

Chapter Ten

CULTURE AS A VEHICLE FOR STUDYING INDIVIDUAL DIFFERENCES

Alex. Onukwube Anedo

Introduction

There are many goals of cultural psychology. Research with a focus on culture itself is concerned with thought processes within members of a particular culture and how those thought processes are similar and different between cultures. For this research, culture is a crucial variable because culture itself is the object of study. For example, a cultural psychologist may want to identify psychological constructs that provide evidence of cultural membership or cultural differences that correlate with psychological ones. Cultures are knowledge traditions. These traditions vary between countries but also within countries. As such, an individual within the same country may be exposed to multiple cultures.* Related work has explored how bicultural individuals are able to maintain distinct cultural identities that each have a unique influence on psychological processing (Chao, Chen, Roisman, & Hong, 2007).

A second goal of cultural psychology is to provide a method for exploring individual differences in psychological processing. That is, cultural psychology provides a window into individual differences in psychological processing that may be hard to observe when studying individuals from only a single culture. To be clear, this aim is very different from other subfields in psychology. Much of psychology (and particularly cognitive psychology) focuses on typical behavior. Data are described by measures of central tendency. Variability is treated as a nuisance, and most experimental methods are aimed at reducing the amount of variability in performance across individuals. This methodology is consistent with the desire to understand the universal functions computed by the mind. Psychology typically assumes that there is an underlying set of cognitive mechanisms common across people. This assumption enables psychologists to run studies on a restricted population (e.g., college students taking introductory psychology), but to generalize the results to all people.

Pervasive cultural differences in cognitive processing call into question the assumption that the phenomena explored with Western college students really do reflect the way that people in general will act in the same situation (e.g., Henrich et al., 2005; Medin, Lynch, Coley, & Atran, 1997; Peng & Nisbett, 1999). Observed cultural differences suggest that the psychological variables causing the behavior of Western college students may be far from

African & Asian Studies, Nnamdi Azikiwe University, Awka, Anambra State, Nigeria.

universal. One difficulty with studying individual differences within a culture is that the members of a culture often display a variety of differences that lead to variability in psychological measurements, and it is hard to determine the sources of this variability. Exploring differences in psychological performance across cultures, however, provides two (or more) groups of people who display reasonably stable differences in performance within groups. In this way, cultural differences can be used as a proxy for studying individual differences in behavior. Research motivated from this perspective focuses on ways to eliminate culture as an explanatory variable by finding other individual differences that explain cultural differences in performance. That is the approach that I have taken to this research. To be clear, I argue that cultural knowledge creates patterns of individual differences that reliably influence performance.

In this paper, I begin by discussing a range of influences that culture can have on cognitive performance. Then, I focus on motivational variables that affect cognitive processing and demonstrate how these variables could ultimately help us to understand both within-culture and between-culture variation in performance on a variety of tasks. This work serves as a case study for the way cultural psychology can provide a framework for better understanding individual differences in behavior.

How can culture affect cognition?

Culture has a number of avenues for influencing psychological processing by members of that culture. In this section, I briefly present some of these key dimensions along which culture can influence cognition. In subsequent sections, I discuss these dimensions in more detail.

Perhaps the most obvious influence is through language and communication. There are two broad classes of linguistic influences on a person's psychology. First, cultures have concepts that they habitually discuss. These forms of cultural expertise are transmitted to members of the culture and may thus have an important influence on their reasoning processes (Latané, 1996). Second, languages themselves differ in the information that they emphasize. While it has been difficult to provide evidence for the strongest claims about the linguistic determinants of thought, there does seem to be clear evidence that the language that people speak affects some aspects of the way that they think (e.g., Gentner & Goldin-Meadow, 2003; Gumperz & Levinson, 1996).

A second influence of culture on cognition is that it suggests strategies for solving problems. It is clear that humans have a more elaborate system of culture than any other animal on earth. Culture permits humans to adapt to the information available in the environment by allowing each new generation to learn the concepts that reflect the current state of the world and to benefit from the knowledge base of previous generations (Tomasello, 1999;

Tomasello, Carpenter, Call, Behne, & Moll, 2005). Not only do humans learn basic concepts from members of their culture, but they also learn procedures for thinking and solving problems. Indeed, the extended period of schooling that we give our children in most modern societies is essentially an extended period of enculturation in which accepted means of thinking are transmitted to children. It is often difficult to see the influence of this extended schooling period on cognition, because (almost) every member of our culture goes through a similar set of experiences. At times, however, cross-cultural study can bring these processes to light.

The last influence of culture that I discuss in this paper involves motivational states. For example, it is well known that cultures differ in the degree, to which they emphasize the primacy of individuals or the centrality of the collective identity (e.g., Markus & Kitayama, 1991; Triandis, 2001). Specifically, on average, members of Western cultures tend to hold more individualist values, and members of African and East Asian cultures tend to hold more collectivist values.

It is not obvious on the surface how differences in the value placed on individual versus collective identity could influence cognitive processing. However, a number of potential motivational influences could be caused by this difference. In particular, the distinction between individual and collective identity is related to research on self-construal and fear of isolation, which may help to explain how cultural differences might influence the information people use in cognitive processing (Gardner, Gabriel, & Lee, 1999; Kim & Markman, 2006; Markus & Kitayama, 1991).

In the rest of this paper, I discuss these three influences of culture on cognition. Of importance, in each case, cultural differences are correlated with other variables that ultimately drive differences in cognitive processing. Thus, for these aspects of cognitive processing, I can explain observed cultural differences in terms of these other psychological factors. Furthermore, these factors are also sources of variation in performance within a culture. For example, members of a culture that values individualism still vary in the degree to which they uphold individualistic values. For this reason, I refer to my explanatory variables as individual difference variables instead of cultural variables. As such, differences first observed to vary across cultures provide us with a window into what individual differences may influence processing more broadly.

Culture, Concepts, Communication, and Language

One key source of variation across cultures is the set of concepts that form a basic part of the way people interact with their world. To some degree, members of cultures are influenced simply by the items that are present in their environments. Eskimos may not have 20 words

for snow, but they will encounter more snow than will the Maya from Guatemala, and based on their experience, Eskimos are likely to be able to think about snow in ways that are different from the way the Maya do.

These general differences in experience can have a profound impact on people's basic reasoning abilities. For example, much research with American undergraduates has examined factors that affect whether they are likely to attribute a novel property to a category of objects based on knowledge of other categories to which it belongs (Osherson, Smith, Wilkie, Lopez, & Shafir, 1990). For example, American undergraduates tend to find the following inductive argument

Mice have antigen GPG in their blood.
Bears have antigen GPG in their blood.
Therefore, mammals have antigen GPG in their blood.

Stronger than the argument

Mice have antigen GPG in their blood.
Rats have antigen GPG in their blood.
Therefore, mammals have antigen GPG in their blood.

Presumably, they find the first argument stronger, because mice and bears are a more diverse set of mammals than are mice and rats. This diversity increases people's confidence that all members of the more general category have this novel property.

Of importance, though, American undergraduates tend to know very little about animals and plants beyond these similarity relationships among them. If research explores reasoning abilities by people who know more about the categories, then a different pattern emerges (Medin & Atran, 2004; Proffitt, Coley, & Medin, 2000). For example, Proffitt et al. (2000) had Itza Mayans evaluate inductive arguments involving trees. This population knows quite a bit about trees (relative to American undergraduates). The Itza Mayans tended to reason on the basis of causal knowledge about the trees rather than on the basis of the similarity between the categories in the premise of the argument and the category in the conclusion. The results with the Maya paralleled other research of Americans who were tree experts (Medin et al., 1997). These results suggest that people use different cognitive strategies to reason about concepts for which they have expertise than about concepts for which they have little expertise. Because types of expertise may vary across cultures, there will also be cultural differences in the kinds of reasoning people perform, simply on the basis of the kinds of concepts that are familiar within that culture.

Categories and Language

Many cultural psychologists have recognized that communication plays a crucial role in the transmission of culture (Latané, 1996; Lau, Lee, & Chiu, 2004). This work starts with the insight that language is a critical tool that people use for communication, and consequently, it plays an important role in driving cultural representations (Lau et al., 2004). In this section, we are interested in influences of language on people's conceptual structures. This section focuses primarily on relationships between language and concepts, but clearly these factors are drivers of cultural differences in cognition, because members of subgroups who communicate will end up with more homogeneous conceptual structures, and these subgroups will ultimately form cultural groups.

The development of expertise in part requires the learner to acquire new linguistic labels and content of concepts. These labels also play a significant role in cognitive processing, and these labels are strongly influenced by cultural factors. This argument is subtle. First, giving a concept a particular label influences processing, because the label typically leads people to assume that the concept shares a set of deep properties, regardless of whether the person knows the properties shared by the objects. Medin and Ortony (1989) called this phenomenon psychological essentialism. Subsequent research has demonstrated that people believe that properties named by a label given to an object are more central to that object than are properties that are just listed as features (Gelman & Heyman, 1999; Yamauchi & Markman, 2000). For example, Gelman and Heyman (1999) found that children believe that the property "eats carrots" is more central to a person if they are described as a "carrot eater" than if they are described as someone who eats carrots.

Second, culture influences labeling because the labels given to objects differ cross-linguistically. Malt and colleagues have analyzed how sets of common objects (e.g., jars, containers, bottles and boxes) are labeled by native speakers of English, Spanish, and Chinese (Malt, Sloman, Gennari, Shi, & Wang, 1999; Malt, Sloman, & Gennari, 2003). They find that there are some broad similarities in the labels given to these objects, but there are also systematic differences in the labels given to objects in different languages. These differences do not reflect that some languages make finer distinctions among types of objects than do other languages, nor do they reflect differences in perceived similarity of the objects by native speakers of different languages. Instead, the label given to a particular object in a particular language is often contingent on labels given to other objects that support effective communication about these objects.

There are two types of influences that communication can have on the concepts held by members of a culture. The most obvious effect of language on culture is that people will communicate particular concepts to other members of that culture. In this way, members of a

culture will come to share a background of basic ideas that are central for communicating with other members of the culture (Lau et al., 2004; Lehman et al., 2004). Latané and colleagues (Latané, 1996; Latané & L'Herrou, 1996) have demonstrated that if people communicate with only a limited number of others, then clusters of beliefs will form that are relatively insulated from the beliefs of groups that do not intercommunicate. Broadly, these beliefs can form the backdrop of culture.

In addition to the influences of language on the overt beliefs that they discuss, the act of communicating with others can affect the concepts of the individuals who communicate with each other. For example, Markman and Makin (1998) had pairs of people build Lego models collaboratively. One member of the pair had pictorial instructions describing how to build a model. The other member of the pair was allowed to touch the pieces to build the model. After building a series of models, each member was taken aside individually and was asked to sort the pieces into groups. The sorts done by people who collaborated on a model were more similar than were sorts done by people who worked with different partners, suggesting that the act of communicating about the pieces helped to synchronize category structures between individuals who communicated together.

Garrod and his colleagues obtained a similar result with people playing a computer game (Garrod & Anderson, 1987; Garrod & Doherty, 1994). Of importance, Garrod's work also demonstrates that when groups of individuals communicate together, they all ultimately end up with the same way of representing a domain. Groups of people who do not communicate with any individuals in common are likely to end up with quite different ways of communicating about the same situation. The groups in Garrod's studies are like members of a culture who communicate. Members of a particular cultural group will have concepts that are more similar than will members of different cultural groups.

This work implies that the label given to a particular object is determined by what will allow members of a culture to communicate effectively with each other. Once an object is given a particular label, though, it is assumed to share deep properties with other objects that have the same label. Thus, members of a culture communicate well together, and they also think more similarly to members of their own culture than to members of other cultures, because they share a common set of category structures (and also common causal knowledge about those categories).

Other Linguistic Effects

Communication between members of the same culture may have other subtle effects that emerge from the concepts that are typically part of a conversation. This issue is related to neo-Whorfian research on language (Gentner & Goldin-Meadow, 2003; Gumperz & Levinson, 1996; Lau et al., 2004). The original Sapir-Whorf hypothesis argued that the language people speak strongly determines the concepts they can represent. For example, proponents of this approach typically focus on grammatical differences among languages and the possibility that these differences influence the way that people represent the world.

Slobin (1996) argues that the basic question needs to be reformulated. Rather than seeking influences of language on thought, he argues that research should seek effects of speaking on thinking. That is, the core function of language is to communicate with others. To the degree that a language requires a speaker to focus on particular aspects of the world in order to properly formulate utterances, speakers of this language should attend to these aspects of the world routinely, because they might need to talk about them.

As an example of the influence of thinking for speaking, Slobin (1996) compared the way speakers of different languages described the narrative of a picture book. One picture showed a boy on the ground below a tree as if he had just fallen. A second showed a dog running. English speakers tend to describe the first by saying, “The boy fell out of the tree,” and the second as “The dog ran” (or perhaps “The dog was running”). Speakers of Turkish, however, must make a grammatical distinction between events in the past that they witnessed and those that they did not witness. Thus, the picture of the boy on the ground must be described using a grammatical form that roughly translates to “The boy (apparently) fell out of the tree.” This form is used because the speaker did not personally witness the falling in the picture. Slobin points out that speakers of English can express this uncertainty (using words like *apparently*), but they need not do it in order to form good sentences in English. Consequently, speakers of English are less sensitive to the distinction between witnessed and non-witnessed actions than are speakers of Turkish.

Once this question is formulated in terms of the actions involved in communication rather than about “language,” we can see that the effects of thinking for speaking extend beyond just the structure of the language that one speaks. If a culture promotes thinking about particular concepts or discussing particular issues, then this information will become a routine part of the way that members of that culture represent information and events.

For example, the classic fundamental attribution error in person perception refers to the tendency for people to attribute the actions of others to dispositions of the person, but to attribute their own actions to aspects of the circumstance (e.g., Lewin, 1935). Using a now

classic method, Ross, Amabile, and Steinmetz (1977) demonstrated the existence of the fundamental attribution error using a quiz show paradigm. Students were randomly divided into pairs and assigned to the “questioner” role or to the “contestant” role. The questioners asked contestants questions either written by the questioners themselves (experimental group) or by others (control group). All students rated their knowledge and the knowledge of their partner after the question period. Contestants in the experimental group rated their partner as having more general knowledge relative to themselves, while contestants in the control group generated approximately equal ratings. Therefore, the contestants in the experimental group failed to take the assigned social roles into account. Their questioner partners only appeared more knowledgeable because they were able to make use of unique personal knowledge to formulate questions.

As mentioned above, however, much research suggests that African and East Asian cultures are relatively more collectivist than Western cultures (Triandis, 2001). Thus, there is a strong cultural force that encourages people to view themselves and others as connected to each other and to their environment. For example, members of East Asian cultures are more likely to describe themselves using interrelated descriptors than are members of Western cultures (Bond & Cheung, 1983). This habitual mode of thought and communication also influences attribution in social situations. Morris and Peng (1994) found that Americans were more likely to give dispositional explanations of other people’s behavior than were Chinese. Of interest, the tendency to give dispositional explanations was true for descriptions of social events but not physical events. That is, culture specifically affected people’s representations of social events, not their ability to represent causal events more generally.

Culture and Cognitive Processes

A second crucial influence of culture on cognition comes from the transmission of cognitive strategies and methods for solving problems. The acquisition of some cognitive abilities requires only experience or immersion in the proper environment. Complex processes of human vision develop normally, provided that humans are exposed to normal visual environments, though some abilities are also enhanced by being able to interact with the environment physically. For example, the development of depth perception is facilitated by infants’ self-directed movement through the environment (Campos et al., 2000). Similarly, language develops normally, without the need for explicit instruction, in children who are exposed to an environment of native speakers.

In contrast, many more complex cognitive abilities do require explicit instruction. Mathematics, for example, needs to be taught. Children need to be taught a number system and a method for counting, as well as procedures for carrying out basic arithmetic operations. Many aspects of what children are taught about these procedures influence the way that they think about number and quantity. For example, many Western languages (like English) use

irregular number words for some of the numbers between ten and twenty (such as eleven and twelve) that do not make place-value transparent. Speakers of languages such as Igbo and Chinese, which have a system that respects place-value starting with the number for eleven, learn place-value more quickly than do speakers of languages like English (Fuson & Briars, 1990; Miura, Kim, Chang, & Okamoto, 1988).

Often, of course, we are so strongly socialized to particular methods for solving problems that we do not recognize that there are even other options for representing the domain and that our particular representation is an accident of our cultural training. The influence of culture on problem solving can extend all the way from modes of navigating the world to mechanisms for defining people's relationships to each other.

Hutchins (1983, 1995) provides an excellent example of this point in his extensive discussion of Micronesian navigation. He points out that modern societies cast the problem of navigation as one of finding a path through space, where space is represented from the two-dimensional overhead perspective used in maps. When boats are being navigated, the position of a boat is often fixed with reference to the position of known landmarks.

This way of thinking about navigation is so intuitive that it is difficult to conceive of another system that could be used successfully. Indeed as Hutchins points out, the difficulty of conceiving of an alternative hampered the ability of anthropologists to understand how native Micronesians navigated successfully between islands. Their navigation system has a number of features that seem strange from a modern perspective. For example, their navigation system relies on making use of fictitious islands that do not exist. Thus, unlike the modern system, in which we seek to create extremely accurate maps that detail the locations of every permanent object in the environment, the Micronesian system routinely made use of fictitious landmarks that nobody had seen and that nobody ever traveled to. This facet of the Micronesian navigation system was one (of many) that made no sense from the perspective of modern navigation practices.

In practice, Micronesian navigators need to travel among a set of islands. To accomplish this task, they represent journeys in terms of directions and travel times rather than routes. Each journey includes time periods associated with the presence of islands or evidence of islands. When there is no visible evidence of the departure or destination islands, the navigators keep track of time by tracking the position of other islands relative to the boat. For example, one time period may exist when birds from an island are visible but land is not, and another time period may exist once the island comes into view. It is not possible just to keep track of time using the passage of the sun, because ocean currents and weather conditions can change the length of a journey substantially. However, the boat's passage of islands can be adjusted by

the speed of the boat. Initially, a distant island might be ahead of the boat and to the left, and over time, it will move slowly from the front to the rear of the boat. The best islands to use for tracking time in this way are islands that are located on the line about halfway between the departure and destination islands. When a real island exists in about the right place, it is used as part of the navigation scheme. When there is no real island in this position, a fictitious one is created in that location and used to help navigate.

This navigation practice (and others, like using the positions of stars to guide the direction of the boat at night) is passed along among members of the culture. For Micronesian navigators, this way of structuring the navigation task is intuitive because this is the system they have learned. The system is strikingly counterintuitive to outsiders because the modern world has settled on a different system. What is crucial from our perspective, though, is that culture presents us with modes of thought that we use to address problems. These modes become central cognitive tools that we use across situations to the point that we may begin to think of them as fundamental aspects of our cognitive architecture. It is important to recognize, however, that these processes are often only one of many that we could have learned, and thus are more like computer programs that we run on our neural hardware than universal aspects of our cognitive endowment.

Culture and Motivation

The first two sections of this paper focused on ways that culture can influence the content of people's mental representations. Content can be influenced directly by transmitting concepts and procedures through communication and instruction, and also more indirectly as a byproduct of the process of communicating with others. In this section, we examine ways that culture might promote motivational states that influence cognitive processing.

There has been an increasing appreciation that motivational states influence not only the likelihood that people will engage in a particular behavior, but also the cognitive processes that they bring to bear on that behavior (Maddox, Markman, & Baldwin, 2006). The relevance of this work for cultural differences is that cultures may promote different chronic motivational states of members. These chronic differences may then lead to cultural differences in the typical mode of cognitive processing engaged in by members of that culture (Hong & Chiu, 2001). Importantly, if a culturally distinct cognitive style results from chronic motivational states, then it should be possible to re-create the cognitive style in members of other cultures by inducing the corresponding motivational state.

One aspect of motivation that has been a source of growing research in culture and cognition examines a set of related motivational constructs surrounding self-construal and fear of isolation (Kim & Markman, 2006; Kühnen & Oyserman, 2002). As discussed earlier, cultures are well known to differ along the individualism-collectivism dimension (Triandis, 2001).

That is, some cultures tend to promote the importance of individuals, individual expression, and individual freedom. Other cultures promote the value of the group and emphasize the role that members of the culture play within the societal fabric.

This broad focus has a number of possible influences on individual members of the culture. One is that it affects people's self-concept (Markus & Kitayama, 1991). An emphasis on individualism may promote a self-concept in which people think of themselves (and describe themselves) in terms of characteristics that are relatively independent of others. For example, a woman might describe herself as pretty, which would be an aspect of her self-concept that is relatively independent of others. In contrast, an emphasis on the role that one plays within society may promote a self-concept in which people think of themselves in terms of interdependent characteristics and roles within that society. For example, the same woman might describe herself as a daughter, which would relate her to her role within her family.

A person's self-concept can be measured in a number of ways. Researchers have used responses to open-ended questions, scales and sorting techniques (Hardin, Leong, & Bhatwat, 2004; Kuhn & McPartland, 1954; Singelis, 1994). For example, the Twenty Statements Task (Kuhn & McPartland, 1954) asks participants to respond with twenty answers to the question "Who am I?" Interdependent individuals respond using more statements that correspond to group membership or roles, whereas independent individuals produce more statements that correspond to individual attributes.

There are reliable group differences in self-concept (Cross & Madson, 1997; Markus & Kitayama, 1991). For one, members of relatively individualist cultures also tend to have more independent self-construal than do members of more collectivist cultures. For another, within any given culture, women tend to have relatively more interdependent self-construal than do men.

What makes these group differences in self-construal particularly interesting is that it is possible to manipulate a person's current self-construal and then examine the influence of that induced self-construal on performance in a task. These experimental procedures can establish a causal link between self-construal and cognition. For example, Gardner et al. (1999) primed a relatively independent or interdependent self-construal by having participants either read a story that emphasized individual or collective values or by having them do a word search that led them to focus on the words "I" and "me" in the independent condition or "we" and "our" in the interdependent condition. People's self-descriptions in the Twenty Statements Task (Kuhn & McPartland, 1954) suggested that the manipulation had the desired effect.

In these studies, Gardner et al. (1999) found that individuals from the U.S. and Hong Kong who were primed to have an independent self-construal endorsed individualist values more strongly than collectivist values. In contrast, those primed to have an interdependent self-construal endorsed collectivist values more strongly than individualist values. Participants also judged an individual who had performed a selfish act more harshly when they were primed with an interdependent self-construal than when they were primed with an independent self-construal. These findings are consistent with observed cultural differences. That is, priming self-construal produced the same outcomes as observed in cultures that promote individualism and collectivism while also causally linking self-construal differences with value differences.

One limitation of studies that explore factors like the endorsement of values is that more work needs to be done to understand the precise influences of self-construal on cognition. An emerging stream of work suggests that an interdependent self-construal makes people more sensitive to context than does an independent self-construal. For example, Kühnen and Oyserman (2002) gave people letters made of smaller letters like those shown in Figure 5.1. Research in perception suggests a global precedence for these figures, in which the large letters are identified more quickly than the small letters (Navon, 1977). Kühnen and Oyserman found that this was only true when individuals were primed with an interdependent self-construal. Those who were primed with an independent self-construal were faster to identify the small letters than the large ones. This finding is consistent with the assumption that the processing of people with an independent self-construal is relatively less influenced by context (here the context of the large letter) than is the processing of people with an interdependent self-construal.

These perceptual tasks suggest that self-construal influences contextual sensitivity. As another demonstration, we (Grimm & Markman, 2007) contrasted performance of a control group with those primed with an interdependent or an independent self-construal, using the “I/we” pronoun circling task (Gardner et al., 1999), on a variation of the classic Jones and Harris (1967) fundamental attribution error paradigm. University of Texas undergraduates read an essay they believed to be written by another subject. The essay was either supportive of University of Texas football coach Mack Brown or argued that he should no longer be employed by the university. Some subjects were told that the author of the essay chose the essay position taken, and others were told the essay position was assigned. After reading the essay, subjects rated the degree to which the position in the essay reflected dispositional and situational causes. Individuals in the control group and those primed with an independent self-construal rated dispositional causes higher than situational ones.

HHHHHH

H

H
HHHHHH
H
H
H
H

Example of a large letter (F) constructed from smaller letters (H).

The lack of a difference between these two groups is not surprising because the subjects were American undergraduates and therefore likely independent even without priming. In contrast, participants who had been primed with interdependent self-construal rated situational causes higher than dispositional ones.

To explore this phenomenon in more detail, we moved to a domain for which it was possible to isolate the information that people were using to perform the task (Kim, Grimm, & Markman, 2007). These studies explored how differences in self-construal affect people's ability to determine causality. Participants learned about the influence of potential causes on an observed effect by viewing observations of the cause and effect relationships. For example, the cover story in our studies told people that they were assessing the influence of a number of liquids on the growth of flowers (see Spellman, 1996). On each trial, one or more of these liquids was applied to the plant, and participants predicted whether the plant would bloom. Then, they were shown whether the plant actually bloomed.

When there is only one potential cause (i.e., only one liquid is poured on the plant), the more often the flower blooms in the presence of the liquid relative to the absence of the liquid, and the more likely is it that the liquid really is causing the flower to bloom (see Cheng, 1997; Cheng & Novick, 1992). Correspondingly, if the flower actually blooms less often in the presence of the liquid, then the liquid probably inhibits flower blooming. When there are multiple possible causes (i.e., multiple liquids), the task of determining whether a liquid promotes or inhibits flower blooming is more complicated, because it is necessary to take into account the presence or absence of the other liquids.

The design of these studies can be quite complicated, but the basic logic of this study was fairly straightforward (see Spellman, 1996, for details). One of the potential causes had a positive influence on plant growth, and the other had a negative influence. However, when the causes were presented during the study, there were more examples of the case where both liquids were presented simultaneously (which tended to lead to the flower blooming) than examples of one of the causes in the absence of the other. Because the presentation was set up this way, participants who only paid attention to whether a particular cause tended to be

associated with the effect would conclude that both liquids tended to promote plant growth. Only if participants attended selectively to cases in which one cause appeared in the absence of the other could they successfully realize that one cause tended to promote the effect and the other tended to inhibit it.

This study provided further support for the claim that an interdependent self-construal is more likely to lead people to attend to contextual information in their environment than is an independent self-construal. People primed with an interdependent self-construal were able to recognize that the inhibitory cause actually inhibited the effect. That is, they were able to attend to the contextual information in the contingency judgment. In contrast, people primed with an independent self-construal tended to judge that this inhibitory cause actually promoted the effect. That is, those with the independent self-construal tended not to attend to contextual information.

So far, the results I have presented suggest that motivational variables that are correlated with cultural differences lead to patterns of behavior in cognitive tasks that are like those observed in cross-cultural studies. Is it possible to explain differences in performance on a task with differences in a motivational variable? Kim and Markman (2006) addressed this question using the related motivational variable fear of isolation (Baumeister & Leary, 1995; Noelle-Neumann, 1984). Fear of isolation is the tendency to be anxious or afraid because of the prospect of being socially isolated from one's peer group. This fear of social isolation can be measured using the Fear of Negative Evaluation (FNE) scale, which measures people's propensity to react anxiously to negative feedback from members of a peer group (Watson & Friend, 1969). Members of East Asian cultures tend to have higher scores on this FNE scale than do members of Western cultures. This result suggests that members of East Asian cultures have a greater propensity than do members of Western cultures to react anxiously to negative evaluations by peers. (Note, however, that this difference does not imply that the resting anxiety level differs.)

Kim and Markman (2006) manipulated fear of isolation in American college students by asking them to write about either (a) experiences in which they were anxious or afraid because they were isolated from a group or (b) experiences in which they were anxious or afraid because they caused someone else to be isolated from a group. Thus, although participants in both conditions thought about the concept of isolation, participants were expected to have a higher fear of isolation in the first condition than in the second. Responses to the FNE scale confirmed this expectation.

Participants in both priming conditions were then asked to evaluate their preference for a set of unfamiliar proverbs used in previous cross-cultural studies by Peng and Nisbett (1999). Half of the proverbs were dialectical proverbs that expressed a contradiction (e.g., "Sorrow is

borne of excessive joy”) and half were non-dialectical proverbs that expressed a preference for a single resolution over a contradiction (e.g., “Good friends settle their accounts speedily”). Peng and Nisbett (1999) found that East Asians showed a greater relative preference for dialectical proverbs than did Americans. Consistent with this observation, participants showed greater preference for dialectical proverbs if their fear of isolation was primed than if it was not. Furthermore, statistical analysis demonstrated that this difference in preference was completely accounted for by differences in scores on the FNE scale.

To examine the relationship of this finding with cross-cultural differences, a group of Korean participants was also run (in Korea). They evaluated the proverbs and filled out the FNE scale. However, although their fear of isolation was not primed, these participants had higher scores on the FNE scale than did Americans, regardless of their fear of isolation. They also had a greater relative preference for the dialectical proverbs than the Americans had. Statistical analyses showed that the between-culture variation in preference for dialectical proverbs was completely explained by differences in scores on the FNE Scale.

Similar findings were obtained in a study examining the influence of fear of isolation on people’s ability to resolve an interpersonal conflict (Kim & Markman, in preparation). In the study, Americans were more likely to provide a dialectical resolution to the interpersonal conflict if their fear of isolation had been primed than if it had not. However, Koreans whose fear of isolation was not manipulated had higher fear of isolation than did Americans in either priming condition, and correspondingly, were more likely to resolve the conflict dialectically than were the Americans.

This study suggests that fear of isolation has similar effects on self-construal. Like an interdependent self-construal, high fear of isolation leads to greater attention to contextual relationships in the environment than do low fear of isolation. Furthermore, it suggests that there are cultural factors that promote chronic differences in these variables in ways that have a general influence on cognitive processing. Further research must explore what factors of culture promote these differences in motivation.

A related question involves trying to better understand what causes the linkage between these variables and motivation. Self-construal could have been a purely cognitive factor that influenced only the content of the way people think about themselves. However, differences in self-construal clearly have motivational effects. In addition to the observation that self-construal differences lead to similar patterns of behavior to those observed with differences in fear of isolation, there is also evidence that self-construal may be related to differences in regulatory focus (Aaker & Lee, 2001; Higgins, 1987, 1997; Lee, Aaker, & Gardner, 2000). In particular, an independent self-construal may be related to a general sensitivity to potential

gains in the environment, or a promotion focus (Higgins, 1997). An interdependent self-construal may be related to a general sensitivity to potential losses, or a prevention focus. Thus, it is possible that self-construal, fear of isolation, and other related variables like mortality salience (Greenberg et al., 1990; Rosenblatt, Greenberg, Solomon, Pyszczynski, & Lyon, 1989) have their effects in part by influencing basic self-regulatory processes like regulatory focus. Future research must explore this possibility.

Implications for Research on Culture and Cognition

The work summarized here suggests that cultures have a number of avenues to affect thought. These avenues range from the overt to the subtle. On the overt side, cultures affect the concepts that people are taught. They also influence the habitual modes of problem solving that are presented. On the subtle side, the act of communicating with others helps to synchronize category structures across individuals because of corrections that occur when people are establishing reference during conversation. Furthermore, distinctions that are made by a language can orient people toward particular aspects of the environment and lead them to represent those aspects as a matter of course. Finally, cultures lead to stable chronic individual differences in variables like self-construal and fear of isolation that have consistent influences on cognitive processing.

This research has interesting implications for the study of culture as an entity, as well as for the examination of cultural influences on cognition. For those interested in the study of culture, two key issues emerge. First, research can examine the factors that support observed cultural differences in psychological variables. For example, what cultural factors promote reliable differences in self construal and fear of isolation? Likewise, are there particular cultural factors that support specific modes of problem solving or representation?

Second, research should explore whether the relationship between culture and individual psychology makes some clusters of cultural properties more stable than others. For example, interdependent self-construal and high fear of isolation seem to co-occur in cultures that are described as collectivist. There is a certain face-validity to this grouping, but it is worth examining the relationships among these variables in more detail. It is logically possible for members of a collectivist culture to have a relatively independent self-construal, but high fear of isolation. It would be useful to better understand why some of these patterns are not typically observed.

As this discussion implies, this work suggests that culture is an important social construct and that further study of culture will greatly illuminate our understanding of psychological variables and also of psychological variability. That is, cultural differences give us a window into a range of behaviors that are obscured by our tendency to focus research on Western-

educated college students and to treat deviations from the mean performance of this group as noise.

At the same time, this work also suggests that it may be possible to eliminate culture as an explanatory variable in psychological models. That is, at present, much work in cultural psychology presents differences in performance of different cultural groups. In these studies, culture is a stand-in for a cluster of psychological variables that drive the behavior of the individuals in the study. By better understanding the psychological variables correlated with culture, we should ultimately be able to explain these differences in behavior in terms of other variables. An important reason for engaging in this style of research is that it will ultimately provide us with a better understanding of variability in performance within cultures as well. That is, the study of cultural differences can help us to treat the variability in the performance of participants in our studies as signal rather than noise.

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One of the issues involved in definitions is because certain terms are culture-bound. This is because of the different experience offered by a culture to its people.