

The Influence of Culture on Consumer Impulsive Buying Behavior

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Impulse buying generates over \$4 billion in annual sales volume in the United States. With the growth of e-commerce and television shopping channels, consumers have easy access to impulse purchasing opportunities, but little is known about this sudden, compelling, hedonically complex purchasing behavior in non-Western cultures. Yet cultural factors moderate many aspects of consumer's impulsive buying behavior, including self-identity, normative influences, the suppression of emotion, and the postponement of instant gratification. From a multi-country survey of consumers in Australia, United States, Hong Kong, Singapore, and Malaysia, our analyses show that both regional level factors (individualism–collectivism) and individual cultural difference factors (independent–interdependent self-concept) systematically influence impulsive purchasing behavior.

Impulsive consumer buying behavior is a widely recognized phenomenon in the United States. It accounts for up to 80% of all purchases in certain product categories (Abrahams, 1997; Smith, 1996), and it has been suggested that purchases of new products result more from impulse purchasing than from prior planning (Sfiligoj, 1996). A 1997 study found that an estimated \$4.2 billion annual store volume was generated by impulse sales of items such as candy and magazines (Mogelonsky, 1998). Paco Underhill, author of *Why We Buy: The Science of Shopping* (1999), affirms that many purchases are being made on the premises of stores themselves as customers give in to their impulses. Furthermore, technologies such as television shopping channels and the Internet expand consumers' impulse purchasing opportunities, increasing both the accessibility to products and services and the ease with which impulse purchases can be made.

Impulsive buying behavior is a sudden, compelling, hedonically complex purchasing behavior in which the rapidity of the impulse purchase decision process precludes

thoughtful, deliberate consideration of all information and choice alternatives (Bayley & Nancarrow, 1998; Rook 1987; Thompson, Locander, & Pollio, 1990; Weinberg & Gottwald, 1982). This description is largely based on interviews and surveys of Westerners.

The growth of e-commerce and the increasing consumer-orientation of many societies around the world offer expanding occasions for impulse purchasing, but little is known about impulsive buying behavior in non-Western societies. Most of the research on impulse buying focuses on consumers in the United States. A few studies have looked at consumers in Great Britain (Bayley & Nancarrow, 1998; Dittmar, Beattie, & Friese, 1995; McConatha, Lightner, & Deaner, 1994), and South Africa (Abratt & Goodey, 1990) and have found that United States consumers tend to be more impulsive than comparable British and South African samples. However, none of these studies examined explicitly the effect of cultural factors on impulse buying behavior.

A recent special issue of the *Journal of Consumer Psychology* dealt with cultural issues demonstrating the growing interest in cultural differences in consumer behavior and highlighted the importance of understanding the cultural context of consumer behavior in an increasing globalized marketplace (Maheswaran & Shavitt, 2000). We believe that

cultural factors significantly influence consumers' impulsive buying behavior. Specifically, the theory of individualism and collectivism holds important insights about consumer behavior that can help us to gain a better, more complete understanding of the impulsive buying phenomenon. Consistent with this interest in cultural differences, this article examines the effect of regional level (individualist–collectivist) and individual difference level (independent–interdependent self-concept) cultural factors on consumers' impulsive buying behavior. Utilizing a multi-country sample of over a thousand consumers from both Western and Eastern cultures, we investigate how culture systematically moderates impulse buying behavior. This is especially important as shopping is a major leisure activity in many East Asian countries (Wong & Ahuvia, 1998), including Singapore, Hong Kong, and Japan.

IMPULSE BUYING

Impulse buying is defined as “an unplanned purchase” that is characterized by “(1) relatively rapid decision-making, and (2) a subjective bias in favor of immediate possession” (Rook & Gardner, 1993, p. 3; see also Rook, 1987; Rook & Hoch, 1985). It is described as more arousing, less deliberate, and more irresistible buying behavior compared to planned purchasing behavior. Highly impulsive buyers are likely to be unreflective in their thinking, to be emotionally attracted to the object, and to desire immediate gratification (Hoch & Loewenstein, 1991; Thompson et al., 1990). These consumers often pay little attention to potential negative consequences that may result from their actions (Hoch & Loewenstein, 1991; Rook, 1987; see also O’Guinn & Faber, 1989).

Previous research conducted in the United States and Great Britain (individualist cultures) has shown that many factors influence impulsive buying behavior: the consumer’s mood or emotional state (Donovan, Rossiter, Marcolyn, & Nesdale, 1994; Rook, 1987; Rook & Gardner, 1993; Weinberg & Gottwald, 1982), trait buying impulsiveness (Puri, 1996; Rook & Fisher, 1995; Weun, Jones, & Beatty, 1998), normative evaluation of the appropriateness of engaging in impulse buying (Rook & Fisher, 1995), self-identity (Dittmar et al., 1995), and demographic factors, such as age (e.g., Bellenger, Robertson, & Hirschman, 1978; Wood, 1998).

Several studies demonstrate the effect of consumers’ moods and affective states on impulsive buying behavior. Rook and Gardner (1993) found that consumers’ positive moods were more conducive to impulsive buying than negative moods, although impulse buying occurred under both types of moods. Beatty and Ferrell (1998) also found that a consumer’s positive mood was associated with the urge to buy impulsively, while the impulse buyers in Weinberg and Gottwald’s (1982) study were more “emotionalized” than nonbuyers. Donovan et al. (1994) discovered a positive association between consumers’ feelings of pleasure in the shop-

ping environment and impulse buying behavior. In each of these studies, pleasurable feelings led to increased unplanned spending.

Cognitive, clinical, social, developmental, and consumer psychologists have studied the general trait of impulsiveness and impulse control (Eysenck & Eysenck, 1978; Eysenck, Pearson, Easting, & Allsopp, 1985; Helmers, Young, & Pihl, 1995; Hilgard, 1962; Logue & Chavarro, 1992; Logue, King, Cavarro, & Volpe, 1990; Mischel, 1961; Puri, 1996; Rawlings, Boldero, & Wiseman, 1995; Rook & Fisher, 1995; Weun et al., 1998). Trait impulsiveness is characterized by unreflective actions (Eysenck et al., 1985) and is significantly correlated with thrill-seeking (Weun et al., 1998), and the psychological need to maintain a relatively high level of stimulation (Gerbing, Ahadi, & Patton, 1987). Rook and Fisher (1995) recently developed a nine-item measure of trait buying impulsiveness that was significantly correlated with impulse buying behavior. In addition, they found that consumers’ normative evaluation of the appropriateness of engaging in impulse buying in a particular situation moderates an individual’s trait impulsiveness. Specifically, when consumers believe that impulse purchasing is socially acceptable, they act on their impulsive tendencies, but when it is socially unacceptable these tendencies may be thwarted.

The literature on compulsive shopping (Elliot, 1994), self-gifts (Mick, DeMoss, & Faber, 1992), and impulse purchases (Dittmar et al., 1995) highlights the role of perceived social image and the expression of self-identity in the purchase decision. Dittmar et al. (1995) hypothesized that impulse purchases were more likely to be items that symbolize the preferred or ideal self and as such should be affected by social categories such as gender. They argued that women value their possessions for emotional and relationship-oriented reasons, whereas men value their possessions for functional and instrumental reasons. The results of the study supported their hypothesis: Men reported more personal (independent) identity reasons for their purchases whereas women reported more social (relational) identity reasons.

An individual’s impulsive behavior tendencies have also been related to demographic characteristics such as a consumer’s age. Based on a national sample of adults in the United States, Wood (1998) found an inverse relationship between age and impulse buying overall. However, the relationship is non-monotonic — between the ages of 18 and 39 impulse buying increases slightly and thereafter declines. This is consistent with Bellenger et al. (1978) who found that shoppers under 35 were more prone to impulse buying compared to those over 35 years old. Research on trait impulsiveness indicates that younger individuals score higher on measures of impulsivity compared to older people (Eysenck et al., 1985; Helmers et al., 1995; Rawlings et al., 1995) and demonstrate less self-control than adults (Logue & Chavarro, 1992). Because impulsiveness is linked to emotional arousal, this finding concerning the relationship between age and impulsiveness is consistent with studies of emotions and emo-

tional control. Research shows that older individuals demonstrate greater regulation of emotional expression than do younger adults (Lawton, Kleban, Rajogopal, & Dean, 1992; McConatha et al., 1994; Siegel, 1985). These findings suggest that as consumers age, they learn to control their impulsive buying tendencies.

Interestingly, the factors that have been linked to impulsive purchasing are also likely to be influenced by culture. The theory of individualism and collectivism offers several insights into many of the variables that have been linked to impulsive buying behavior, including self-identity, normative influences, the suppression of emotion, and postponement of instant gratification (see Triandis, 1995 for a review). In the next section, we discuss this theory and demonstrate that it is well suited to the study of impulse buying.

INDIVIDUALISM AND COLLECTIVISM

Triandis (1995) defined collectivism as a social pattern that consists of individuals who see themselves as an integral part of one or more collectives or in-groups, such as family and co-workers. People who are more collectivist are often motivated by norms and duties imposed by the in-group, give priority to the goals of the in-group, and try to emphasize their connectedness with the in-group. He defines individualism as a social pattern that consists of individuals who see themselves as autonomous and independent. People who are more individualist are motivated by their own preferences, needs, and rights, give priority to their personal goals, and emphasize a rational analysis of their relationships with others (Triandis, 1994). These social patterns are expected to influence impulsive purchasing behavior through their affect on a person's self-identity, responsiveness to normative influences, and the need (or lack of need) to suppress internal beliefs in order to act appropriately.

The tendency to focus on group preferences and group harmony in collectivist cultures leads to an ability to repress internal (personal) attributes in certain settings. Accordingly, people in collectivist cultures often shift their behavior depending on the context or what is "right" for the situation. Among collectivists a person is generally seen as more mature when s/he puts personal feelings aside and acts in a socially appropriate manner rather than in a way consistent with personal attitudes and beliefs (Triandis, 1995). Consequently, it has been found that attitude-intention (Bagozzi, Wonge, Abe, & Bergami, 2000; Lee, 2000) and attitude-behavior relationships (Kashima, Siegal, Tanaka, & Kashima, 1992) are weaker in collectivist than individualist cultures. This pattern is likely to carry over to the impulse trait-behavior relationship.

Collectivist cultures also emphasize the control and moderation of one's emotions more so than individualistic cultures (Potter, 1988; Russell & Yik, 1996; Tsai & Levenson, 1997). For instance, the maintenance of harmony within the

group is dependent on members' ability to manage their emotions. In short, culture is likely to impact an individual's emotional experiences by determining the appropriate expression of one's feelings (McConatha, 1993). Culture influences both "feeling rules," how an individual interprets the environment, and "display rules," which emotions are expressed and how they are expressed (Ekman, 1972). For instance, people from Asian (collectivist) cultures have been found to control negative emotions and only display positive emotions to acquaintances (Gudykunst, 1993). Given that impulsiveness is related to sensation-seeking and emotional arousal (Rook, 1987; Weinberg & Gottwald, 1982), it is likely that people in collectivist cultures learn to control their impulsive tendencies more than people from individualist cultures. In fact, children in collectivist cultures are socialized to control their impulses at an early age (Ho, 1994).

In individualist cultures, people often ignore the potential negative consequences of their impulsive buying behavior (see Rook, 1987), preferring to focus on the positive consequences of their actions and on their own feelings and goals. This may not be true for people from collectivist cultures, who are more likely to focus on the potential negative consequences of their behavior and the effect of their actions on in-group members (Triandis, 1995). The greater likelihood that people in collectivist cultures will consider the negative consequences of their actions makes the suppression of the impulse trait-behavior relationship more probable.

These differences between individualists and collectivists are best explained by examining the tenants on which the cultural patterns of individualism and collectivism are based. As Kim, Triandis, Kagiycibasi, Choi, and Yoon (1994) explained Western individualist societies are based on the tenant of liberalism. In these societies individuals are encouraged to be rational and are given individual rights to define their own goals and choose freely. Conversely, East Asian collectivist societies are based on Confucianism, which promotes common goals and social harmony over individual interests. Within each society these differences are reinforced at the cultural level through social institutions such as schools, workplaces, and families, so that even very ambitious (i.e., more individualist) people who grow up in China are likely to be better at controlling their impulses and emotions than very family-focused (i.e., more collectivist) people from the United States. In collectivist societies individuals are encouraged to suppress their own hedonic desires in favor of group interests and goals. From this we conclude the following:

H1a: The relationship between trait buying impulsiveness and impulsive buying behavior will be stronger among people from individualist cultures compared to people from collectivist cultures.

Several researchers have emphasized the importance of examining the influence of culture at the individual level as well as at the national level (e.g., Kim et al., 1994; Schwartz,

1994; Singelis & Brown, 1995; Triandis, 1994, 1995). According to Triandis (1994), "All of us carry both individualist and collectivist tendencies; the difference is that in some cultures the probability that individualist selves, attitudes, norms, values, and behaviors will be sampled or used is higher than in others" (p. 42). Consequently, people from collectivist cultures should be more likely to rely on a more interdependent self-concept and people from individualist cultures should be more likely to rely on a more independent self-concept in any given situation. Singelis (1995) defined an *interdependent self-concept* as one emphasizing "(a) external, public features such as statuses, roles, and relationships, (b) belonging and fitting in, (c) occupying one's proper place and engaging in appropriate action, and (d) being indirect in communication and 'reading others' minds,'" and an *independent self-concept* as one emphasizing "(a) internal abilities, thoughts, and feelings; (b) being unique and expressing the self; (c) realizing internal attributes and promoting one's own goals; and (d) being direct in communication" (p. 581).

We expect that measuring self-concept at the individual level across cultures should produce parallel although not identical results to the cultural (i.e., regional) level analysis. Although a person's self-concept reveals the parts of culture that have been internalized by that individual, it does not fully explain differences that may be due to the influence of social institutions, which emphasize the suppression of hedonic desires in favor of group interests and goals. Thus, at the individual level across societies, we expect to find a similar pattern of trait-behavior relationships, although the differential effect of culture should be somewhat weaker than at the regional-national level.

H1b: The relationship between trait buying impulsiveness and impulsive buying behavior will be stronger for individuals classified as having a more independent (individualist) self-concept as compared to those classified as having a more interdependent (collectivist) self-concept.

In addition, because control and moderation of one's emotions is emphasized more strongly in collectivist cultures, consumers from these cultures are more likely to suppress the emotional component of their impulse buying experience than those from individualist cultures.

H2: The emotional factors of pleasure and arousal that characterize impulsive buying behavior will be more positively related to impulsive buying behavior among individualists than among collectivists.

However, pleasure and arousal may be universal components of spontaneous buying behavior, and ones shared by people in both individualist and collectivist cultures. If so, then feelings of pleasure and arousal will be positively related

to impulse buying behavior among both individualists and collectivists. Given the lack of research into impulse buying in non-Western societies, one of the objectives of our research is to determine in what ways impulsive buying behavior differs across cultural contexts.

Finally, the moderating influence of age is expected to affect the impulsive buying behavior of people from collectivist cultures earlier than those from individualist cultures. Given that adults in individualist cultures have demonstrated a slight increase in impulsive buying into their late 30's (Wood, 1998), we do not anticipate a decline in impulsive buying behavior for college-aged individualists. Conversely, because people in collectivist cultures learn at an earlier age to control their emotions and behavior, we expect age to negatively impact impulse buying once collectivists reach college age.

H3: Age will negatively impact impulse buying to a greater extent for collectivists compared to individualists, in their early adult years.

METHOD

Overview

Two studies were conducted to measure the influence of culture on consumers' impulsive buying behavior. The preliminary study concentrates on a parsimonious explanation of impulsive buying behavior: The basic hypothesis is that consumers with a personality trait of impulsiveness will make more frequent impulsive purchases, but that this relationship will be more moderate in collectivist cultures. The main study examines this effect but also controls for the effect of affective states and age variables on impulsive buying behavior to better understand this complex buying behavior within different cultural contexts.

In these studies, surveys were administered to students and non-students in highly individualist and highly collectivist countries purposefully selected from their positioning on Hofstede's (1991) ranking of individualism to include the United States (individualism score = 91) and Australia (90) as highly individualistic countries and Singapore (20), Malaysia (26), and Hong Kong (25) as highly collectivist countries. In each study, cultural differences were compared at two levels of analysis: cultural region (Western Individualist vs. Eastern Collectivist) and individual level (independent vs. interdependent self-concept). Using both levels helps to address some of the more common criticisms associated with cross-cultural research. Although using cultural region as an indicator of individualism and collectivism offers the advantage of capturing the more complex nature of the construct, it also includes the disadvantage of adding between-country variance to the often problematic within-country variance found in cross-cultural research. On the other hand, using people's self-concept as an indicator of their level of individ-

ualism and collectivism measures the within-country variances, recognizing that each person internalizes national and institutional influences to a greater or lesser extent, but it fails to pick up the more complex nature of the construct. Using an individual level measure of culture in addition to a regional or national level measure adds confidence that the results are due to the construct of culture regardless of its measurement (see Maheswaran & Shavitt, 2000; Schwartz, 1994; Singelis & Brown, 1995; Triandis, 1994, 1995).

PRELIMINARY STUDY

Participants and Measures

A survey was administered to 706 students and non-students in four countries, two individualistic countries (Australia and United States) and two collectivist countries (Singapore and Malaysia). As part of a larger study, participants were asked to complete a questionnaire concerning a recent impulsive purchase, defined in this questionnaire as, "one in which you experience a sudden unexpected urge to buy something that you cannot resist. Impulse purchases occur while a person is in the store and involve rapid decision making." The survey included questions on impulsive purchasing behavior, respondents' independent and interdependent self-concept (Singelis, 1994), trait buying impulsiveness (Rook & Fisher, 1995), and demographic items including the country in which respondent currently lives, and whether this country is the one she or he has lived in most of his or her life.

A single measure of impulsive buying behavior was used for this preliminary study. The item, "How often do you buy things on impulse?" was measured on a 4-point scale from 1 (*almost every day*) to 4 (*almost never*). The summary statistics for this item are reported in Table 1.

Respondents were classified into cultural groupings based both on their cultural region and their individual self-concept score as follows. At the cultural region level, respondents were classified into two groups based on their country of residence: individualist (Australia and United States) or collectivist (Malaysia and Singapore). Those respondents who had not lived in their country for most of their life were excluded from the sample at this level of analysis. The resulting samples comprised 245 respondents from the individualist region ($n = 131$ from Australia and $n = 114$ from the United States) and 344 respondents from the collectivist region ($n = 160$ from Malaysia and $n = 184$ from Singapore). The cultural classification procedure developed by Triandis (1995) was used to group participants at the individual level of culture. Respondents indicated their level of agreement with 12 independence and 12 interdependence self-concept statements found in Singelis (1994) on 9-point strongly disagree-strongly agree scales. These two self-concept scales have been used frequently in cross-cultural research with consistent results and in this study each scale received a satis-

factory level of reliability in each sample, using Nunnally's (1978) criteria of $\alpha > .70$. The 12 interdependent items and 12 independent items were each averaged, and respondents were trichotomized with a score of 1, 2, or 3 on each. The independent score was reversed and added to the interdependent score to produce a measure of independence-interdependence on a scale of 2 to 6. Those respondents who scored a 2 or 3 were classified as independent ($n = 217$), those who scored a 5 or 6 were classified as interdependent ($n = 207$) and those who scored 4 were classified as neither and removed from the analysis at the individual self-concept level.

The personality trait of buying impulsiveness was initially measured using Rook and Fisher's (1995) nine trait-buying-impulsiveness-scale items, measured on 5-point strongly disagree-strongly agree scales. This scale achieved satisfactory levels of reliability (ranging from .79 to .92) in each of the country samples (Nunnally, 1978). However, it is possible that the nine items measure slightly different constructs in different cultures and if so, the impulse model may fit poorly (see Marsh & Byrne, 1993). All nine of the trait impulsiveness items were factor analyzed across cultural regions and reduced to a sub-scale of four items¹ that were most consistent across different cultures (for details see Appendix A).

Of course, we predict that people with higher trait buying impulsivity will make more frequent impulse purchases, but we also hypothesize that for consumers in individualist cultures the trait-behavior relationship will be stronger than for consumers in collectivist cultures. To test this, a comparison of correlations and their variation across cultural groupings was conducted.

Results

As seen in the top portion of Table 2, the correlation between trait and behavioral impulsiveness equals 0.64 for individualist cultures and 0.40 for collectivists. Similarly, the correlation between trait and behavioral impulsiveness equals 0.59 for independent and 0.46 for interdependent self-concepts of culture. All of these correlations are significantly positive at the .001 level as expected.

As hypothesized, the buying impulsiveness trait was more strongly associated with impulse buying behavior for the individualist than for the collectivist groups. Fisher's z -transformations revealed that the correlations differed significantly in the expected direction at both the cultural region ($z = 3.87, p < .001$) and the individual self-concept ($z = 1.93, p < .05$) levels of analysis (see Table 2). As expected, the effect was more distinct at the regional level than at the individual level of measurement of culture. Notably, the results

¹ 'Just do it' describes the way I buy things; (2) 'I see it, I buy it' describes me; (3) 'Buy now, think about it later' describes me; and (4) I often buy things without thinking.

showed stronger support for our hypothesis at both levels of analysis when we compared the partial correlations after controlling for variances (cultural region, $z = 6.27, p < .001$; individual difference, $z = 4.40, p < .001$).

Discussion

The results from our preliminary investigation indicate a stronger relationship between trait buying impulsiveness and impulsive buying behavior for individualists compared to collectivists, which suggests that collectivists are less driven than individualists to act on their trait buying impulsiveness

by making an impulse purchase. Our finding is consistent with other research that indicates the attitude-behavior relationship is weaker in collectivist than in individualist cultures (Kashima et al., 1992). This evidence suggests that culture does moderate the impulse trait-behavior relationship.

Although this finding highlights a significant difference between consumers in Western versus Eastern cultures, it is important to examine other variables that may also differentially affect the impulsive buying behavior of individualists compared to collectivists. The impulse buying literature suggests that consumers' emotional states and their age influence their impulsive buying behavior, yet the theory of individualism and collectivism would predict a less important role for

TABLE 1
Description of Measures and Summary Statistics for Scales

Description of Measures	Individualist Region (n = 230)		Collectivist Region (n = 318)	
	M	SD	M	SD
Preliminary Study				
Impulsive buying behavior (4-point)*	2.03	0.72	2.09	0.52
Trait buying impulsive sub-scale (5-point)**	2.53	0.97	2.59	0.81
“Just do it” describes the way I buy things	2.90	1.17	3.03	1.06
“I see it, I buy it” describes me	2.42	1.13	2.57	1.02
“Buy now, think about it later” describes me	2.34	1.12	2.37	1.03
I often buy things without thinking	2.46	1.11	2.36	0.94
Main Study				
<i>Caucasian (n = 167)</i>				
<i>Asian (n = 233)</i>				
Impulsive buying behavior (number of times in last month)	4.68	4.51	3.29	2.89
Trait buying impulsiveness sub-scale (7-point)	4.23	1.57	4.12	1.30
When I go shopping, I buy things that I had not intended to purchase ***	4.18	1.87	4.17	1.59
I am a person who makes unplanned purchases***	4.38	1.92	3.98	1.68
When I see something that really interests me, I buy it without considering the consequences****	3.66	1.98	3.98	1.82
I avoid buying things that are not on my shopping list (r)****	4.70	1.63	4.35	1.65
Arousal scale (8-point semantic differential scales)				
Stimulated–relaxed (r)	5.63	1.64	4.78	1.85
Calm–excited	5.41	1.76	5.22	1.67
Frenzied–sluggish (r)	5.01	1.16	4.76	1.10
Unaroused–aroused	5.91	1.23	5.55	1.12
Pleasure scale (8-point semantic differential scales)				
Happy–unhappy (r)	6.49	1.09	5.98	1.32
Annoyed–pleased	6.38	1.22	5.86	1.28
Unsatisfied–satisfied	6.39	1.16	5.91	1.21
Contented–melancholic (r)	5.81	1.33	5.24	1.20

Note. Items with an (r) are negatively worded and are scored inversely. Items with one asterisk are measured as 1) almost every day, 2) often, 3) sometimes, 4) never. Items with two asterisks are measured as 1) strongly disagree, 2) disagree, 3) neither, 4) agree, 5) strongly agree. Items with three asterisks are measured as 1) very rarely, 4) sometimes, 7) very often. Items with four asterisks are measured as 1) strongly disagree, 4) neither, 7) strongly agree.

TABLE 2
Correlations of Trait Buying Impulsiveness Subscale With Impulsive Buying Behavior and Entire Trait Buying Impulsiveness Scale

	<i>Correlation With Impulse Buying Behavior</i>	Z_1	$Z = Z_1 - Z_2$	<i>Z for Partial Correlations</i>	<i>Correlation With Entire Trait Scale</i>	<i>Sample Size</i>
Preliminary Study						
Individualist	.64***	.75	3.87***	6.27***	.91***	237
Collectivist	.40***	.42			.87***	336
Independent	.59***	.68	1.93**	4.40***	.90***	212
Interdependent	.46***	.49			.88***	201
Main Study						
Individualist	.49**	.54	.83	1.35*	.99***	194
Collectivist	.42**	.45			.97***	164
Caucasian	.51**	.57	1.94**	1.67**	.99***	173
Asia	.36**	.38			.98***	241
Independent	.53**	.59	1.88**	2.08**	.99***	127
Interdependent	.34**	.36			.97***	157

* $p < .10$. ** $p < .05$. *** $p < .001$ or smaller, one-tailed.

these variables in the behavior of collectivists due to cultural differences. We examine the effect of consumers' age and affective feelings in the main study, described next.

MAIN STUDY

Due to limitations inherent in using only one study to uncover the buying impulsiveness trait-behavior relationship, albeit a large survey in four different countries, we conducted a conceptual replication and extension. While this main study was carried out in a manner similar to the preliminary study, we varied the major measures using a different buying impulsiveness trait scale and a different measure of impulsive buying behavior to attempt to generalize our findings, as recommended by Lehmann (2001). Using a different but equally reliable measure of trait buying impulsiveness provides more assurance that our results reveal cultural influences and are not an artifact of the measures used. In addition, an attempt was made to better match the samples by using only University students. We also extended our analysis to include the effects of consumers' age and affective feelings, as these variables have been characterized as distinct components of impulsive buying behavior in previous (individualist) studies.

Participants and Measures

A survey was administered to 481 students at large universities in five countries: Australia ($n = 61$), the Midwestern United States ($n = 168$), Singapore ($n = 72$), Malaysia ($n = 53$), and Hong Kong ($n = 62$). Additional data gathered in Hawaii ($n = 65$) was separated from the Midwestern United States sample, as Hawaii has been found to be more collectiv-

ist than individualist due to the mixed cultural base (Kashima et al., 1995). Students were chosen in all five countries in an attempt to achieve demographically matched samples and thus minimize the variance in terms of age, education, and other potential confounds. The mean age across all respondents was 24 years (range 19 to 45 years).

As part of a larger study, participants were asked to respond to questions concerning a recent spontaneous clothing purchase, and then to answer a more general set of questions relevant to this study regarding their trait and behavioral impulsiveness.² The introduction to the questionnaire was similar to that of the preliminary study, except that the words "impulsive purchase" were replaced with "spontaneous clothing purchase." The word "impulsive" may be more value-laden in some cultures so the more neutral "spontaneous" was used, consistent with the historical operationalization of impulsive buying as "a purchase characterized by spontaneity" (O'Guinn & Faber, 1989, p. 150).

In this study, impulsive buying behavior was measured as, "How often have you bought things spontaneously in the last month?" Trait-buying impulsiveness was measured with the five-item scale from Weun et al. (1998), rather than the Rook and Fisher (1995) scale. Respondents' affective feelings when engaging in impulsive buying behavior were assessed

² Respondents were first queried about a recent spontaneous clothing purchase before being asked more general questions about their impulsive buying behavior in order to increase the saliency of the topic (see Sudman & Bradburn 1982). The product category of clothing was chosen for several reasons: (1) clothing was one of the most likely consumer goods to be purchased on impulse according to the Dittmar et al. study (1995), (2) clothing is a product purchased and worn by consumers of both sexes and all ages, and (3) it is a product that is readily available in each of the countries studied.

by eight semantic-differential scales measuring pleasure and arousal based on Russell and Pratt (1980). According to the Russell and Pratt model, two major dimensions, pleasure and arousal can represent all affective states.³ These pleasure-arousal scales have been used by others to assess consumers' affective responses (see Dawson, Bloch, & Ridgway, 1990; Donovan & Rossiter, 1982; Donovan et al., 1994; Havlena & Holbrook, 1986; Holbrook & Batra, 1987). As in the preliminary study, independent-interdependent self-concept was measured using Singelis' (1994) scales. In addition, several demographic items were included, such as the country in which respondent currently lives, whether this country is the one she or he has lived in most of his or her life, ethnicity, age, and sex. See Table 1 for scale items and summary statistics.

Respondents were classified into three cultural groupings: cultural region, individual difference (independent-interdependent self-concept), and self-reported ethnicity. As in the preliminary study, at the cultural region level respondents were classified into two groups based on their country of residence: individualist (Australia and United States – excluding Hawaii) and collectivist (Singapore, Malaysia, and Hong Kong). The resulting sample size was 197 respondents from the individualist region including Australia ($n = 42$) and the United States ($n = 155$), and 174 from the collectivist region including Singapore ($n = 66$), Malaysia ($n = 50$) and Hong Kong ($n = 58$). The reliabilities for Singelis' (1994) independence-interdependence scales were satisfactory in each country sample and the respondents were classified into two individual difference groups following the same procedure as in the preliminary study. At the ethnicity level, respondents were classified into two groups based on their self-reported ethnicity (coded as Caucasian and Asian). Table 3 details the percentage of respondents from each country allocated to the cultural region, individual difference, and ethnicity groups.

Respondents from the more collectivist countries (Singapore, Malaysia, and Hong Kong) were almost all of Asian ethnicity, and more often classified as interdependent than as independent. As expected, the Hawaiian sample shared the characteristics of collectivist countries. Respondents from the more individualist countries (Australia and the United States) showed more variation in both ethnicity and at the individual self-concept level. This is due to the larger international student population at the universities sampled in Australia and the United States. We expect this to impact our cultural region level analysis, but not the ethnicity or in-

dividual difference comparisons. For this reason reliabilities and equivalencies were assessed using the ethnicity groupings.

The five-item trait buying impulsiveness scale from Weun et al. (1998) achieved satisfactory levels of reliability (ranging from .68 to .88) in each country sample, although the reliabilities were noticeably lower for the collectivist countries than for the individualist countries. Next, all five items were submitted to a maximum likelihood exploratory factor analysis for each ethnicity group. Following the same procedure as in the preliminary study produced a 4-item scale⁴ accounting for 64% of the variance in the Caucasian sample and 52% of the variance in the Asian sample (see Table 1 for items included in this subscale and Appendix A for details of the factor analysis).

Using the same method, the four pleasure items and the four arousal items were submitted to maximum likelihood exploratory factor analyses for each cultural region (see Table 1 for the items and summary statistics). These constructs were found to be consistent across cultures, as demonstrated in Appendix B.

Results

Two traditional methods, Fisher's z -test and moderated regression analysis, were used to assess moderation for this study. The first was done to maintain comparability with our preliminary study; we tested the association between trait buying impulsiveness and impulsive buying behavior at the cultural region (individualist-collectivist), ethnicity (Caucasian-Asian), and individual difference (independent-interdependent self-concept) levels to determine whether the buying impulsiveness trait explains as much of the variation in impulsive buying behavior for one group as it does for the other. However, it is possible that the correlation of impulsive buying behavior with just a personality trait fails to distinguish the impact of trait from situational variables (like mood) or demographic variables (like age) that also vary within the sample. To deal with this a moderated regression analysis was also conducted to determine the differential contribution of trait buying impulsiveness, arousal, pleasure, and age across cultures.

First, the Fisher's z -test results of the cultural differences in trait-behavior impulsiveness correlations are consistent with the first study (see Table 2). A Fisher's z -transformation revealed that the correlations differed significantly at the ethnicity ($z = 1.94, p < .05$) and individual difference ($z = 1.88, p < .05$) levels, but not at the cul-

³The Russell-Pratt model represents a modification of Mehrabian and Russell's (1974) Pleasure-Arousal-Dominance paradigm. The third dimension, dominance, has been found to be less robust and not always replicable across studies (Russell, 1978; Watson & Tellegen, 1985). Russell deleted dominance in his later work arguing that it requires a cognitive interpretation and is not applicable to purely affective responses.

⁴(1) When I go shopping, I buy things that I had not intended to purchase; (2) I am a person who makes unplanned purchases; (3) When I see something that really interests me, I buy it without considering the consequences; and (4) I avoid buying things that are not on my shopping list.

TABLE 3
Cross-Tabulation of Respondents' Country by Ethnicity and Self-Concept

	Ethnicity			Self-Concept		
	Caucasian (%)	Asian (%)	Sample Size	Independent (%)	Interdependent (%)	Sample Size
Australia	78	22	55	44	56	36
United States	92	8	137	62	38	104
Hawaii	11	89	57	29	71	45
Singapore	—	100	71	32	68	38
Malaysia	—	100	51	26	74	31
Hong Kong	2	98	56	47	53	34
Collectivist	1	99	165	34	66	96
Individualist	94	6	171	60	71	124

tural region level, most likely due to the larger percentage of international students in our samples from Australia and the United States (although directional support for our hypothesis was found). For the more individualist groups, the buying impulsiveness trait was more strongly associated with how often a consumer bought something on impulse than it was for the corresponding collectivist groups, supporting our hypothesis. After controlling for the variances, these results increased in significance and the cultural region comparison reached significance at the $p < .10$ level (see Table 2).

Second, a moderated regression analysis was conducted to assess the influence of all the relevant independent variables on consumers' reported impulsive buying behavior. As previously stated, we expected the regional level variable, ethnicity, to capture the moderating effect of culture on impulsive buying behavior, but we also expected some within culture variation. To capture this, we included respondents' level of independent self-concept in the regression model. Respondents' level of independence, a continuous variable, was calculated by averaging the scores from the independence scale items and dividing that score by a sum of the average of respondents' scores on the independence scale items and interdependence scale items. Values closer to 1 indicate high independence while scores closer to zero indicate low independence. The influence of affective feelings of pleasure and arousal, and age on impulse buying was also assessed through regression analysis. The following multivariate regression equation was used to test the moderating effect of culture on impulsive buying behavior. Ethnicity grouping (CULTURE, with 1 = Caucasian, 0 = Asian) was treated as a moderator of the effects of trait buying impulsiveness (TRAITIMP), independence (INDEP), age (AGE), pleasure (PLEAS), and arousal (AROUS) on impulsive buying behavior (IMPBEHAVIOR):

$$\text{IMPBEHAVIOR} = a + b_1 \text{ CULTURE} + b_2 \text{ TRAITIMP} + b_3 \text{ INDEP} + b_4 \text{ AGE} (1)$$

$$+ b_5 \text{ PLEAS} + b_6 \text{ AROUS} + b_7 (\text{TRAITIMP} \times \text{CULTURE}) + b_8 (\text{INDEP} \times \text{CULTURE})$$

$$+ b_9 (\text{AGE} \times \text{CULTURE}) + b_{10} (\text{PLEAS} \times \text{CULTURE}) + b_{11} (\text{AROUS} \times \text{CULTURE}) + \text{error.}$$

Table 4 summarizes the empirical results. As expected from the preliminary study, in either culture a person who has more trait buying impulsiveness has made more spontaneous purchases in the previous month. The coefficients for the interaction terms, b_7 – b_{11} , indicating the moderating effect of Caucasian ethnicity on impulsive buying behavior can be found in Table 4 under the column heading “Difference between Caucasians and Asians.”

We predicted a positive parameter for the TRAITIMP \times CULTURE term. The results support our hypothesis with this parameter estimate being positive and significant ($b_7 = 0.88, t = 3.54, p = .001$) indicating that the Caucasian-Asian culture variable does moderate the influence of trait buying impulsiveness. That is, while the coefficient for trait buying impulsiveness (TRAITIMP) is positive and significant for both Caucasians ($b_2 + b_7 = 1.51, t = 8.36, p = .001$) and Asians ($b_2 = 0.63, t = 3.61, p = .001$) the influence of trait buying impulsiveness on impulsive buying behavior is stronger for the Caucasian sample.

The independence–interdependence cultural variable allows us to check for an additional self-concept effect within ethnicity group. The independence (INDEP) parameter is positive and significant for Caucasians ($b_3 + b_8 = 8.17, t = 2.11, p = .04$) but not significant for Asians. Among Asians a more independent sense of self does not contribute to more impulsive buying behavior but it does positively impact impulse buying among Caucasians. In other words, Asians regulate their impulsive buying behavior regardless of their individual level of independent self-concept. This finding is consistent with previous research that has found that while individuals in Asian cultures maintain both an independent and an interdependent sense of self (Markus & Kitayama, 1991),

TABLE 4
Moderated Regression Analysis for Impulsive Buying Behavior: Unstandardized Regression Coefficients

Variable	Caucasian		Asian		Difference Between Caucasians and Asians	
	Coefficient	t-Value	Coefficient	t-Value	Coefficient	t-Value
Trait Impulsiveness	1.51***	8.36	.63***	3.61	.88***	3.54
Independence	8.17**	2.11	3.42	.78	4.75	.81
Age	-.02	-.49	-.09**	-2.15	.07	.95
Pleasure	-.29	-.91	.12	.49	-.41	-1.03
Arousal	.06	.24	.52**	2.35	-.46	-1.35
Intercept	-3.89	-1.35	-1.98	-.69	-1.91	-.47
Adj R2	.25		.25			

Note. To get the t-statistics for the two cultures, two equivalent versions of equation (1) were estimated, the first using a dummy variable coding of "1" for Asian and "0" for Caucasian (see the "Caucasian" column) and a second reversing the coding, using "1" for Caucasian and "0" for Asian (see the "Asian" column). N = 414.

* $p < .10$. ** $p < .05$. *** $p < .01$ or smaller.

they are able to suppress their independent self in certain situations, putting aside their own preferences in order to act appropriately (Triandis, 1995).

The moderating influence of age was expected to negatively affect collectivists' impulsive buying behavior at a younger age than individualists. As predicted, the age coefficient is negative and significant for the Asian sample ($b_4 = -.09$, $t = -2.15$, $p = .03$), suggesting that impulse buying decreases with age among college-aged Asian students. Although directionally consistent, the age coefficient for Caucasians is nonsignificant. This is consistent with previous research, which found an increase in impulse buying among United States consumers in their 20s, with declines occurring after the mid-30s (Bellenger et al., 1978; Wood, 1998). Ninety percent of the Caucasian sample was under 30 years old.

The contribution of affective feelings to impulsive buying behavior was surprising. While the arousal coefficient (AROUS) is nonsignificant for the Caucasian sample, it is positive and significant for Asian sample ($b_6 = .52$, $t = 2.35$, $p = .02$), suggesting that Asians' impulsive buying behavior is responsive to feelings of excitement or arousal, while Caucasians' behavior is not. No significant effect of pleasure was produced for either group. In addition, the interaction terms between pleasure and culture and arousal and culture were not significant. This is discussed further in the next section.

Discussion

The results of the main study provide further evidence that culture affects the relationship between trait buying impulsiveness and impulsive buying behavior at the cultural grouping and individual difference levels. Compared to Caucasians, Asians engage in less impulse buying behavior due to trait buying impulsiveness. In addition, independence—an individual level measure of cultural influence—was not shown to impact Asians' impulsive buying behavior, although it did contribute

to impulsive buying among Caucasians. For Caucasians, the more independent their self-concept, the more impulsive buying behavior they are likely to engage in. This finding reveals the powerful and consistent influence of culture at both the ethnicity level and the individual level. Furthermore, this difference occurs despite similar levels of trait buying impulsiveness among our different cultural groups. Although there is no significant difference in trait buying impulsiveness between Caucasians and Asians there is a difference in their impulsive buying behavior.⁵

In addition, at the college-age level (range 18–45 years, mean 24 years in both samples), getting older reduces impulsive buying among our Asian sample but does not have a significant effect on our Caucasian sample. This is consistent both with our hypothesis for the Asian sample and with previous research on Caucasians (Bellenger et al., 1978; Wood, 1998). A separate regression investigating the influence of age on trait buying impulsiveness indicated that trait buying impulsiveness decreases with age among Asians but not Caucasians. Our results confirm that the moderation of behavior occurs earlier for Asians compared to Caucasians.

Unexpectedly, affective feelings played a greater role in the impulsive buying behavior of Asians compared to Caucasians. For our sample of Asians, heightened arousal promoted impulsive buying. One possibility is that trait buying impulsiveness captures the contributing influence of affective feelings of pleasure and arousal on impulsive buying behavior for Caucasians. It should be noted that the reliabilities for the pleasure and arousal scales were not high for either Caucasians or Asians. The affective feelings associated with impul-

⁵The difference in trait impulsiveness for Caucasians (see Table 1 where $M = 4.23$, $SD = 1.57$) and Asians ($M = 4.12$, $SD = 1.30$), $t = .78$, is not significant at 5% with 331 degrees of freedom. Caucasians engage in significantly more impulse buying ($M = 4.68$, $SD = 4.51$) than Asians ($M = 3.29$, $SD = 2.89$), since $t = 3.56$, has a $p < .001$ for 271 observations.

sive buying behavior may be difficult to assess retroactively through a survey instrument. It is also possible that these scales do not accurately measure the affective states Asians experience while making impulse purchases. Clearly, additional research is called for to help clarify these issues.

GENERAL DISCUSSION

Attempts to understand consumer impulse buying behavior based solely on a Western point-of-view is incomplete, at best. The Western-individualist emphasis on the self, individual needs and desires, and hedonistic pleasure encourages impulsive buying behavior. However, Eastern-collectivist notions of the self, which emphasize interdependence, emotional control and moderation, and group needs and desires would seem to discourage impulse buying behavior as it is practiced and described in the West. Due consideration of these differences is warranted.

As Rook (1987) correctly stated, buying impulses are presumed to be largely universal in nature, but local market conditions, systems of exchange and various cultural forces will impact how consumers operate on impulse. The findings of the articles in the recent special issue of the *Journal of Consumer Psychology* confirmed that cultural differences are a significant factor and need to be taken into account in our theories of consumer behavior. Our findings demonstrate that culture does have an influence on impulse buying behavior.

Although previous researchers have explored the influence of mood and emotions (Donovan et al., 1994; Rook & Gardner, 1993), trait impulsiveness (Rook & Fisher, 1995; Weun et al., 1998), norms (Rook & Fisher, 1995), and self-identity (Dittmar et al., 1995) on consumer impulse buying behavior, none have looked at cultural influences such as collectivist and individualist tendencies, or independent-interdependent self-concept. As shown in this article, cultural factors do moderate consumer impulsive buying behavior.

Overall, Asian collectivist consumers engage in less impulsive buying than Caucasian individualist consumers, despite the highly developed shopping culture in East Asia. In addition, there is a weaker correlation between self-reported trait buying impulsiveness and the frequency of impulsive buying behavior for collectivists compared to individualists. This finding supports and extends previous research that found that collectivists are able to maintain inconsistent attitude-behavior relationships (Kashima et al., 1992) and to put their own feelings aside in order to act in an appropriate manner (Triandis, 1995). Although collectivists possess the buying impulsiveness trait in equal measure with individualists, they suppress this trait impulse and act in a manner that is consistent with cultural norms, in this case, reducing their impulsive buying behavior, which has been characterized as a highly individualistic, emotionally charged behavior.

In the United States, it is assumed that impulse purchasing is correlated with personality traits, such as variety seeking, sensation seeking, and risk aversion. If the correlations

among these variables are weaker in certain countries or regions, there must be other driving factors differentially affecting the amount of impulse purchasing that occurs. One such factor, identified by Rook and Fisher (1995), is the social acceptability of impulse purchasing. An interesting area for future research would be to investigate the interaction between culture and the appropriateness of engaging in impulse buying in different situations. Although the ability to control the trait-behavior relationship appears to differ by culture, it is also likely that the appropriateness of the behavior would influence the desire and thus the extent of control. One limitation of this study was that the appropriateness of impulse buying was not investigated, although the countries included are all considered to be "shopping cultures."

Many other aspects of culture are also likely to interact with impulsiveness, at least as it has been characterized by Western research, including hedonism, risk avoidance, perceived consequences, and the influence of others. Future research of a qualitative nature is needed to uncover the antecedents and consequences of buying impulsiveness across cultures.

It has been suggested (Beatty & Ferrell, 1998) that profiles of highly impulsive shoppers be identified, so that promotions can be targeted at these individuals. Previous research using consumer impulsivity as a lifestyle trait has identified that people vary in their impulse buying susceptibility (Rook, 1987; Rook & Fisher, 1995; Rook & Gardner, 1993). Work in this vein can identify high-, medium-, and low-impulse consumers. Our research suggests that these profiles may in fact be different in other cultures. Further research needs to be conducted into what factors are reliable indicators of impulse buyers in cultures outside of the United States.

The marketing factors that encourage impulse purchasing also need renewed attention. It would be useful to investigate in detail how various marketing factors support impulsive purchasing, and which ones exert the strongest influence within different cultural contexts. Access to the World Wide Web may well be an important factor. The Internet most certainly has changed the access to impulse purchasing opportunities for those from more remote areas. The global electronic marketplace is making it increasingly important to study the processes that may differentially affect people from other countries, regions or areas of the world. One future study would be to investigate the interaction of situational variables within different cultural settings and among consumers with different levels of the impulsiveness trait.

Our research uncovers another area where scales developed in the United States are not valid for use in other countries, highlighting the difficulty of cross-cultural research. The results of the factor analyses indicate that there may in fact be more than one dimension to the buying impulsiveness trait. We found that the Weun et al. (1998) scale produced better results than the Rook and Fisher (1995) scale, although even this scale had to be modified to achieve equivalence across cultures. Further research needs to be conducted to

provide evidence of the nomological validity of the trait impulsiveness subscales.

This research has the traditional limitations associated with self-report survey research. Using a single-item measure of impulse purchasing may be problematic due to error in the measurement of this construct. Yet, due to the unique nature of impulse buying researchers often rely on single-item self-reports to measure this behavior (e.g., Beatty & Ferrell, 1998; Rook & Fisher, 1995). Our use of two different items in two different investigations of impulsive buying behavior produced the same hypothesized results providing more confidence that measurement error did not produce erroneous or misleading results. One concern is that the cultural differences in impulsive buying behavior that we found were due to cultural biases in response style. Members of Eastern Asian cultures have been shown to use the midpoint in rating scales more than members of Western Caucasian cultures (Chen, Lee, & Stevenson, 1995) so it is possible that our Caucasian-individualist respondents were more likely to use the extreme values of the rating scales. However, Chen et al. (1995) found that even when response-style biases due to culture are accounted for, they do not significantly change the outcome of between-group comparisons. Furthermore, no difference was found between the self-reported buying impulsiveness trait levels in each culture.

The use of sub-scales could be problematic in capturing all of the aspects of the impulsiveness trait. While this may be problematic in both of our studies, there is some evidence that these sub-scales are highly correlated with the original scale ($r < .9$). In addition, the sub-scale did not produce different results from the same analysis using the original scale, lending confidence to our findings.

Researchers and practitioners need to be aware of cultural differences when applying United States-based research findings to marketing strategies targeting non-United States consumers. Although we surveyed individuals from highly consumer-oriented societies where ample opportunities to engage in impulse purchasing exist, there are essential underlying differences between consumers in Western individualist societies and those in Eastern collectivist cultures. Although the published research on impulsive buying behavior has been helpful in unraveling the impulse buying phenomenon in individualistic societies, this article clearly highlights the impact that culture has on this complex consumer behavior and suggests we need to take into account the interaction of culture and consumers in order to better understand impulsive buying behavior.

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APPENDIX A

Analysis of Trait Buying Impulsiveness Scales

In the preliminary study, all nine Rook and Fisher's (1995) trait impulsiveness items were submitted to a maximum likelihood exploratory factor analysis for each of the cultural regions. Using the eigenvalue greater than 1 and the percent of variance accounted for as initial indicators, one factor emerged for the individualist region accounting for 53% of the variance, but two factors emerged for the collectivist region accounting for 26% and 18% of the variance, respectively. In addition, some of the communalities were as low as 0.17. After successive elimination of the items with low communalities a set of four potentially equivalent items were left. These items loaded greater than 0.6 on the factor and held communalities of greater than 0.4 in each cultural region. In addition, the χ^2 for the exploratory factor analysis supported a one-factor solution in both regions (individualist, $\chi^2 = .413$, $df = 2$, $p = .82$ and collectivist, $\chi^2 = 4.98$, $df = 2$, $p = .08$). Next, the data were submitted to a maximum-likelihood multi-group confirmatory factor analysis using LISREL 8 to simultaneously assess the equality of factor structures across the two regions. The four factor loadings and four error variances were found to be invariant across the groups ($\chi^2 = 15.90$, $df = 12$, $p = .20$; RMSEA = .03), indicating metric equivalence. Please see Table 1 for the individual sub-scale items and their summary statistics and Table 2 for the subscale correlations with the full nine-item scale. For the main study, all five Weun et al. (1998) trait-buying impulsiveness items were submitted to the same analysis. The χ^2 for

each region supported a one-factor solution (Caucasian, $\chi^2 = 1.04$, $df = 2$, $p = .60$; Asian, $\chi^2 = .46$, $df = 2$, $p = .80$). When the data were submitted to the maximum-likelihood multi-group confirmatory factor analysis the four factor loadings and four error variances were found to be invariant across the groups ($\chi^2 = 15.65$, $df = 12$, $p = .21$), indicating metric equivalence.

APPENDIX B

Analysis of Pleasure and Arousal Scales

The four pleasure items and the four arousal items were submitted to maximum likelihood exploratory factor analyses for each cultural region (see Table 1 for the items and summary statistics). The pleasure scale accounted for 47% of the variance in the Caucasian sample and 45% in the Asian sample.

In addition, the χ^2 for each region supported a one-factor solution (Caucasian, $\chi^2 = 2.27$, $df = 2$, $p = .32$; Asian, $\chi^2 = 5.50$, $df = 2$, $p = .06$). When these items were submitted to the maximum-likelihood multi-group confirmatory factor analysis the four factor loadings and four error variances produced a slightly higher chi-square ($\chi^2 = 23.64$, $df = 12$, $p = .02$), but an adequate fit using other indices that are less influenced by sample size (e.g., RMSEA = .07). As an added precaution, the invariant model was compared with other less constrained models to assess metric equivalence across groups. The χ^2 difference between the invariant factor model and three other models (allowing factor loadings and error variances to differ) produced an insignificant difference in each case. The arousal scale also produced a one-factor solution (Caucasian, $\chi^2 = 1.28$, $df = 2$, $p = .53$; Asian, $\chi^2 = 1.50$, $df = 2$, $p = .47$), although it accounted for less variance in each group (35% in the Caucasian sample and 25% in the Asian sample). When these items were submitted to the maximum-likelihood multi-group confirmatory factor analysis the four factor loadings and four error variances were found to be invariant across the groups ($\chi^2 = 14.75$, $df = 12$, $p = .26$), indicating metric equivalence.