanese. Across two studies, Canadians showed significantly more unrealistic optimism than Japanese. In this context, unrealistic optimism is defined as the tendency for people to believe that they are more likely to experience positive events, and less likely to experience negative events, than similar others. Heine & Lehman suggest that this phenomenon is related to people's tendencies to distort their perceptions of the world in a self-enhancing manner. Thus, unrealistic optimism is in part determined by whether one has an independent or interdependent construal of self. Markus & Kitayama (1991) define the independent construal of self as characterized by a bounded and autonomous sense of self that is relatively distinct from others and the environment. They argue that those with an independent construal of self strive to assert their individuality and uniqueness and stress their separateness from the social world. This construal of self is most representative of North American and Western European cultures. In contrast, they contend that the interdependent construal of self is characterized by an emphasis on the interrelatedness of the individual to others and to the environment. This construal of self is most representative of Asian cultures. It is clear that this model mirrors the concepts of the individualism-collectivism continuum. In another study, Kitayama et al., (1997) propose that enhancement of the self (pervasive in the United States), criticism and subsequent improvement of the self (widespread in Japan), result from and support the very ways in which social acts and situations are collectively defined and subjectively experienced in the respective cultural contexts. Their study revealed that American

situations are relatively conducive to self-enhancement and American people are likely to engage in self-enhancement. In contrast, the study also revealed that Japanese situations are relatively conducive to self-criticism and Japanese people are more likely to engage in self-criticism. These results lend support to the notion that collectivists would be less likely than individualists to display overconfidence, given that they are more self-critical. In fact, the evidence from both Heine & Lehman (1995) and Kitayama et al., (1997) can lead one to hypothesize that individualists would be more overconfident than collectivists. However, the bulk of the evidence points in the opposite direction. Since this study presents the opportunity to investigate this phenomenon, the ensuing three hypotheses are posited. Hypotheses 5a and 5b will be an attempt to discover whether the collectivists will be less confident in their creative abilities as suggested by some of the evidence. The difference here is that no general knowledge questions are used. Instead, the measure will be based on the subject's own self-perception of how creative his/her brainstorming performance was in comparison with the performance of others. Hypothesis 6 will determine whether the individual versus group context will affect overconfidence on a cross-cultural level.

H5: Individualism-collectivism will influence confidence.

> **H5a:** Individualists will be more confident in their personal creative abilities than collectivists.

> **H5b:** Individualists will be more confident in their group's creative abilities than collectivists.

H6: The individual versus group context will have a moderating effect on IC's influence over confidence. Collectivists' degree of confidence is predicted to be smaller in the group setting than in the individual setting.

VI. Methodology

VI.A. Experimental Tasks

A within-subjects design for task type was used, namely every subject was required to participate in both individual and group brainstorming tasks. The duration of each individual brainstorming task was five minutes. The duration of each group brainstorming task was ten minutes. The brainstorming tasks were the "Thumbs Problem" and the "Tourist Problem". To avoid the possibility of any order bias (individual vs. group / "Thumb Problem" vs. "Tourist Problem"), order of tasks were counterbalanced. This way, every possible sequential combination was covered in a balanced fashion (See Exhibit 1). In addition to the brainstorming tasks, subjects were required to choose their one "best" idea from the group brainstorming session. Finally, they were required to fill out a questionnaire, which consisted of overconfidence questions and a scale for measuring individualism and collectivism.

One of the brainstorming tasks was a modified version of the "Thumbs Problem", which has been extensively used in research on brainstorming (e.g., Bouchard & Hare, 1970). For the "Thumbs Problem", subjects were told to generate ideas about the practical benefits that would arise if everyone had an extra thumb on each hand as of next year. The original "Thumbs Problem" included generating ideas about the practical difficulties that would arise if everyone had an extra thumb on each hand as of next year. This part about the practical difficulties of having the extra thumb on each hand was eliminated since some of the subjects were asked to choose their best answer to the "Thumbs

Problem". A best answer to a two-sided question seems awkward. Thus, the 'difficulties' part to the "Thumbs Problem" was eliminated. In the case where subjects were asked to arrive at their best idea for the "Thumbs Problem", they were asked to choose the idea that would provide the greatest benefit(s) to having an extra thumb on each hand. The other brainstorming task was a modified version of the "Tourist Problem", which has also been used extensively in research on brainstorming (e.g., Paulus & Dzindolet, 1993). The original problem simply asked that subjects come up with ways to attract more tourists to their own city. However, since the present study involves participants from two different cities, which are geographically and culturally dissimilar, it was decided that a geographically and culturally neutral location should replace one's own city. Thus, subjects were told to generate ideas on how to attract more tourists to an imaginary underwater city. The imaginary underwater city was chosen because of its geographical and cultural neutrality. Since the city does not exist, there are no a priori connections to it. Moreover, neither the inhabitants of Montreal nor of Taipei have any strong cultural ties to the ocean. For the "Tourist Problem", the best idea should be the one that would attract the most tourists to the imaginary underwater city.

Pretesting for the Tourist and Thumbs problem were conducted on a small sample of four groups. Initial results indicated misunderstandings as to what the underwater city and hand with extra thumb actually looked like. This suggested a need for a graphical depiction of both problems. Thus, a drawing of a hand with two thumbs and a drawing of an underwater city were provided to all subjects during the brainstorming sessions. See Exhibit 2 for the drawings.

Notices were put on the two university campuses (one in Taipei, one in Montreal) describing the relevant details of the study (duration of study, possible times, location, experimenter's name, etc.). Interested individuals provided their names and phone numbers on the notices. Subsequently, the notices were collected and the subjects were called to set up specific appointments. Subjects were paid ten dollars for their participation, which required approximately 45 minutes.

An empty classroom was used for conducting the experiments. Efforts were made to use the same room throughout the experimental process. However, this was not always possible. Subjects were brought into the empty classroom. Upon arrival, subjects were told that they would be participating in an experiment to explore the effectiveness of brainstorming. Subjects were debriefed on the true nature of the study after they had completed the experiment.

To promote an ingroup environment within the laboratory setting, subjects were told that their group results would be compared to the results of other groups. Moreover, subjects were told that videotaping the sessions would be necessary for possible subsequent observations of their group interactions.

Prior to embarking on the brainstorming tasks, subjects were briefed on the brainstorming rules as adapted from Osborn (1957, pp.83-84). The rules were translated into Chinese

for the Taiwanese subjects. The initial translation was performed by a University educated Taiwanese who was fluent in English. That translated version was double-checked for accuracy by another University educated Taiwanese who was fluent in English. The rules are as follows:

1) Criticism is ruled out. Adverse judgment of ideas must be withheld. No one should criticize anyone else's ideas.

2) Freewheeling is welcome. The wilder the idea, the better. It is easier to tame down than to think up. Do not be afraid to say anything that comes to mind, the farther out the idea the better. This will stimulate more and better ideas.

3) Quantity is wanted. The greater the number of ideas, the more likelihood of winners. Come up with as many as possible.

4) Combination and improvement are sought. Ideas of others can be combined into better ideas.

For the individual brainstorming tasks, subjects were given a pencil and a sheet of paper and told to generate as many ideas as possible. For the group brainstorming tasks, subjects were also told to generate as many ideas possible. However, they had to nominate one member who was responsible for writing down all the ideas. Following this, subjects were instructed to evaluate all of the ideas in order to arrive at their "best"

idea. Prior to all the tasks, subjects were told to write as neatly as possible.

After completing the brainstorming tasks, subjects completed the postsession questionnaire. They were then debriefed on the true nature of the study. Moreover, they were asked not to divulge the nature of the study to anyone else.

VI.C. Subjects

Hofstede's (1980) examination of individualistic values among employees of a multinational corporation in 40 countries revealed that the Chinese in Taiwan were among the lowest in individualism. Moreover, the study showed that Canadians were among the highest in individualism. Thus, their contrasting standings on the IC continuum made them ideal samples for the study.

• 128 students in Taipei, Taiwan from Taiwan Normal University represented the collectivists. To avoid cultural variance, only students of a Chinese and/or Taiwanese background were selected. Given Taiwan's ethnic homogeneity, the selection of Chinese and/or Taiwanese subjects was not an issue.

• 128 students in Montreal, Canada from Concordia University represented the individualists. Since Canada (Montreal in particular) is a very ethnically diverse society, it was important that subjects emanating from very collectivistic ethnic backgrounds not

be included in the sample. Since, North American and Western European countries are among the most individualistic (Hofstede, 1980), efforts were made to recruit Canadians with Western European backgrounds. Subjects whose ethnic backgrounds fell within the lower half of Hofstede's Country Individualism Index were rejected. That is, only subjects considered "ethnically acceptable" were contacted for participation in the study.

The impact of gender on brainstorming productivity was not expected to be a factor. Herschel's 1994 study investigated the impact of varying gender composition on group brainstorming performance in a Group Support Systems environment. The results indicate that there was no difference in group brainstorming productivity due to gender, when controlling for group size. Thus, no effort was made to test for gender effects.

As previously mentioned, collectivists only behave in a collectivist fashion within their ingroups. Thus, the question is raised as to whether assembling a group of students for the purpose of brainstorming ideas qualifies as creating an actual ingroup. The answer to this question is not thoroughly transparent. The subjects brought together should consider one another as peers, as they were from the same university. They were given a common purpose - to generate ideas for a given problem. Moreover, a sense of teamwork and competitiveness was encouraged by the experimenter. The definition of the ingroup in collectivist cultures depends to some extent on the situation. While "family and friends" is the main definition, fellow villagers, political allies, or the country as a whole (in time of war) become the relevant ingroups for particular behaviours. It is the opinion of the authors that the experimental environment was sufficient to create an ingroup situation. On the other hand, people in individualist cultures are generally better

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at meeting outsiders, forming new ingroups, and getting along with new people (Triandis et al., 1988). Consequently, it can be argued that the groups formed by the individualists are "tighter-knit" groups than those formed by the collectivists. Thus, the degree of ingroup versus outgroup variance may be an issue. However, it is the opinion of the authors that the competitive aspect introduced into the tasks should have equalized all ingroup-outgroup variances.

Another factor that was difficult to control for was that some groups had members that were more familiar with one another than other groups did. When recruiting all subjects from the same campus, some subjects will invariably know one another. Different degrees of familiarity among group members may contribute to the degree of ingroup versus outgroup variance. However, since the recruiting situation was the same in both countries, any confounds based on subject familiarity should not have yielded any systematic biases.

VI.D. Independent Variable

• Cultural Orientation (collectivism vs. individualism)

Although it was a priori assumed that the collectivists and individualists were respectively represented by the Taiwanese and the Canadians, every subject's IC score was measured using the shortened version of the original INDCOL scale as developed by

Hui (1988). The original measure consisted of 63 items measuring communal versus individual orientation, which were divided into six subscales: spouse, parent, kin, neighbor, friend, and co-worker. One flaw with the original instrument was its length. Because of time constraints, many researchers (e.g., Ho & Chiu, 1994; Meindl, Hunt, & Lee, 1989) did not administer the Scale in its entirety. This inevitably undercut the instrument's reliability and validity, and may have obscured potentially interesting findings. In Hui & Yee (1994), confirmatory factor analyses raised doubts about the original six-factor model of the Scale. Subsequent principal component analyses extracted five factors, which could be further grouped under two second-order factors. Based on the factor analytic results, the INDCOL Scale was shortened, thus meeting researchers' need for a short instrument to gauge individualism-collectivism. The five factors in the shortened version were: Colleagues and friends/supportive exchanges (CF), Parents/consultation and sharing (PA), Kin and neighbors/susceptibility to influence (KN), Parents and spouse/distinctiveness of personal identity (PS), and Neighbor/social isolation (NE). The shortened version contains only 33 items (See Exhibit 3).

VI.E. Moderating Variable

• Group Size (individual vs. groups of four)

All subjects were asked to perform brainstorming tasks both individually and in groups of four. The group size was set at four per group as it is a very common practice in

brainstorming studies (cf., Taylor, Berry, & Block, 1958; Diehl & Stroebe, 1987; 1991; Camacho & Paulus, 1995). Having four per group is ideal as it is large enough for adequate allowance of group dynamics to occur, but not too large so that recruitment becomes too difficult.

VI.F. Dependent Variables

- Quantity of ideas generated

- Quality of ideas generated (i.e., originality)

- Quantity of "negative" verbal cues generated

- Valence of "negative" verbal cues generated

- Degree of confidence in personal and group brainstorming performance

VI.G. Scoring & Analysis

Quantity of ideas generated – This measure refers to the number of different task-appropriate ideas produced. The mean number of ideas obtained from the individual tasks of the Taiwanese was compared to those of the Canadians. The same comparison was made for the mean number of ideas obtained from the two group tasks. Only the non-redundant ideas were counted. That is, overlapping ideas only counted as one idea.

The protocol for determining what is or what is not overlapping was adapted from Bouchard & Hare (1970, p. 52):

1. *Generalities*. Statements that are too general will not be counted because it will be difficult to determine the intent of the idea.

2. *Misunderstandings*. Some subjects may misunderstand the nature of the problem. Whether a misunderstood answer will count will depend on the nature of the misunderstanding. This will be judged on a case by case basis.

3. *Lists*. A general rule including a list of examples is given credit as only one idea. If, within the list, examples are explained rather than just mentioned, each explained example will be counted as an idea.

Quality of ideas generated – Since the two brainstorming topics are open-ended problems with no fixed solution criteria, the ideas cannot be objectively classified as to their quality. For this reason, quality assessment has to rely on subjective ratings. Two performance measures for quality were employed: *total quality* and *average quality*. To obtain a *total quality* measure, the originality ratings over all (different) ideas were summed. To obtain an *average quality* measure, the total originality score was divided by the number of ideas. This yields an index of the average quality of the ideas produced by a subject or group. Thus, the mean score for quality of ideas per individual from the Taiwanese was compared to those from the Canadians. Moreover, the mean score for quality of ideas per group from the Taiwanese was compared to those from the Canadians. The quality for each idea was rated by two independent raters according to

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originality on a 5-point scale. Originality was defined as "the degree of commonality of the idea". The scale ranged from 1 = an extremely unoriginal idea (*Anyone would have thought of that*) to 5 = an extremely original idea (*I would have never thought of that*). Subjects were told to disregard any considerations for feasibility, practicality, effectiveness, or absurdity of ideas. The two raters were defined as in agreement when their ratings of an idea fell within 1 point of each other on the 5-point scale (Diehl & Stroebe, 1987, 1991; McLeod et al., 1996). The two judges were in agreement on 90.55% of the originality ratings. The two judges' ratings were averaged to produce a single rating for each idea. For the rating instructions, see Exhibit 4.

All the Taiwanese data was translated to English. To verify accuracy of translation, 25% of the translated data was translated back into Chinese by a different translator. The back-translated data was then compared to the original Chinese data for accuracy. The comparison indicated a 98.09% degree of accuracy, which was deemed sufficient. The translated data that was deemed inaccurate by the second translator was reviewed once again by both translators in order to reach agreement on proper translation. All the written ideas (both English and Chinese converted into English) were typed out. The typed responses removed any confusion or biases due to handwriting. The raters did not know that half of the data was originally in Chinese. All of the ideas were presented randomly.

Quantity of "negative" verbal cues generated – These were counted by four coders from observing the videotaped sessions (two coders for the Canadian data and two coders for

the Taiwanese data). A "negative" verbalization was defined as any verbal utterance intended for disagreement. Every verbal disagreement uttered by members of each group was counted as one negative verbalization. The two coders for each data set had to agree on what was considered a negative verbalization. The mean number of negative verbal cues generated by the Taiwanese groups were compared to those generated by the Canadian groups.

Valence of "negative" verbal cues generated – Negative verbal cues were coded based on the intensity of the expression on a five point scale [1 (mildly negative) – 5 (extremely negative)]. These were coded independently by the four video coders. Prior to the coding, the coders were briefly coached on how to properly code the data. Coders were given several examples of how different intensities of expression should be coded. For instance, a very strong negative statement such as, "No way can that work!" should be scored as a "5". A very mild negative statement such as, "Well, that may not work because..." should be scored as a "1". The mean valence score of negative verbal cues generated by the Taiwanese groups were compared to those generated by the Canadian groups. The two judges were defined as in agreement when their ratings fell within 1 point of each other. The judges were in agreement 88.26% of the time. The coders' ratings were averaged to produce a single rating for each verbalization.

Degree of confidence - Subjects rated their own degree of confidence as part of the postsession questionnaire. They were asked to rate how creative they thought their individual ideas were in comparison to the individual ideas of other participants in the

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study. They were also asked to rate how creative they think their group's ideas were in comparison to the ideas of other groups in the study. For adequate variance, they were requested to rate the perceived creativity on a seven point scale [1 (low) - 7 (high)].

Degree of individualism-collectivism as collected using the shortened INDCOL Scale was coded according to the scheme in Exhibit 5.

VII. Results

To test each of the aforementioned hypotheses, it was necessary to compare the means by conducting t-tests and analysis of variance tests. One-tailed t-tests were carried out to compare (i) the number of ideas produced by the individualists and the collectivists on a per person basis; (ii) the originality scores of the individualists and the collectivists on a per person basis; (iii) the number of ideas produced by the individualists and the collectivists on a group basis; (iv) the originality scores of the individualists and the collectivists on a group basis; (v) the number of negative verbalizations of the individualists and collectivists; (vi) the valence of the negative verbalizations of the individualists and the collectivists; (vii) the individual confidence score of individualists and collectivists; and (viii) the group confidence score of individualists and collectivists. Analysis of variance tests were carried out to compare: (ix) the difference between the number of ideas between individualists and collectivists as moderated by an individual versus group context; (x) the difference between the originality scores between

individualists and collectivists as moderated by an individual versus group context; and (xi) the difference between the confidence levels of the individualists and collectivists as moderated by an individual versus group context. Tables 2 and 3 displays the relevant means across the two samples.

Table 2. Results as divided between Individualists and Collectivists

	Mean for Individualists per person basis, n = 128 per group basis, n = 32	Mean for Collectivists per person basis, n = 128 per group basis, n = 32
Number of ideas per person	9.15	5.53
Number of ideas per group	30.53	16.13
Total originality of ideas per person	26.14	16.48
Total originality of ideas per group	88.68	50.37
Average originality of ideas per person	2.86	2.98
Average originality of ideas per group	2.90	3.12
Number of negative verbal cues	1.94	1.00
Valence of negative verbal cues	1.64	0.88
Confidence score in individual creative abilities	3.59	3.24
Confidence score in group's creative abilities	3.97	3.65
Group time to reach best idea (seconds)	221.91	137.69

Table 3. Results as divided between Individual and Group Context

	Individual Context n = 128	Group Context n = 32
Difference between the number of ideas between individualists and collectivists	3.62	14.40
Difference between the originality of ideas between individualists and collectivists	0.12	0.22
Difference between the confidence levels between individualists and collectivists	0.35	0.32

i) The results revealed a significant difference (t = -5.138; P < 0.001) between the mean number of ideas produced by the individualists and that of the collectivists on a per person basis. Table 2 shows that individualists produced more ideas than the collectivists (9.15 versus 5.53). These results support Hypothesis 1a.

ii) The results revealed a significant difference (t = 1.692; P < 0.05) between the mean originality score of ideas produced by the individualists and that of the collectivists on a per person basis. Table 2 shows that, contrary to Hypothesis 1b, the ideas of the collectivists scored higher on originality than those of the individualists (2.98 versus 2.86). These results do not support Hypothesis 1b.

iii) The results revealed a significant difference (t = -8.859; P < 0.001) between the mean number of ideas produced by the individualists and that of the collectivists on a group

basis. Table 2 shows that the individualists produced more ideas than the collectivists (30.53 versus 16.13). These results support Hypothesis 2a.

iv) The results revealed a significant difference ($t = 5.312$; $P < 0.001$) between the mean originality score of ideas produced by the individualists and that of the collectivists on a group basis. Table 2 shows that, contrary to Hypothesis 2b, the ideas of the collectivists scored higher on originality than those of the individualists (3.12 versus 2.90). These results do not support Hypothesis 2b.

v) The results revealed a significant difference ($t = -2.239$; $P < 0.05$) between the number of negative verbalizations uttered by the individualists and collectivists. Table 2 shows that the mean number of negative verbalizations uttered by the individualists was higher than that of the collectivists (1.94 versus 1.00). These results support Hypothesis 4a.

vi) The results revealed a significant difference ($t = -2.460$; $P < 0.01$) between the valence of negative verbalizations between the individualists and collectivists. Table 2 shows that the mean valence of negative verbalizations of the individualists is higher than that of the collectivists (1.64 versus 0.88). These results support Hypothesis 4b.

vii) The results revealed a significant difference ($t = -2.060$; $P < 0.05$) between the mean individual confidence score of individualists and collectivists. Table 2 shows that the

mean individual confidence score of the individualists was higher than that of the collectivists (3.59 versus 3.24). These results support Hypothesis 5a.

viii) The results revealed a significant difference ($t = -1.923$; $P < 0.05$) between the mean group confidence score of individualists and collectivists. Table 2 shows that the mean group confidence score of the individualists was higher than that of the collectivists (3.97 versus 3.65). Hence, Hypothesis 5b is supported.

ix) The results revealed a significant moderating effect of an individual versus group context on the mean number of ideas between individualists and collectivists. The analysis of variance indicates a significant interaction between the IC orientation and whether the task was completed alone or in a group ($t = -6.639$; $P < 0.001$). Table 3 shows the means of the individual context versus group context to be 3.62 and 14.41, respectively. Hence, Hypothesis 3a is supported.

x) The results did not reveal a significant moderating effect of an individual versus group context on the mean originality score of ideas between individualists and collectivists. The analysis of variance indicates an insignificant interaction between the IC orientation and whether the task was completed alone or in a group ($t = 0.646$; $P > 0.50$). Table 3 shows the means of the individual context versus group context to be 0.12 and 0.22, respectively. Hence, Hypothesis 3b is not supported.

xi) The results did not reveal a significant difference between individual confidence and group confidence as moderated by an individual versus group context. The analysis of variance indicates an insignificant interaction between the IC orientation and whether the task was completed alone or in a group ($t = -0.099, P > 0.50$). Table 3 shows the means of the individual context versus group context to be 0.34 and 0.32, respectively. Hence, Hypothesis 6 is not supported.

In order to assess subjects' degree of IC, a t-test was conducted to compare the five factors of the shortened INDCOL scale. Table 4 shows the results of the INDCOL questionnaire completed by the 128 Canadian and 128 Taiwanese subjects. The results reveal a significant difference between the Canadian sample and the Taiwanese sample on four of the five factors.

A significant difference ($t = 8.294$; $P < 0.001$) was found between Canadian and Taiwanese subjects for CF. This implies that the Taiwanese subjects held a higher level of intimacy pertaining to the concepts of sharing and interdependence with colleagues and friends than the Canadian subjects. A significant difference ($t = -6.103$; $P < 0.001$) was found between Canadian and Taiwanese subjects for PS. This implies that the Taiwanese subjects had a stronger sense that the nuclear family is their basis unit of survival. Moreover, their personal identity rests more in the family than in themselves. A significant difference ($t = -1.772$; $P < 0.05$) was found for KN. This implies that the Taiwanese subjects were more readily influenced by their kin's and neighbors' attitudes and views. A significant difference ($t = -3.942$; $P < 0.001$) was found between Canadian

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and Taiwanese subjects for NE. This implies that the Canadian subjects had a stronger lack of even causal relationships with their neighbors than the Taiwanese subjects. There was no significant difference found between the Canadian and Taiwanese subjects for PA, although the Taiwanese mean score was more collectivist.

Table 4. Results of INDCOL Scale

	Individualists n = 128	Collectivists n = 128
Colleagues and friends/ supportive exchanges (CF)$^\Psi$	16.13	20.92
Parents/consultation and sharing (PA)	3.64	3.37
Kin and neighbors/ susceptibility to influence (KN)[b]	-1.72	-2.94
Parents and spouse/distinctiveness of personal identity (PS)$^\Psi$	1.87	-0.71
Neighbor/social isolation (NE)$^\Psi$	-6.92	-9.78

$^\Psi$ Significant at $P < 0.001$.
[b] Significant at $P < 0.05$.

VIII. Discussion

The findings of the Montreal/Taipei experiment indicate that there are clearly some creative differences between the two cultures within a brainstorming context. One of the principal predictions was that individualists would perform better than collectivists in the brainstorming sessions by producing a greater quantity of ideas (i.e., greater productivity). This hypothesis was clearly supported. As previously discussed, the productivity of a brainstorming group has always been considered a primary measure of brainstorming performance. Thus, the present study has shown that a group's IC orientation can have a significant influence on brainstorming productivity. In searching for a solution to any given problem, the probability of finding an acceptable one becomes naturally higher when there are more ideas to choose from. From the Montreal/Taipei brainstorming sessions, it was found that on average each individualist produced 3.62 more ideas than each collectivist (representing 39.54% more ideas). The individualist groups produced on average 14.41 more ideas than the collectivist groups (representing 47.19% more ideas). In light of these findings, it would be difficult to dispute that a person or group representing a greater degree of individualism would likely produce a greater quantity of ideas in a problem scenario, thus raising the probability of finding an acceptable solution.

The number of ideas produced by both the individualists and collectivists indicate that nominal groups outperformed real groups. In the case of the individualists, real groups produced a mean of 30.53 ideas while nominal groups produced a mean of 36.59 ideas. In the case of the collectivists, real groups produced a mean of 16.13 ideas while the

nominal groups produced a mean of 22.13 ideas. These results serve to corroborate previous findings, which have demonstrated the failure of group brainstorming as a technique for enhancing idea generation. As previously discussed, it has been shown repeatedly that groups made up of individuals working alone will consistently outperform interacting groups of the same number with respect to number of ideas. The current study has once again replicated this robust finding.

In addition to producing a superior quantity of ideas, it was also predicted that the individualists would produce ideas that were of higher quality (i.e., more original). However, the findings were not entirely supportive of this prediction. As previously explained, there are two perspectives from which to approach this particular hypothesis. If we are to consider the *total* quality of the ideas (i.e., the sum of the quality ratings over all different ideas), then the prediction of superior individualist performance is overwhelmingly supported. This particular conclusion is quite obvious given that the individualists produced significantly more ideas. It stands to reason that by producing more ideas, *total* quality of ideas becomes higher. Thus, the individualists' *total* quality of ideas should be higher for the simple reason that they produced a significantly greater number of ideas. However, when we are to consider the *average* quality of the ideas (i.e., the *total* quality score divided by the number of ideas), then the hypothesis is not supported. As previously reported, the collectivists actually attained a higher *average* quality score then the individualists. The *average* quality of ideas should be considered a "purer" measure as it better reflects the overall quality of a set of ideas. It would be obviously advantageous to pick and choose from a set of ideas with a higher *average*

quality. As shown from the results, the collectivists had a significantly higher *average* quality for their ideas on a per person basis and a group basis. The fact that their ideas were fewer in number but higher in *average* quality suggests that they practiced greater caution in offering ideas. It would appear that their interpretation of the exact same brainstorming rules were somewhat more conservative than that of the individualists. With participants offering only their better ideas, it follows that the groups' *average* quality of ideas were higher. These results suggest that the Taiwanese were more reflective in their behavior than the Canadians. Similar observations are found in another cross-cultural study (Li & Shallcross, 1992), which compared the performance on the nine-dot problem of Mainland Chinese students to those of American students. In this study, the contrast of approach to the experimental task was quite different between the two samples. Most of the American students started the task quickly, and rapidly completed trials on the nine-dot problem. This behavior may reflect their value of "doing". On the other hand, most of the Chinese students focused on what was required of them and spent more time on understanding the rules. This may reflect their value of "thinking before doing". In the end, the American students completed more trials of the problem but were less successful at solving it than the Chinese students. These results mirror the results of the present study in that Canadian students were able to produce more ideas but ended up with a poorer average quality for ideas than the Taiwanese students. It would be interesting to further test this "reflective versus action" dichotomy by testing for differences in how Asian and non-Asian cultures respond to the exact same instructions.

As was predicted, individualists displayed a greater propensity to openly disagree with one another during the group interactions. This was manifested through both the quantity of negative verbalizations uttered and the valence of those negative verbalizations. The greater willingness on the part of the individualists to openly disagree with each other suggests that they are more at ease in expressing themselves freely. In other words, they feel less inhibited in verbalizing what is on their minds. Thus, it makes sense that they were able to offer more ideas in the brainstorming sessions. From this standpoint, the individualists' greater propensity to openly disagree with one another was advantageous. Since the collectivists disagreed less than the individualists, it only follows that they would take less time in reaching a best idea. This was shown to be the case. Individualists took a mean time of 221.91 seconds to reach a best idea, whereas collectivists only took a mean time of 137.69 seconds. The difference between the two mean times were found to be significant ($t = -3.259$; $P < 0.01$). The temporal difference suggests more efficiency on the part of the collectivists with respect to making a decision. These findings suggest that decisions can be made more quickly within a stronger ingroup setting characterized by less conflict and a greater sense of harmony. Thus, a stronger ingroup setting would appear to be a positive aspect for situations involving group decision making. On the other hand, disagreements and conflict can play an important function in instances where debate over different options is potentially beneficial. Evidently, both styles of group decision making have their advantages and disadvantages. At this point in time, it would be difficult to conclude which style of group decision making is superior. It would make sense that a combination of critical discussion along with an adequate degree of group harmony would be the optimal style.

The current study utilized tasks for which there was no right or wrong answer. To clarify the issue at hand, it may be useful to further test individualists against collectivists, using a problem type that requires one or more distinct solutions. By using problems with distinct solutions, one can test for the ability to arrive at a correct answer (testing for group effectiveness) and also the length of time it takes to arrive at a correct answer (testing for group efficiency).

The previous discussion argued that the collectivists took less time in reaching a decision simply because they disagreed less amongst each other. However, it should also be considered that the collectivists had fewer ideas to reflect over as a result of their lower brainstorming productivity. This factor confounds any conclusive findings regarding the speed of group decision making between the two samples. Future research may account for this factor by giving the two samples equal amounts of data to begin with prior to instructing them to choose the best idea.

The Taiwanese were considered an ideal sample for the present study given their documented inclination towards collectivism (cf., Hofstede, 1980). The INDCOL tests adequately confirmed this with the Taiwanese scoring higher on collectivism on all five factors with three of them being significant. However, it should not be assumed that the Taiwanese are necessarily representative of the other Asian cultures. After all, Taiwan is only one small island nation among many larger countries in the Pacific Rim. Although it is quite conceivable that the current findings would carry over to other Asian cultures, this notion cannot be taken for granted. Thus, it may be a useful effort to conduct a

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similar study in other Asian countries. Japan, in particular, would be a worthwhile region to study for several reasons. First, they represent a comparatively large and strong economy in Asia. Moreover, Japan's economic influence is felt on a global scale. Thus, any betterment into the understanding of the culture behind such a vast economic power would be a useful endeavor. Moreover, given the fact that Japan is such an economically influential nation, there has already been much research conducted on the Japanese culture. In the current study's literature review, much of the available literature relating to the topic at hand was conducted on Japanese subjects. Although the Taiwanese culture is very similar to the Japanese culture, they are nonetheless different. As was the case, the authors could often only draw broad inferences from the literature relating to Japanese research. In the case of a similar study conducted in Japan, new research findings could be directly compared to the past research.

As was previously discussed, it would have been ideal to use another rating in addition to originality to assess the quality of ideas. It would have been very interesting to see which sample generated ideas that were more effective, practical, and feasible. However, given the highly fictitious nature of the brainstorming tasks, it would not have been appropriate to judge the ideas on feasibility, effectiveness, or practicality. A useful extension of the present study could utilize tasks that are not of a fictitious nature so that the latter three dimensions can be tested for.

IX. Conclusion

It would not have been a constructive exercise to merely compare and state that one cultural group is superior to another in some aspect of performance. In fact, this line of reasoning may conjure up sentiments of racial bigotry, as was and still is the case with Phillip Rushton's research on racial differences in intelligence (cf., Rushton, 1985). On the other hand, by objectively analyzing differences in performance between cultures and subsequently understanding those differences, we can hopefully begin to build theoretical foundations with which to improve various aspects of creative performance regardless of cultural background.

The question remains as to whether there has been ample evidence in the present study to suggest that the Taiwanese culture produces individuals who are less creative than their Canadian counterparts. Given the scope of the present study, there are certain limitations to the inferences that can be legitimately drawn from the findings. From a creativity aspect, we can only make inferences within a brainstorming context. It is within the context of brainstorming where we find the Canadians to surpass the Taiwanese in idea productivity. This one measurement may not be sufficient to support sweeping generalizations on the creativity of the Taiwanese. However, it does offer reason for reflection upon the state of their creativity. Taiwan's economic success over the past two decades has been based primarily on a hard work ethic rather than innovation. The Taiwanese have been very successful in importing and applying foreign concepts and technologies. Traditionally, they have been a culture constantly looking outward rather

than inward for innovation. Thus, it makes sense that their idea generating abilities would be weak relative to the Canadians. It is insufficient for an economy in the long run to rely only on outward innovations. The performance differential between the two cultures may be interpreted as an indication that a vital link is missing in the way the Taiwanese conduct their creative efforts. If it can be determined through future research that their creativity is indeed lacking on a societal scale, then measures should be taken to remedy the situation. However, such a course of action would not be so simple given that their collectivistic behavior is deeply embedded in their values.

The question also arises as to whether similar findings with respect to quality of ideas would take place if the country roles were reversed. In other words, suppose the exact same study was conducted, however this time all the data is rated in Taiwan. In this case, all the English data would be translated to Chinese and rated by Taiwanese raters. Would this factor change the findings of the experiment? The answer to this question is unclear. Although different cultures have different attitudes and approaches to creativity, the neutrality of the brainstorming tasks should serve to minimize any possible effect. However, a future endeavor into this type of cross-cultural rating could include raters from both cultures to see if there would be differences in the findings.

In addition to the analyses on the Taiwanese state of creativity, the current study also offers some insight into how businesses can better manage their creative efforts. From a marketing perspective, it is of great importance to define and prioritize market opportunities. However, it is just as important to be able to find those creative ideas,

which generate value for customers so that the potential of the identified opportunities can be tapped into. This is an important reason why better creative management is so crucial for businesses. Although the creative ideas generated are rarely the final product, these ideas do form the basis for further analysis. The findings of the present study suggests ways through which group ideation may be enhanced. Through the study, we have learned that a higher degree of individualism can lead to more productivity in brainstorming. Within the context of better creative performance, a higher degree of individualism implies a greater diversity in group participants, a greater freedom in expression, and a sentiment that conformity is not necessarily rewarded. These components should be an integral part of an ideation group. A greater diversity of participants implies that individuals with different backgrounds provide for greater potential in developing alternative ideas. Members should differ in various areas such as their particular expertise, their degrees of experience, their positions in the organization, and even their personalities. Greater freedom in expression implies that members should not be afraid to speak their mind. Thus, members should feel equal within the group. It may be ideal that during group ideation sessions, seniority be neutralized in order to establish an atmosphere of equality. This way, both intimidation and inhibition are reduced. Finally, group participants should not be given the impression that conformity is necessarily rewarded. An organizational philosophy, which strongly promotes conformity, may in fact promote an environment that is not conducive to creativity.

Given the prevalence of technologies such as air travel and telecommunications, the world has become seemingly smaller. Cross-cultural differences have become not only

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more noticeable, but also more important to understand. It is hoped that the present study has somewhat contributed to the ongoing research that is conducted in the interest of understanding different cultures. As was previously discussed, there are several directions in which further theorizing of creative differences between individualists and collectivists might develop. It is also hoped that the results of the present study will motivate further interest into the study of cross-cultural differences in creativity.

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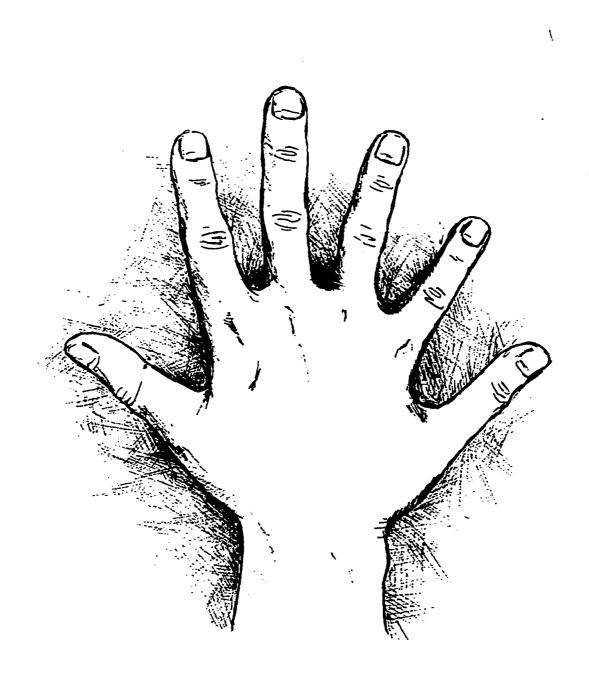
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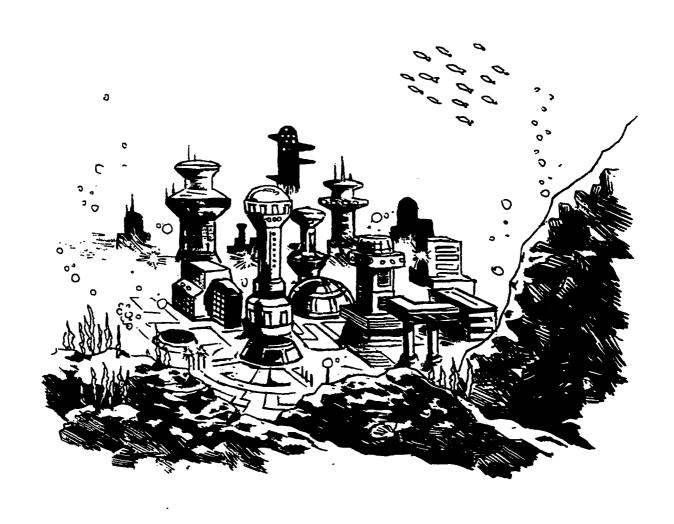
XI. Appendices

Appendix 1: The Conditions for both Individualists & Collectivists

GROUP	1st TASK (Individual/Thumbs)	2nd TASK (Group/Tourist)
1		
2		
3		
4		
5		
6		
7		
8		

GROUP	1st TASK (Individual/Tourist)	2nd TASK (Group/Thumbs)
9		
10		
11		
12		
13		
14		
15		
16		

GROUP	1st TASK (Group/Thumbs)	2nd TASK (Individual/Tourist)
17		
18		
19		
20		
21		
22		
23		
24		

GROUP	1ST TASK (Group/Tourist)	2nd TASK (Individual/Thumbs)
25		
26		
27		
28		
29		
30		
31		
32		

Appendix 2: Thumb and Underwater City

Appendix 3: Questionnaire

Please circle the appropriate response.

1) For the individual brainstorming task, how creative do you think your ideas were in comparison with the ideas of other individuals participating in this study?

Extremely   1   2   3   4   5   6   7   Extremely
Uncreative   Creative

2) For the group-brainstorming task, how creative do you think your group's ideas were in comparison with the ideas of other groups participating in the study?

Extremely   1   2   3   4   5   6   7   Extremely
Uncreative   Creative

Please indicate your degree of agreement by circling the appropriate response.

1) If a husband is a sports fan, a wife should also cultivate an interest in sports. If the husband is a stockbroker, the wife should also be aware of the current market situation.

Strongly Disagree   0   1   2   3   4   5   Strongly Agree

2) The decision of where one is to work should be jointly made with one's spouse, if one is married.

Strongly Disagree   0   1   2   3   4   5   Strongly Agree

3) In these days, parents are too stringent with their kids, thus stunting the development of initiative.

Strongly Disagree   0   1   2   3   4   5   Strongly Agree

4) Teenagers should listen to their parents' advice on dating.

Strongly Disagree   0   1   2   3   4   5   Strongly Agree

5) Even if the child won the Nobel Prize, the parents should not feel honored in any way.

Strongly Disagree   0   1   2   3   4   5   Strongly Agree

6) I would not share my ideas and newly acquired knowledge with my parents.

Strongly Disagree   0   1   2   3   4   5   Strongly Agree

7) I would not let my needy mother use the money that I have saved by living a less than luxurious life.

Strongly Disagree   0   1   2   3   4   5   Strongly Agree

8) I would not let my parents use my car (if I have one), whether they are good drivers or not.

Strongly Disagree   0   1   2   3   4   5   Strongly Agree

9) Children should not feel honored even if the father was highly praised and given an award by a government official for his contribution and service to the community.

Strongly Disagree   0   1   2   3   4   5   Strongly Agree

10) Young people should take into consideration their parents' advice when making education/career plans.

Strongly Disagree   0   1   2   3   4   5   Strongly Agree

11) Whether one spends an income extravagantly or stingily is of no concern to one's relatives (e.g. cousins, uncles).

Strongly Disagree   0   1   2   3   4   5   Strongly Agree

12) When deciding what kind of work to do, I would definitely pay attention to the views of relatives of my generation.

Strongly Disagree   0   1   2   3   4   5   Strongly Agree

13) When deciding what kind of education to have, I would pay absolutely no attention to my uncle's advice.

Strongly Disagree   0   1   2   3   4   5   Strongly Agree

14) Each family has its own problems unique to itself. It does not help to tell relatives about one's problems.

Strongly Disagree   0   1   2   3   4   5   Strongly Agree

15) I can count on my relatives for help if I find myself in any kind of trouble.

Strongly Disagree   0   1   2   3   4   5   Strongly Agree

16) I have never chatted with my neighbors about the political future of this state.

Strongly Disagree   0   1   2   3   4   5   Strongly Agree

17) I am often influenced by the moods of my neighbors.

Strongly Disagree   0   1   2   3   4   5   Strongly Agree

18) My neighbors always tell me interesting stories that have happened around them.

Strongly Disagree   0   1   2   3   4   5   Strongly Agree

19) I am not interested in knowing what my neighbors are really like.

Strongly Disagree   0   1   2   3   4   5   Strongly Agree

20) One need not worry about what the neighbors say about whom one should marry.

Strongly Disagree   0   1   2   3   4   5   Strongly Agree

21) I enjoy meeting and talking to my neighbors everyday.

Strongly Disagree   0   1   2   3   4   5   Strongly Agree

22) In the past, my neighbors have never borrowed anything from my family or me.

Strongly Disagree   0   1   2   3   4   5   Strongly Agree

23) One needs to be cautious in talking with neighbors, otherwise others might think that you are nosy.

Strongly Disagree   0   1   2   3   4   5   Strongly Agree

24) I don't really know how to befriend my neighbors.

Strongly Disagree   0   1   2   3   4   5   Strongly Agree

25) If possible, I would like co-owning a car with my close friends, so that it wouldn't be necessary for them to spend much money to buy their own cars.

Strongly Disagree   0   1   2   3   4   5   Strongly Agree

26) I like to live close to my close friends.

Strongly Disagree   0   1   2   3   4   5   Strongly Agree

27) To go on a trip with friends makes one less free and mobile. As a result, there is less fun.

Strongly Disagree   0   1   2   3   4   5   Strongly Agree

28) It is a personal matter whether I worship money or not. Therefore it is not necessary for my friends to give any counsel.

Strongly Disagree   0   1   2   3   4   5   Strongly Agree

29) The motto "sharing in both blessing and calamity" is still applicable even if one's friend is clumsy, dumb, and causes a lot of trouble.

Strongly Disagree   0   1   2   3   4   5   Strongly Agree

30) One needs to return a favor if a colleague lends a helping hand.

Strongly Disagree   0   1   2   3   4   5   Strongly Agree

31) There is everything to gain and nothing to lose for classmates to group themselves for study and discussion.

Strongly Disagree   0   1   2   3   4   5   Strongly Agree

32) Classmates' assistance is indispensable to getting a good grade at school.

Strongly Disagree   0   1   2   3   4   5   Strongly Agree

33) I would like to help if a colleague at work told me that he/she needed money to pay utility bills.

Strongly Disagree   0   1   2   3   4   5   Strongly Agree

Please provide the following information about yourself.

Age: _____

Sex: _____

Ethnic Background: _____

Area of study: _____

Appendix 4: Instructions for Creativity Coders

Please rate the following ideas according to originality on a 5-point scale. Originality will be defined as "the degree of commonality of the idea". The scale will range from 1 = a very unoriginal idea (*Anyone would have thought of that.*) to 5 = a very original idea (*I would have never thought of that.*). Do not take into consideration the feasibility, practicality, or effectiveness of the ideas. For instance, an idea that is highly original may not be feasible in its application in the real world. Moreover, do not take into consideration the absurdity of the ideas. For instance, an idea that you think is completely ridiculous may very well be a highly original idea. The scale should be regarded as the following.

1	2	3	4	5
very unoriginal	unoriginal	moderately original	original	very original

Simply indicate your score beside each idea.

If the number 1, 2, 3, 4, 5, or 6 is indicated on the top of the first sheet, the ideas refer to Task 1.

If the number 7, 8, or 9 is indicated on the top of the first sheet, the ideas refer to Task 2.

If the number 10 is indicated on the top of the first sheet, please refer to Task 1 & Task 2.

Task 1.

Imagine an inhabited city under the ocean. Come up with as many ways you can think of to attract more tourists to this underwater city.

Task 2

Imagine that starting next year, everyone in the world will grow an extra thumb on each hand. Come up with as many of the possible benefits of having an extra thumb on each hand.

Note

- Some ideas may be less clear or less descriptive than others. Do not worry about that. If an idea seems unclear, vague, or broad, that is okay. Just rate it according to how you perceive it.

- You may come across some ideas that are similar to others. That is okay. Just rate it according to how you perceive it.

Appendix 5: Scoring Scheme for the Shortened INDCOL Scale

1. Colleagues and friends/supportive exchanges (CF) = F8 + C9 + C3 + C7 + C8 + F3 – F7 – F6[1]

   This translates into CF = 29) + 33) + 30) + 31) + 32) + 26) – 28) – 27)[2]

2. Parents/consultation and sharing (PA) = P4 + P13 – P10 – P9 – P7

   This translates into PA = 4) + 10) – 8) – 7) – 6)

3. Kin and neighbors/susceptibility to influence (KN) = N3 + N2 + K5 + K8 + F2 – K7 – K3 – N5 – K6

   This translates into KN = 18) + 17) + 12) + 15) + 25) –14) – 11) – 20) – 13)

4. Parents and spouse/distinctiveness of personal identity (PS) = S7 + S1 – P5 – P11 – P2

   This translates into PS = 2) + 1) – 5) – 9) – 3)

5. Neighbor/social isolation (NE) = N6 - N9 – N7 – N4 – N1 – N8

   This translates into NE = 21) – 24) – 22) – 19) – 16) – 23)

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[1] This is how the scoring scheme is presented in the INDCOL questionnaire from Hui & Yee (1994). For example, (CF) is derived from adding the scores of questions F8, C9, C3, C7, C8, and F3, and then subtracting the scores of questions F7 and F6.

[2] This is how the questions in the present study correlate to Hui & Yee's scoring scheme. For example, 29) refers to F8, 33) refers to C9, 30) refers to C3, and so on.