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Abstract

Past research suggests that concrete ad stimuli generate more imagery than abstract stimuli. However, this finding may not be culturally universal. Our research suggests that East Asians tend to generate more imagery than Westerners when exposed to abstract advertising messages, but these differences in imagery generation tend to subside when both cultural groups are exposed to concrete stimuli. Exposure to abstract stimuli while limiting mental resources results in narrowing the differences in number of images generated by Westerners and East Asians as does providing subjects with instructions to imagine.

Key Words: Imagery Generation, Abstract Thinking, Concrete Thinking, Culture and Advertising

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1. Introduction

Over fifty years ago, White (1959) discussed the relationship between imagery and advertising effectiveness. Since then, several scholars have sought to decipher the ways in which the imagery generation occurs (cf. Block, 1981; Bolls and Muehling, 2007; Cartwright et al., 1978; Edell and Staelin, 1983; Paivio, 1965). Imagery is the process by which concrete sensory information is represented in working memory (MacInnis and Price, 1987). Imagery could be multisensory (combination of smell, taste, sight, and touch), or be comprised of a single sense such as sight (MacInnis and Price, 1987).

Imagery generation plays an important role in information processing (Block, 1981) through its effects on learning (e.g., recall), ad and brand attitudes, and purchase intention (Babin and Burns, 1997; Bone and Ellen, 1992; Burns et al., 1993; MacInnis and Price, 1987; Mikhailitchenko et al., 2009). Imagery generation can be triggered by external stimuli such as pictures, concrete words, instructions to imagine, and guided imagery (Alesandrini and Sheikh, 1983; Lutz and Lutz, 1978; MacInnis and Price, 1987).

While past research has contributed substantially to our understanding of the process and consequences of imagery, the impact of culture on imagery generation still remains unexplored. To better comprehend the role of culture in imagery generation, we seek to examine the following issues: (1) How abstract versus concrete stimuli differentially influence imagery generation among Westerners and East Asians; (2) How different patterns of thinking impact imagery generation; and (3) How varying the amount of mental resources available impacts the imagery generated by Westerners and East Asians. Three experimental studies involving East Asian and North American subjects were conducted to test our hypotheses.

2. Abstract versus Concrete Thinking

Paivio (1971) suggests that words used in the course of communication play a big part in imagery generation. Words can be categorized into “concrete” or “abstract,” based on their capacity for imagery generation (Paivio and Csapo, 1973; Paivio and Foth, 1970; Paivio et al., 1968; Richardson, 1980). Concrete words such as apple, banana, table, and chair are more likely to generate imagery in people’s minds compared to abstract words such as love, freedom, justice, and virtue.

When external stimuli are absent, imagery can still be evoked by a person’s knowledge about objects (MacInnis and Price, 1987; Solso, 2001), knowledge about one’s self and others, and the context (Bone and Ellen, 1992). Culture impacts a person’s values, attitudes, and

behaviors and plays a significant role in a person's knowledge schemata (Mikhailitchenko et al., 2009; Soares et al., 2007). An individual's knowledge about objects, self and others is inherently culture-dependent (Kale and Barnes, 1992). Cousins (1989) contends that since East Asians and Westerners have different ways of thinking (i.e. concrete vs. abstract thinking) which causes them to store and retrieve different information in and from memory when subjected to the same stimuli. East Asians have "a tendency to perceive things a part of the real-life settings" (Cousins, 1989, p. 124), resulting in generation of imagery even in the absence of external stimuli. In contrast, Westerners tend to think abstractly, exhibiting "a tendency to mentally isolate objects or their attributes and generalize across contexts on the basis of conceptual similarity" (Cousins, 1989, p. 124). Because Westerners store and retrieve largely abstract and context-independent data in and from memory they are less likely to generate imagery when imagery-inducing stimuli are absent.

Cultural predisposition toward abstract or concrete thinking can be traced to different views of self which, in turn, reflects differences in social structure and practices across cultures. People from individualistic cultures (e.g., U.S.) have an *independent* view of the self, where the self is construed as bounded, unitary, and stable; somewhat detached from the social context. Westerners view the self as autonomous with its own distinct internal attributes, and not subject to subordination by their in-group (Hofstede, 1990). Westerners' attitudes, feelings, and behaviors are largely self-driven and not significantly influenced by external factors.

In contrast, people from collectivistic cultures (e.g., China, Japan, Korea, and other East Asian countries) live in a complex interdependent world with many role prescriptions. Consequently, they develop an *interdependent* view of the self, where the self is flexible and variable, one which emphasizes relationship with others. East Asians see themselves as an integral part of the setting, situation, or context in which they are embedded (Markus and

Kitayama, 1991; Nisbett et al., 2001). Individual behavior, especially in the presence of others, is predicated on the context (Hall and Hall, 1990). The independent-interdependent dimension of self helps explain people's perceptions of objects and events and the contents of thought (Kühnen et al., 2001; Markus and Kitayama, 1991).

People acquire specific attention and identification patterns through participation in socialization processes characteristic of each culture (Nisbett and Miyamoto, 2005). Reared in typically context independent socialization structures, Westerners tend to describe themselves in terms of internal dispositions with few references to surrounding contexts (Cousins, 1989). Abstract terms often serve as Westerners' unit of representation (Markus and Kitayama, 1991), making them more prone to generalize attributes across contexts and organize their knowledge into a hierarchical structure with their individual distinctive internal attributes serving as superordinate nodes (Markus and Kitayama, 1991). This representation is essentially the context-independent, abstract mode of thinking (Kühnen et al., 2001).

In contrast, the attention of East Asians is more directed to the context in which they and others are embedded. Specific social contexts, not internal attributes, serve as the unit of representation (Markus and Kitayama, 1991). Knowledge, for East Asians, tends not be abstract and generalized across contexts, but is specific to, and contingent upon, the focal context (Markus and Kitayama, 1991). Essentially, East Asians exhibit a context-bound, concrete mode of thinking (Kühnen et al., 2001; Nisbett et al., 2001).

3. Hypotheses Development

Westerners' abstract orientation leads to isolating objects from the context in which they are embedded (Choi et al., 1999; Ng and Houston, 2006; Nisbett et al., 2001). When Westerners retrieve information from memory, largely abstract (not concrete) information surfaces (Markus and Kitayama, 1991). We therefore expect that when Westerners read abstract ad

messages devoid of imagery-inducing stimuli, they will retrieve abstract information from memory and hence not generate much imagery.

In contrast, since East Asians tend to direct their attention to specific contexts, they are more likely to store concrete (as opposed to abstract) information in memory, and retrieve this information even when presented with abstract cues. Abstract representation is somewhat alien for East Asians; they will therefore embody abstract cues with specific contexts (Cousins, 1989). For East Asians, imagery generation involves retrieval of past experience (Yuille and Catchpole, 1977); scenes of specific daily contexts retrieved from memory will create concrete imagery even in face of abstract cues (MacInnis and Price, 1987). Westerners are likely to generate more imagery when processing concrete ads than abstract ads, which is unlikely to happen in the case of East Asians. Concrete stimuli will provide East Asians with the desired contexts thus diminishing the need to retrieve additional concrete images. This discussion informs the following hypotheses:

H₁. When exposed to abstract ads, East Asians will generate more mental images than Westerners.

H₂. Westerners will generate more mental images when exposed to concrete stimuli in ads than when exposed to abstract stimuli.

Since abstract descriptions are not congruent with their characteristic way of thinking, East Asians embed abstract stimuli with concrete contexts through the information retrieval process. Such retrieval would be unlikely for Westerners as abstractness is consistent with the Western mode of thinking. The differential view of self will play a part in the types of imagery people generate (Bone and Ellen, 1992). Recall that East Asians have an interdependent view of self and Westerners have an independent view of self. Therefore, for westerners, self-related imagery should be easier to create than other-related imagery. For East Asians, other-related imagery would be the more natural preference. When exposed to stimuli containing abstract cues, East Asians will generate images largely focusing on themselves and others (i.e. *interdependent images*) while Westerners will generate more images highlighting themselves (i.e. *independent images*). These differences would not be expected when the two groups are presented with readymade concrete descriptions as

concrete descriptions provide the specifics of imagery to be generated. This discussion informs Hypothesis H₃.

H₃. When exposed to abstract descriptions, East Asians will generate proportionally higher number of interdependent images than Westerners.

Imagery generation involves the brain's visual processing and memory areas (Solso, 2001). Since cognition plays a role in imagery, lesser number of images should result when access to cognitive mental resources is restricted (Bone and Ellen, 1992; Kisielius and Sternthal, 1984; Unnava et al., 1996). If East Asians were instructed to read ad descriptions as fast as possible, they would have less opportunity to retrieve scenes from memory as the reading task would consume bulk of their mental resources. Fewer mental images will therefore be generated. Westerners tend to think in abstract terms and are less likely to access the mental resources required to retrieve scenes from memory. For them, limiting mental resources may thus have little or no impact on the imagery produced. This discussion leads to the following hypothesis:

H₄. Subjected to abstract descriptions, limiting mental resources will have a stronger effect in inhibiting imagery generation for East Asians than for Westerners.

The nature and amount of imagery generation can be altered by “priming” subjects or by providing them with specific “instructions to imagine” (MacInnis and Price, 1987). Just because Westerners are conditioned to think in abstract terms does not mean that only abstract information is stored in their memory. Rather, it means that the default mode of retrieval is to access abstract imagery when provided with abstract descriptions. Instructing Westerners to imagine could prompt them to expend requisite mental resources to retrieve concrete scenes from memory. Such instruction to imagine may not have a similar effect on East Asians; they will generate concrete imagery with or without specific instruction. We therefore propose the following hypothesis:

H₅. When processing abstract descriptions, instruction to imagine results in relatively more imagery generation on the part of Westerners than East Asians.

4. Methodology and Findings

We tested the five hypotheses using three experimental studies. Study 1 examined the differences in imagery generation between East Asians and Westerners under conditions of abstract and concrete stimuli. Study 2 investigated whether limiting mental resources inhibits subjects' imagery generation ability. Study 3 studied whether instruction to imagine impacts the imagery generation ability of East Asians and Westerners.

4.1 Study 1

4.1.1 Design.

Past studies have established that Chinese tend to think concretely (Ip and Bond, 1995; Triandis et al., 1990) and Americans tend to think abstractly (Cousins, 1989). To test hypotheses H1 through H3, a 2 (ad description: concrete vs. abstract) x 2 (culture: East Asians vs. Westerners) between-subject factorial design was used.

Forty-two American and 41 Chinese students from marketing classes at a large Midwestern university in the U.S. were recruited for Study 1. A small token gift, i.e. a pen or a marker, was provided for their participation. All American students were born and raised in the U.S. For Chinese students, only those who had been in the U.S. for less than six months were chosen in order to rule out any significant acculturation. The original ads and questionnaire were drafted in English, and then translated into Chinese. A back translation by a different translator was used to ensure equivalence in treatments across American and Chinese subjects.

4.1.2 Stimuli.

Treatments used by Unnava and Burnkrant (1991) were adapted for deployment in this study to ensure comparability with regard to dimensions such as believability, understandability, meaningfulness, distinctiveness, self-referencing, informativeness, and perceived strength of arguments. Participants filled an imagery index adapted from Unnava and Burnkrant (1991) on three seven-point semantic differential scales. Each scale measured the imagery-provoking ability of the ad (1 = not imagery-provoking / dull / boring; 7 = imagery provoking / vivid / interesting). A digital camcorder was used as the focal product. This product was chosen because it is of inherent interest to most subjects and students have enough familiarity with the product. If an unfamiliar product with little or no schematic knowledge on the part of subjects were used, respondents' ability to generate images could be inhibited (Wright and Rip, 1980). To eliminate any effects of past experience with existing brands, the product was given a fictitious name, Classa.

4.1.3 Ad Descriptions.

Concrete and abstract descriptions used in this study were adapted from Unnava and Burnkrant (1991). The ad described four attributes of the digital camcorder (size, low light performance, zoom, and the ability to capture sports action). Table 1 lists these descriptions.

Insert Table 1 about here

4.1.4 Procedure.

At the outset, participants were told that a large manufacturer of consumer electronics was planning to introduce a new product in their geographic area and that they were a small

group of consumers selected for testing the ad and the concept. This was done to inject realism and increase subject involvement in the study. Subjects were asked to read a cover story and advertisement messages. After reading the ad, they completed a five-minute questionnaire on basic information about the U.S. to clear their short term memory. Then, they were asked to write down the imagery generated in their minds when they were reading the ad, and were provided instructions to complete the imagery index. Finally, participants completed a series of ancillary measures and a “Ten Statement Test” (TST) in which they were asked to respond ten times to a question, “Who am I?” This concluded the experiment after which participants were debriefed.

The categories used for TST classification were concrete and abstract. Physical (e.g., I am 23 years old), social (e.g., I am a marketing major), concrete preference (e.g., I like swimming; I like cats), concrete wish (e.g., I hope to be an accountant), and activity (I am doing a project for my marketing class) were coded as concrete statements. Global preference (e.g., I like music/sports/animals), global wish (e.g., I wish the world to be better), pure attribute (e.g., I am friendly), qualified attribute (e.g., I am nice to my friends), or other global statements were coded as abstract statements.

4.1.5 Dependent Variables

4.1.5.1 Number of Images.

The number of mental images generated by each subject was counted by two independent judges. A sentence or a group of words was coded as one image. If a sentence had different scenes and they occurred at different times, they were coded as different images (e.g., I recorded myself playing tennis -- and went home to play the scene back, were counted as two images). Disagreements were resolved by mutual discussion. We asked participants to write

down imagery they generated when reading ad stimuli rather than using Likert-type scale questions to measure imagery because individuals from dissimilar cultures may have different standards in responding to Likert-type scales (Heine et al. 2002).

4.1.5.2 *Type of Images.*

Two coders grouped the images into three groups: independent images, interdependent images, and others. Independent images focus on the individual (e.g., I imagined a tiny camcorder in my hand). Interdependent images depict a group of people or portray the relationship of an individual with others (e.g., I pictured myself recording a child’s birthday party with her parents present). The category “others” contains no references to people (e.g., a small and compact camcorder; a camcorder on a weighing scale.)

4.1.6 *Results*

Hypotheses 1-3 were tested based on a 2 (description: concrete vs. abstract) x 2 (culture: East vs. Western) analysis of variance (ANOVA). The means and standard deviations for generated imagery are shown in Table 2.

Insert Table 2 about here

4.1.6.1 *Manipulation Checks.*

Since the imagery index was developed in the U.S., we need to check whether it is cross-culturally invariant. In an experimental study such as this, differences in measurement across groups may arise indicate differences between cultures or could arise because of different orientations in responding to Likert-type scales (Heine et al., 2002; Steenkamp and Baumgartner, 1998). To test for cross-cultural invariance of our measures, we checked for homogeneity of the covariance matrices using culture as a dependent variable and three imagery measurement items as predictors. The Box’s test of equality of covariance matrices was not significant (*Box’s M* = 6.701, *p* = .377), thus suggesting that the imagery index is invariant across cultures.

The means of imagery index (Cronbach's $\alpha = 0.889$) were subjected to a 2 (culture) x 2 (descriptions) ANOVA. A significant effect of description emerged ($F(1, 79) = 119.329, p < .01$). Participants rated the concrete descriptions ($M = 4.62$) as more imagery provoking than the abstract descriptions ($M = 3.55$). Moreover, Levene's test was not significant, suggesting variance homogeneity ($F_{3, 79} = 1.713, p > 0.1$). We also ran two one-way ANOVA tests on the two groups' responses to the imagery index. The responses of Chinese (Cronbach's $\alpha = 0.895$) showed that concrete words were more likely to induce imagery than abstract words ($M_{\text{concrete}} = 4.87, M_{\text{abstract}} = 3.63; F_{1, 39} = 12.481, p < .01$). Responses of Americans (Cronbach's $\alpha = 0.884$) similarly showed that concrete words were more likely to induce imagery than abstract words ($M_{\text{concrete}} = 4.38, M_{\text{abstract}} = 3.47; F_{1, 40} = 7.141, p < .05$).

Participants also completed the TST. Two judges coded TST into two categories: abstract or concrete statements. The inter-judge reliability was 87%. Conflicts were solved by discussion between judges. As anticipated, Chinese subjects generated more concrete statements than did Americans ($M_{\text{Chinese}} = 6.32, M_{\text{American}} = 3.21; F(1, 81) = 50.885, p < .01$).

4.1.6.2 *Generated Images.*

Two judges not conversant with the purpose of this study counted the number of images generated by participants. Inter-judge reliability was acceptable with the level of agreement at 89%. Conflicts were resolved by discussion between judges.

A 2 (culture) x 2 (description) ANOVA with the number of mental images as a dependent variable was conducted (see Table 2). Significant main effects of culture ($M_{\text{Chinese}} = 2.78, M_{\text{American}} = 1.90; F = 21.258, p < .01$) and description ($M = 2.84, M = 1.80; F = 27.601, p < .01$) emerged. The interaction effect was also significant ($F = 12.064, p < .01$; see Figure 1). Since the interaction effect was significant, four contrasts were conducted using pooled error. When exposed to abstract descriptions, the Chinese generated more images than did Americans ($M_{\text{Chinese}} = 2.60, M_{\text{American}} = 1.00; F = 31.527, p < .01$), thus providing support for

H₁. For Chinese subjects, there was no significant difference in number of images generated when reading concrete versus abstract descriptions ($M_{\text{concrete}} = 2.95$, $M_{\text{abstract}} = 2.60$; $F = 1.567$, $p > .1$). As hypothesized in H₂, American subjects generated more images when exposed to concrete descriptions than when exposed to abstract descriptions ($M_{\text{concrete}} = 2.73$, $M_{\text{abstract}} = 1.00$, $F = 38.491$, $p < .01$). When exposed to concrete descriptions, there was no significant difference in the number of images generated by Chinese and Americans ($M_{\text{Chinese}} = 2.95$, $M_{\text{American}} = 2.73$; $F = 0.670$, $p > .1$).

4.1.6.3 Type of Images.

Two judges unaware of the purpose of this study coded images into three groups: interdependent images, independent images, and others. The inter-judge reliability was 94%. Z-tests were used to test the proportions of number of interdependent images to the sum of interdependent and independent images. Americans generated more interdependent images when exposed to concrete descriptions than when exposed to abstract descriptions (54.5% vs. 27.8%; $z = 2.281$, $p < .05$). For the Chinese, there was no significant difference in the proportion of interdependent images between concrete (59.6%) and abstract descriptions (67.3%; $z = 0.82$, $p > .1$). When exposed to abstract descriptions, the proportion of interdependent images was higher for the Chinese than for the Americans (67.3% vs. 27.8%; $z = 2.893$, $p < .01$), thus supporting H₃. When exposed to concrete descriptions, there was no significant difference in the proportion of interdependent images generated between Chinese (59.6%) and American subjects (54.5%; $z = 0.545$, $p > .1$).

Insert Figure 1 about here

4.2 Study 2

4.2.1 Design

This study was designed to test the hypotheses that limiting mental resources will differentially impact imagery generation on the part of East Asians and Westerners. The method used by Kisielius and Sternthal (1984) was adapted for this study wherein participants

were asked to read the ad descriptions as fast as possible, thus placing cognitive limitations on information processing.

Ads for this study were the same as those used in Study 1. Seventy-eight American students and 62 Chinese students from a Southeastern U.S. university participated in the study. Procedures used were identical in most respects to the first study with the additional manipulation of reading speed.

Students in the “fast” condition were asked to read the ad descriptions as quickly as possible while those in the “slow” condition were not asked to do so. After reading the cover story, participants were asked to go to next page to read the ad when the experimenter started an on-line stopwatch shown on a projection screen. After finishing reading the ad, participants were asked to write down the time they used according to the timer on the screen. They then were asked to complete the imagery index used in Study 1.

4.2.2 Results

4.2.2.1 Manipulation Check.

A 2 (culture) x 2 (speed) x 2 (description) ANOVA with the seconds to read the ad as a dependent variable was conducted. A significant main effect of speed ($F_{1, 132} = 38.705, p < .01$) and culture ($F_{1, 132} = 15.666, p < .01$) emerged. On average, participants spent more time to read the ad under the slow condition ($M = 42.8s$) than under the fast condition ($M = 33.6s$). Overall, Chinese ($M = 34.98s$) spent less time than Americans ($M = 40.8s$) to read the ad. This may be because the Chinese characteristics are more like pictures, so the processing of Chinese characteristics was faster. For Chinese subjects, a 2 (speed) x 2 (description) ANOVA, with time to read the ad as a dependent variable, revealed only a significant main effect of speed ($M_{slow} = 39.45, M_{fast} = 30.52; F_{1, 58} = 18.118, p < .01$). The same result manifested with American subjects where ANOVA only revealed a significant main effect of speed ($M_{slow} = 45.49, M_{fast} = 36.08; F_{1, 74} = 21.515, p < .01$).

To establish measure invariance across cultures, we ran a regression using culture as a dependent variable and the three imagery measurement items as predictors. Box's test of equality of covariance was not significant (*Box's* $M = 5.970, p = .443$), suggesting that the imagery index was invariant across cultures. Means of the imagery index (*Cronbach's* $\alpha = 0.845$; *Cronbach's* $\alpha_{\text{Chinese}} = 0.859$; *Cronbach's* $\alpha_{\text{American}} = 0.829$) were subjected to a 2 (culture) x 2 (speed) x 2 (descriptions) ANOVA. A marginally significant main effect of speed ($F(1, 132) = 7.083, p < 0.1$) and message ($F_{1, 132} = 71.546, p < .01$) emerged. Participants stated that concrete messages ($M = 4.76$) were more imagery-provoking than abstract ones ($M = 3.76$). Participants also thought that the same stimuli were more imagery-provoking under the slow condition ($M = 4.31$) than under the fast condition ($M = 3.96$). Moreover, Levene's test was not significant ($F_{7, 132} = 0.954, p > .1$).

A one way ANOVA with the number of concrete statements as a dependent variable was conducted. The analysis showed that the images generated by Chinese were more concrete than those generated by the Americans ($M_{\text{Chinese}} = 5.32, M_{\text{American}} = 3.21; F_{1, 138} = 46.422, p < .01$).

4.2.2.2 Number of Images.

A 2 (culture) x 2 (speed) x 2 (description) ANOVA with the number of images as a dependent variable was conducted (see Table 3). A significant three-way interaction emerged ($F_{1,132} = 5.076, p < .05$). For abstract stimuli, a 2 (culture) x 2 (speed) ANOVA was carried out. Significant main effects of culture ($F_{1, 67} = 7.681, p < .01$) and speed ($F_{1, 67} = 17.999, p < .01$) emerged. There was also significant interaction effect between culture and speed ($F_{1, 67} = 10.869, p < .01$). The planned contrast showed that when exposed to abstract descriptions, Chinese generated more images under the slow condition than under the fast condition ($M_{\text{slow}} = 2.065, M_{\text{fast}} = 0.87; F_{1, 29} = 25.339, p < .01$). For Americans, there was no significant difference in the number of images generated while reading abstract descriptions under slow

and fast conditions ($M_{\text{slow}} = 1.10$, $M_{\text{fast}} = 0.95$; $F_{1,38} = 0.510$, $p > .1$). Furthermore, under the fast condition, there was no significant difference in the number of images generated by Americans and Chinese ($M_{\text{American}} = 0.95$, $M_{\text{Chinese}} = 0.87$; $F_{1,33} = 0.118$, $p > .1$). As hypothesized in H_4 , when subjected to abstract stimuli, limiting mental resources inhibited imagery generation capability of the Chinese but not the Americans. Consequently, imagery generation differences observed in the first experimental study are not manifested here.

Insert Table 3 and Figure 2 about here

4.3 Study 3

4.3.1 Stimuli, Participants, and Procedure.

This study was used to test hypothesis H_5 which specifies how instructions to imagine would impact imagery generation. Abstract stimuli used in Study 1 were used for this study as well. A total of 40 American students and 42 Chinese students from a Southeastern university in the U.S. participated in the study. Procedures used were identical in most respects to those used in Study 1. The only added manipulation of was “instructions to imagine.” Students in the “instruction” condition were asked to imagine when reading the ad while those in “no instruction” condition were not asked to do so. Participants were also required to complete the imagery index.

4.3.2 Manipulation Check.

Participants were asked to answer whether they tried hard to imagine when reading the ad. Multiple regression with culture as a dependent variable and the item to measure whether participants tried hard to imagine when reading the ad as a predictor was conducted. Box’s test of equality of covariance was not significant (*Box’s M* = 0.686, $p = .410$), suggesting the measure’s cross-cultural invariability. A 2 (culture) x 2 (instruction) ANOVA was conducted.

A significant main effect of instruction emerged ($F_{1,78} = 7.620, p < .01$). A marginally significant two way interaction ($F_{1,78} = 2.863, p < .1$) also emerged. Americans tried harder to imagine when asked to do so ($M = 5.57$) than when not asked. ($M = 4.58; F_{1,38} = 9.387, p < .01$). For Chinese, there was no significant difference between the instruction condition ($M = 5.52$) and the no-instruction condition ($M = 5.29, F_{1,40} = 0.602, p > .1$). This suggests that the Chinese are likely to provide the missing context to abstract stimuli even when not instructed to imagine.

4.3.3 Results.

An ANOVA with the number of images as a dependent variable and culture and instruction as independent variables were conducted. A significant main effect of culture ($F_{1,78} = 7.438, p < .1$) and instruction ($F(1, 78) = 6.240, p < .05$) emerged. Although Chinese generated a few more images when instructed to imagine than when not so instructed to do so, the difference was not statistically significant ($M_{\text{instruction}} = 2.19, M_{\text{no instruction}} = 1.86; F(1, 40) = 1.467, p > .1$). Americans generated more images when instructed to imagine than when not instructed ($M_{\text{instruction}} = 1.81, M_{\text{no instruction}} = 1.11; F(1, 38) = 5.077, p < .05$). Instruction to imagine had a stronger effect on Americans than on Chinese, thus lending support for Hypothesis 5. Moreover, when instructed to imagine, there was no significant difference in the number of images generated by Americans ($M = 1.81$) and Chinese ($M = 2.19; F(1, 40) = 1.584, p > .1$).

Insert Table 4 about here

5. Research Implications

This study extends extant research on the perceptual processes of East Asians and Westerners by exploring differences in imagery generation by the two groups under various

controlled conditions. As with most cross-cultural studies, our research suffers from several shortcomings which need to be overcome in future studies. First, any experimental study raises the issue of generalizability of findings. To what extent would differences in imagery generation observed in the current study emerge if East Asians and Americans were reading ad descriptions under natural conditions? A related issue is our use of student samples, which places limitations on the breadth of subjects' age as well as socialization differences.

Capability of imagery generation increases with age as more and more concrete information gets stored in the brain with the passage of time. Future research could assess how imagery generation varies with age, and whether cultural differences in imagery generation between East Asians and Westerners tend to narrow as subjects' age increases.

In this research we asked subjects to list and describe the imagery generated in their mind. We could have supplemented our findings by using a brain scanner, but cost considerations prevented us from doing so. Besides, Chinese subjects would have been quite uncomfortable with the use of such a device. Future research could employ brain scanners to understand how abstract versus concrete descriptions activate various areas of the brain and the role of culture in the activation process.

Another worthy area of related research would be to assess imagery differences when exposed to web-based communication. With the ubiquity of the Internet and the increasingly important role it plays in world trade, it is critical to understand the nuances of web communication in cross-cultural settings (Baack and Singh, 2007).

Future research could also explore how deeply culture impacts people's perceptual processes (Nisbett and Miyamoto, 2005). For example, since interdependent cultures (e.g., East Asians) are better tuned to context, is the actual field of vision wider for those from interdependent cultures than for independent cultures (e.g. Westerners)?

Since we used overseas Chinese students as our research subjects, the generalizability of our findings to other Chinese populations is limited. Future studies should replicate our studies by using subjects from mainland China as well as Chinese diasporas in non-Western countries to validate our findings. Doing so will shed light on issues such as whether individuals who are bicultural (e.g. second generation Chinese in Australia) can prime both their cultural identities at will, thus bringing to fore more flexible and dynamic perceptual processes.

6. Managerial Implications

Previous studies using U.S. population have found that use of concrete words in advertisements serves to create images in people's minds that result in higher ad recall, enhanced attitude toward the brand, and positive behavioral intentions toward brand purchase (Bone and Ellen, 1992; Wright and Rip, 1980). Our research indicates that the process of imagery generation is not uniform across cultures. Unlike Westerners, East Asians generate concrete imagery even when subjected to abstract stimuli. Thus, while concrete messages may be a prerequisite for overall enhanced brand favorability in Western populations, abstract stimuli may perform just as well for East Asians.

Abstract stimuli may, in fact, serve the advertiser's cause better when dealing with East Asian audiences. Since East Asians allocate more mental resources to generate imagery when processing abstract stimuli, they would exhibit greater involvement with abstract ads and use the central as opposed to peripheral route to ad processing. High ad involvement would serve to enhance brand promise comprehension and contribute to brand affinity and loyalty.

As the importance of markets such as China and India continues to grow, marketers need to become more cognizant of the way audiences in these countries process abstract versus concrete stimuli. Would Indians react similarly to East Asians or would their

information retrieval processes more resemble the Westerners? Given the racial differences between countries constituting the Indian subcontinent and the rest of Asia, this issue needs to be unequivocally resolved before considering pan-Asian advertising appeals. If differences in imagery generation between East Asians and Westerners observed in the three studies discussed here hold under real-world conditions, marketers from Western societies desirous of optimizing the impact of their advertising appeals would be well-advised to appropriately adapt their advertising content when targeting East Asian audiences.

7. Summary

Evidence continues to accumulate suggesting that East Asians tend to think in a concrete manner whereas Westerners' way of thinking is more abstract in nature. These perceptual differences arise from differences in socialization practices across societies. A preference for concrete thinking causes East Asians to generate concrete imagery even when exposed to abstract stimuli. When exposed to concrete stimuli, East Asians as well as Westerners produce concrete imagery. Differences in the number of images created by East Asians and Westerners when reading abstract ad descriptions tend to narrow if: mental resources are limited; and/or subjects are specifically asked to engage in imagery.

These findings corroborate the previously observed influence of temporary social orientation or priming on abstract versus concrete perceptual processes. Future research needs to build on the findings of this study so that we will be in a position to more fully comprehend the relationship between culture and perceptual processes.

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Table 1

Concrete versus abstract descriptions

Concrete Descriptions	Abstract Descriptions
<p>The Classa digital camcorder has ultra compact size and can easily be held and operated by one hand.</p> <p>Picture a child's shiny face, happy smile, and dancing eyes as he blows out his birthday candle. The light of that one candle is enough for Classa digital camcorder.</p> <p>Imagine screaming people on a roller coaster plummeting down the steep track. The excitement on their face can be clearly captured with Classa's high zoom ability (12X optical and 480X digital zoom).</p> <p>Classa can even improve your tennis game. As you make a shot on the tennis court, you know that every stroke you made has been captured by your Classa. The tape can be analyzed later, to the minutest detail, using slow motion and freeze-frame.</p>	<p>The Classa digital camcorder has ultra compact size and weights less than one pound.</p> <p>Classa digital camcorder performs very well under low light conditions. With its new filters and lenses, a light as dim as a candle is enough for recording.</p> <p>Classa allows you to capture the scene clearly from a long distance with its 12X optical and 480X digital zoom. Because of the high zoom, you can get clear pictures even from a mile away.</p> <p>Classa can help you in sports too. It records all your movements with great accuracy. You play them back to the minutest detail, using slow motion and freeze-frame, to analyze your performance and correct your mistakes.</p>

Table 2

Means and standard deviations (SD) for study 1

Measures	American		Chinese	
	Concrete	Abstract	Concrete	Abstract
No. of Images	2.73	1.00	2.95	2.60
SD	0.83	0.86	0.86	1.05
N	22	20	21	20

Table 3

Means and standard deviations (SD) for study 2

Culture	Speed	Message	No. of Images	SD	N
Chinese	Slow	Abstract	2.06	0.57	16
		Concrete	2.20	0.77	15
	Fast	Abstract	0.87	0.740	15
		Concrete	1.63	0.89	16
American	Slow	Abstract	1.10	0.64	20
		Concrete	2.16	0.76	19
	Fast	Abstract	0.95	0.69	20
		Concrete	1.47	0.90	19

Table 4

Means and standard deviations (SD) for study 3

Instruction	Culture	Message	Mean	SD	N
Instruction to	Chinese	Abstract	2.19	0.75	21
Imagine	American	Abstract	1.81	1.17	21
No Instruction	Chinese	Abstract	1.86	1.01	21
	American	Abstract	1.11	0.74	19

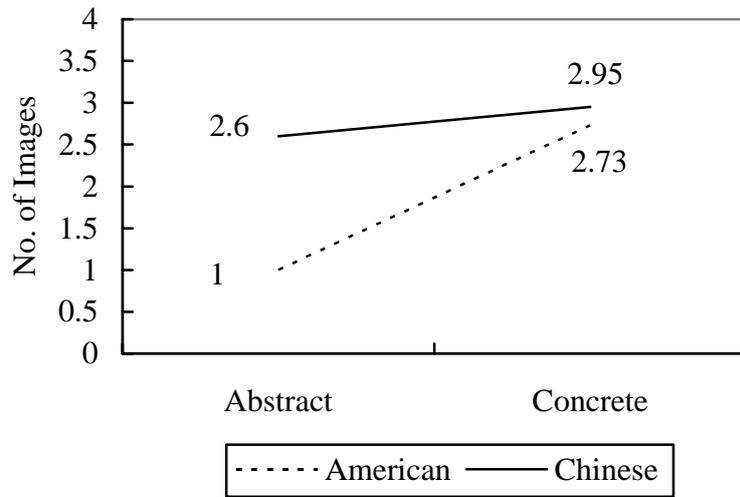


Figure 1

Study 1: Culture and ad interaction for mental images

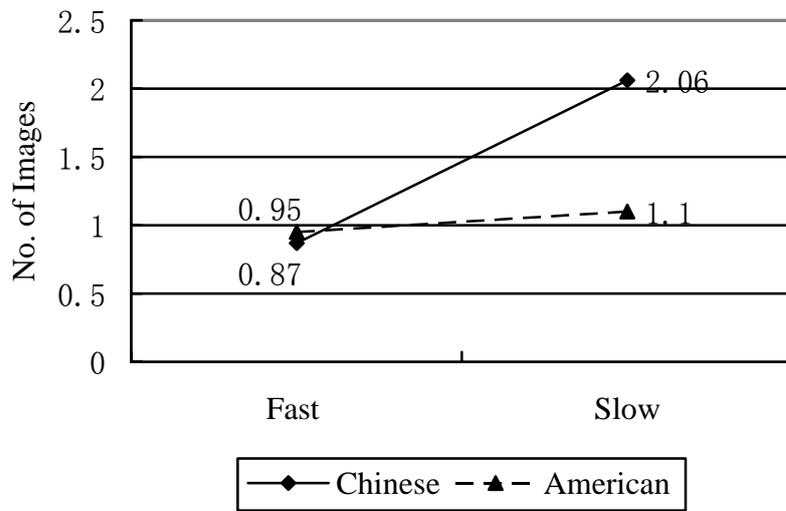


Figure 2
Study 2: Culture and speed interaction of abstract stimuli