

Toward a New Generation of Cross-Cultural Research

David Matsumoto¹ and Seung Hee Yoo²

¹San Francisco State University and ²Yale University

ABSTRACT—*In this article, we describe how cross-cultural research methodologies have evolved, with each phase of research addressing limitations of a previous one. We describe briefly the three previous phases and argue for embarking on a fourth phase that empirically establishes linkages between the active cultural ingredients hypothesized to cause between-country differences and the observed differences themselves. We discuss theoretical considerations and possible empirical methods to establish such linkages, and urge researchers to seriously consider incorporating these kinds of linkage studies in their programs of research.*

Cross-cultural psychological research has evolved over the years, moving from documenting cultural differences to identifying meaningful and relevant dimensions of cultural variability, and then to using those dimensions in creating elegant theoretical models that predict and explain the documented differences. Undoubtedly, this research has put culture on the map of psychology. Culture is now widely recognized as an important, if not crucial, variable to be integrated in theory and research on all aspects of human behavior.

In this article, we describe how cross-cultural research methodologies have evolved over time, each phase of inquiry addressing limitations of a previous one. In particular, we describe the three previous phases of cross-cultural research methods and argue for embarking on a fourth phase, one that empirically links the active cultural ingredients hypothesized to cause differences with the observed differences themselves. We discuss theoretical considerations and possible empirical methods to establish such linkages; we do so not to provide definitive solutions to the limitations in existing research, but rather to spur continued thinking about the importance of establishing linkage and the methods for doing so. We begin with a

description of what we consider the first three phases of cross-cultural research.

THE EVOLUTION OF CROSS-CULTURAL RESEARCH METHODS

Bond (2004) distinguished three generations of cross-cultural studies, each identified by its emphasis on a particular methodology. To be sure, contemporary cross-cultural research involves all the types of methods. Thus, the methods associated with the various phases of cross-cultural research are not mutually exclusive; rather, the relative emphasis on different methods has changed across time.

Phase I: Cross-Cultural Comparisons

The backbone of cross-cultural psychology is cross-cultural comparisons that document the existence of differences across cultural groups. Methodologically, such studies are quasi-experimental studies in which cultural group is the independent variable and psychological variables are dependent variables. Most often the cultural groups are national groups (i.e., countries), although ethnic, language, and racial groupings have also been studied.

Research identifying and documenting cross-cultural similarities and differences has made a major contribution to psychology and should continue to do so in the future. Such studies test the boundaries of knowledge generated in the monocultural studies that dominated American (and other) psychology in the past. They have been useful in generating knowledge about universal and culturally specific psychological processes. And they have spurred critical thinking about the cross-cultural applicability of all aspects of psychological inquiry.

This first phase of cross-cultural research began more than 100 years ago. Rivers's (1905) study was one of the first, demonstrating that individuals from India and New Guinea were more fooled by optical illusions than were individuals from England. Many other pioneering studies demonstrated cultural similarities and differences in cognition (Cole & Scribner, 1974; Mishra, 2001; Segall, Campbell, & Herskovits, 1963), emotional

Address correspondence to David Matsumoto, Department of Psychology, San Francisco State University, 1600 Holloway Ave., San Francisco, CA 94132, e-mail: dm@sfsu.edu.

expression (Ekman, 1972), and social cognition (Kashima, 2001). The *Journal of Cross-Cultural Psychology*, which specializes in the publication of cross-cultural comparisons, has been in existence for more than 35 years.

Phase II: Identifying Meaningful Dimensions of Cultural Variability

One of the limitations of Phase I cross-cultural comparisons (and many Phase III cultural studies), however, is that they do not allow for empirically justified interpretations about culture as the source of group differences. That is, when group differences have been found, researchers have typically concluded that those differences have a cultural source, when in fact the mere documentation of between-group differences does not justify such interpretations. There are many ways in which two or more countries, ethnic groups, or racial groups may differ. Some of these ways are cultural, and some are not. The problem in inferences occurs when researchers attribute the source of group differences to culture without being empirically justified in doing so. And even if the source of observed differences is indeed culture, it is not exactly clear what cultural variables produce the differences and why. Campbell (1961) referred to this type of error of interpretation in inference as the ecological fallacy, and in the case of cross-cultural studies, we refer to them as the *cultural attribution fallacy*—the inference that something “cultural” about the groups being compared produced the observed differences when there is no empirical justification for this inference.

This limitation exists partly because of the ways cultures are sampled—via country, ethnic, or racial groups—and partly because many cross-cultural studies involve comparisons of only two or a small handful of groups. The groupings used, however, are not necessarily cultural. This brings us to the question of what is culture. Attempts to define culture go back well over a hundred years (e.g., Baumeister, 2005; Berry, Poortinga, Segall, & Dasen, 1992; Jahoda, 1984; Kroeber & Kluckhohn, 1952/1963; Pelto & Pelto, 1975; Rohner, 1984; Tylor, 1865), and there is no one accepted definition of culture in anthropology, sociology, or psychology today. Yet most definitions share certain characteristics, and we believe that human culture is generally defined as a meaning and information system shared by a group and transmitted across generations. Culture includes objective and subjective elements (Triandis, 1972) produced and reproduced by interconnected individuals to solve complex social problems (Kashima, 2000; Triandis, 1994). The distinction between the objective and subjective elements of culture is related to Kroeber and Kluckhohn's (1952/1963) distinction between implicit and explicit culture.

Because interpretations about the source of cross-cultural differences were limited, it became necessary for psychologists to identify meaningful dimensions of cultural variability that describe the subjective elements of culture. Such dimensions

would aid researchers in interpreting their findings. Hofstede addressed this need in his seminal work. Initially (Hofstede, 1980), he reported data from 40 countries, and soon thereafter (Hofstede, 1984), he added 13 more. Most recently (Hofstede, 2001), he has reported data from 72 countries—the responses of more than 117,000 employees of a multinational business organization to his 63 work-related values items. This research project spanned more than 20 languages and seven occupational levels. Originally, Hofstede conducted ecological-level factor analyses on the country means for his work-related items and generated three dimensions that he suggested could describe the cultures of the countries sampled. He then split one of the dimensions into two on the basis of theoretical reasoning and the fact that controlling for country-level gross national product produced a differentiation in the factor structure. This resulted in his well-known set of four dimensions: Individualism Versus Collectivism, Power Distance, Uncertainty Avoidance, and Masculinity. Recently, Hofstede incorporated a fifth dimension called Long- Versus Short-Term Orientation (Hofstede, 2001; Hofstede & Bond, 1984).

The identification of these dimensions, their quantification on scales, and the placement of countries on these scales were major advances for the field, enabling researchers to predict and explain cultural differences along meaningful dimensions of variability. Of Hofstede's five dimensions, individualism-collectivism became especially popular. Triandis championed this dimension and used it to explain many cross-cultural similarities and differences in behaviors, including cross-cultural differences in relationships with in-groups versus out-groups (Triandis, 1994, 1995, 2001; Triandis, Bontempo, Villareal, Asai, & Lucca, 1988). Individualism has been theoretically related to cultural differences in the expression, perception, and antecedents of emotion (Gudykunst & Ting-Toomey, 1988; Matsumoto, 1989, 1991; Wallbott & Scherer, 1988); self-monitoring and communication (Gudykunst et al., 1992); the effects of speech rate on perceptions of speakers' credibility (Lee & Boster, 1992); and family values (Georgas, 1989, 1991). In fact, although Hofstede's other dimensions have received some attention in the literature (Gudykunst, Nishida, & Chua, 1986; Gudykunst, Yang, & Nishida, 1985; Shuper & Sorrentino, 2004), individualism-collectivism became the most widely studied dimension in the field and has been conceptually linked to many psychological differences across cultures (Hofstede, 2001; Triandis, 1995, 2001).

Phase III: Cultural Studies

Although the elucidation of dimensions of cultural variability such as individualism-collectivism was clearly an advance in the field, it still did not completely address issues concerning the cultural attribution fallacy; country names were just replaced with dimension labels. For example, merely assuming that cultural groups were either individualistic or collectivistic, and that the members of individualistic cultures harbored

individualistic values whereas the members of collectivistic cultures harbored collectivistic values, remained just that—an assumption. Therefore, between-group differences could still not be justifiably attributed to cultural sources because cultural differences of the studied samples were being assumed.

This problem was addressed by Markus and Kitayama's (1991) landmark work linking individualism-collectivism on the cultural level with the concept of self on the individual level. They posited that individualistic cultures foster the development of independent self-construals, which, in turn, have consequences for mental processes and behaviors. Likewise, they suggested that collectivistic cultures foster the development of interdependent self-construals, which have different consequences. This work was important in the evolution of cross-cultural research methods because it identified an important potential mediator of cultural differences—self-construals. Different types of self-construals, emerging from different cultural contexts, could therefore be one of the sources of observed cultural differences.

Markus and Kitayama's (1991) framework spurred the next generation of cross-cultural research, characterized by what we call *cultural studies*: rich descriptions of complex theoretical models of culture and self that predict and explain cultural differences. In the area of emotion, for instance, Mesquita (2001; Mesquita & Karasawa, 2002) has described how cultural systems produce different concepts of the self, which, in turn, produce different types of specific concerns for the individual. According to her framework, individualistic cultures encourage the development of independent senses of self that encourage a focus on personal concerns and the view that emotions signal internal, subjective feelings; collectivistic cultures, in contrast, encourage the development of interdependent senses of self that encourage a focus on one's social worth and the worth of one's in-group, and the notion that emotions reflect something about interpersonal relationships.

Another major line of research that exemplifies Phase III is the impressive work produced by Nisbett and his colleagues in the area of cognition (Masuda & Nisbett, 2001; Miyamoto, Nisbett, & Masuda, 2006; Nisbett, Peng, Choi, & Norenzayan, 2001; Peng & Nisbett, 2000). In recent years, this group has demonstrated numerous differences in perception and cognition between Americans and East Asians. These researchers suggest that cultural differences, born from differences in ecologies, lead to different social practices in the United States and East Asia. In the United States, social practices encourage agency, whereas in East Asia, they encourage harmony. These different affordances produce differences in the way individuals in the two cultural groups categorize items (Ji, Zhang, & Nisbett, 2004), communicate (Sanchez-Burks et al., 2003), make attributions (Nisbett et al., 2001), and perceive the environment (Masuda & Nisbett, 2001). In this framework, North Americans' cognitive styles are analytic and logical, whereas East Asians' cognitive styles are holistic and dialectical.

Other cultural studies have addressed a host of psychological constructs and processes, including morality (Shweder, 1993), the nature of unspoken thoughts (Kim, 2002), the need for high self-esteem (Heine, Lehman, Markus, & Kitayama, 1999), and many others (many of these areas of research are reviewed in Heine & Norenzayan, 2006, this issue). These studies have served cross-cultural psychology well through their elegant experiments, nuanced descriptions, and innovative methodologies. They provide fascinating descriptions of cultural practices and potential mechanisms for how cultural differences may be produced (intrapersonal, interpersonal, situational, and ideological), and the conceptual frameworks of the studies are often supported by thoughtful discussions of the sociohistorical contexts in which these practices are embedded. These frameworks are also often complemented by observations of everyday life in the various cultures. Cultural studies go beyond simply examining cultural differences in mean levels of responses (which characterize much of Phase I research); they often compare relationships among variables across cultures, suggesting how variables function differently in different cultural contexts.

THE NEXT EVOLUTION IN CROSS-CULTURAL RESEARCH: PHASE IV STUDIES

We argue that it is time for cross-cultural research methods to evolve once again—to Phase IV. This phase will be characterized by what we call *linkage studies*, because they empirically link the observed differences in means or correlations among variables with the specific cultural sources that are hypothesized to account for those differences. This phase of research will be an important extension to Phase III studies because, although the theoretical frameworks of many Phase III cultural studies have done an excellent job at identifying the potentially active cultural ingredients that supposedly produce predicted differences, these studies often do not measure those cultural ingredients—be they selfways, affordances, worldviews, or cultural practices—and link them to the observed differences empirically (Matsumoto, 1999). Without such linkage, the theories about how observed differences between groups were produced remain speculative and empirically unjustified, despite their elegance.¹

For instance, Iwata and Higuchi (2000) compared Japanese and American responses to the State-Trait Anxiety Inventory (STAI) and reported that Japanese reported less positive feelings and higher state and trait anxiety than Americans. Explaining these differences, Iwata and Higuchi wrote:

¹To be sure, there have been some attempts to establish linkages. Yet we agree with Heine and Norenzayan (2006, this issue) that these studies are still in their infancy. Thus, definitive conclusions about possible cultural sources of group differences are probably premature.

In traditional Japan, a typical collectivistic society, individual psychological well-being is subordinate to the well-being of the group; that is, maintenance of social harmony is one of the most important values (Iwata et al., 1994). The healthy collectivist self is characterized by compliance, nurturance, interdependence, and inhibited hedonism (P. J. Watson, Sherbak, & Morris, 1998). The inhibition of positive affect seems to represent a moral distinction and reflect socially desirable behavior in Japan (Iwata et al., 1995). For this reason, the Japanese are taught from childhood to understate their own virtues and avoid behaving assertively (Iwata et al., 1994). *Because of this socialization, the Japanese seem less likely to generate positive feelings and more likely to inhibit the expression of positive feelings.* (p. 58; emphasis added)

Unfortunately, none of the factors suggested to account for the country differences in anxiety were empirically linked to the differences. To justify Iwata and Higuchi's causal statement, researchers would need to demonstrate that (a) Japan is a collectivistic society where (b) individual psychological well-being is subordinate to the well-being of the group and (c) maintenance of social harmony is one of the most important values; (d) Japanese selves are characterized by compliance, nurturance, interdependence, and inhibited hedonism; (e) the inhibition of positive affect represents a moral distinction and is socially desirable in Japan; (f) the Japanese underestimate their own virtues; and (g) the Japanese avoid behaving assertively. And it would be necessary to demonstrate that these factors were empirically linked to the country differences in the STAI. None of this was done. In reality, the observed differences may in fact be due to these factors; we are arguing that Iwata and Higuchi's interpretation is not empirically justified, and some study or studies should be designed to test their idea.

Addressing the limitation in interpretations such as the one just discussed can begin with the recognition that the differences researchers observe in cross-national comparisons are "country" rather than "cultural" differences. This recognition acknowledges that country is not necessarily culture, and that there are many possible factors—cultural and noncultural—that can contribute to between-country differences. Researchers, then, have the onus of identifying those cultural factors that possibly contribute to the country differences and empirically linking those factors to those differences.

Phase IV linkage studies should attempt to accomplish this. In the next section, we discuss theoretical issues that should be considered in this phase of research. We then consider several research models that could be used to establish linkages empirically.

THEORETICAL CONSIDERATIONS

Culture or Not Culture?

The Ecological Level

Given that most cross-cultural research is really cross-national, one needs to consider all the relevant sources that could po-

tentially produce observed between-country differences. Some may be cultural, some may not, and it will be important for research in the future to rule out the possibility that noncultural sources contribute to observed group differences. Our definition of culture—as a meaning and information system shared by a group and transmitted across generations—would allow researchers (as would any other definition) to begin to parse out many noncultural variables that vary between countries and need to be considered.

On the ecological level, there are many potentially relevant noncultural variables, such as affluence or socioeconomic status, population density, religion and religious practices, and climate (Georgas & Berry, 1995; Georgas, van de Vijver, & Berry, 2004).² Each of these varies greatly among countries, and each has potential impact on psychological processes. For example, according to the *World Factbook* (Central Intelligence Agency, 2006), the country with the highest per capita purchasing-power parity is Luxembourg at \$62,700; the country with the lowest is East Timor at \$400. This is quite a spread. Even the differences between the United States (\$41,800) and Japan (\$30,400), South Korea (\$20,300), and mainland China (\$6,200), countries often compared with the United States, are considerable and cannot be overlooked. Given that affluence is related to individualism (e.g., Hofstede, 1980, reported a correlation of .82 between the two; see also Kashima & Kashima, 2003; Triandis, 2001), there is a distinct possibility that observed between-country differences that are assumed to occur because of differences in individualism-collectivism may in fact occur because of economic factors.

Climate is another ecological-level variable to consider. Climates, average temperatures, rainfall, and the degree of extreme weather—either hot or cold—can influence culture and behavior. Kashima and Kashima (2003) demonstrated that geographical latitude predicted individualism on the country level, and Van de Vliert and his colleagues have amassed impressive data demonstrating that climate is related to leadership behavior and volunteer work across countries (Van de Vliert, 2004, 2006; Van de Vliert, Huang, & Levine, 2004; Van de Vliert & Janssen, 2002; Van de Vliert, Schwartz, Huismans, Hofstede, & Daan, 1999).

One interesting line of research in recent years is that of McCrae and his colleagues, who have demonstrated the existence of between-country differences in levels of personality traits, as measured by the five-factor model (Allik & McCrae, 2004; McCrae, 2002; McCrae & Costa, 1999; McCrae et al., 2005). Thus, countries differ on aggregate levels of Neuroticism,

²Some scholars may believe that these are aspects of culture itself. We disagree, given our definition of culture. If culture is defined to be all-encompassing, so that it includes these and other constructs and explains all group differences, then we believe it has little explanatory value (see also our later discussion concerning unpacking culture). Regardless, it is imperative for researchers to make their definitions of culture known so that it is clear what they do and do not consider to be culture.

Extraversion, Conscientiousness, Openness, and Agreeableness and their facets. To be sure, these findings raise interesting conceptual issues, especially concerning whether or not personality traits are conceptually linked to culture. The five-factor model suggests that these traits represent biologically based predispositions for behaviors, and that cultures provide individuals with specific ways in which these predispositions are manifested in concrete behaviors. To the extent that personality and culture are separate, therefore, one question that arises is the degree to which between-country differences occur because of culture, or because of aggregate differences in personalities in the countries being measured.

There are many other noncultural factors that could be sources of between-country differences in psychological processes and behavior. Countries differ, for example, not only in the relative degree to which religion is practiced, but also in the degree to which religion is infused in government and culture. Also, it is difficult to imagine that such factors as the amount of arable land relative to population density do not have an impact on culture and behavior. Countries also differ in educational practices, and there are likely to be differences between countries that use an American or Western European style of education and those that do not. Even among countries that have an American system, there may be major differences in how the system is implemented. In Japan and South Korea, for instance, students are required from a very early age to memorize facts in a much more passive, didactic manner than students in the United States are. These types of differences may contribute to differences in performance of cognitive-related tasks requiring attention, perception, or memory; systemic cultural differences such as differences in individualism-collectivism are not the only possible explanation.

Of course, it may be that these noncultural ecological-level factors contribute to the development of cultures in the first place, an idea that is consistent with an environmental causation model of culture (described later in "In Which Directions Do the Arrows Point?"). Even so, it may be wise for researchers to incorporate some of these factors in studying the sources contributing to between-country differences, because not all group-specific ecological differences are cultural (at least as defined here).

The Individual Level

Many of the same concerns exist on the individual level as well, and researchers need to exercise caution in ensuring that their samples are adequately representative of the cultures in question and do not differ in other, noncultural demographic variables. Again, this is important because one cannot simply assume that the only differences between samples from different countries are cultural. There may, in fact, be noncultural demographic differences between the samples that may contribute to any observed differences in behavior and psychological processes, and these noncultural differences need to be ruled out.

Most cross-cultural research uses university-student samples, and it is easy to believe that there is some degree of equivalence among samples because of their level of education. In many cases, this may be true. But it is also true that requirements for entrance into universities vary across countries. In the United States, it is very common for high school graduates to gain entrance into a university or college. In some countries, however, a university education is a luxury that is limited to members of a privileged class.

Even among university samples, there can be many noncultural demographic differences. In the United States, for instance, the average age of undergraduate students is between 18 and 22 at many universities, but considerably higher at others. At commuter schools like San Francisco State University, for instance, where one of us is located, the average age of student samples is typically about 26. Obviously, such differences need to be accounted for in testing for cultural differences.

University samples in different countries can also differ in living situations or work experience. In the United States, for instance, students often work either full- or part-time while attending school. Many live on their own or with other students. Many support themselves or are only partially supported by parents. However, many of these factors differ in other countries. For example, in Japan and South Korea, which often serve as comparisons to the United States, many students live at home and are completely supported by their families. It is not clear what effect these kinds of differences have on psychological variables, but they potentially have some kind of noncultural effect that needs to be accounted for.

Religious backgrounds and practices are another major difference among individuals from different cultures. In the United States, for instance, religious practices are relatively separable from nonreligious practices, and most people can choose which religion to practice and how much to actively practice it. In some cultures, however, there is little or no separation between religion and culture, and in others, religion is so well infused in the culture that the two are indistinguishable.

Another individual-level variable researchers should consider is personality. As we have noted, countries differ in aggregate levels of personality traits. Samples from such countries are therefore also likely to differ on those traits, and if these differences are not controlled, between-country differences in culture are confounded by between-country differences in levels of personality traits in their samples.

As is the case with the ecological-level factors, all of the individual-level variables described in this section may in fact be inseparable from culture, and it may be impossible for cross-cultural studies to establish equivalence in samples on all demographic characteristics. We suggest, nevertheless, that cross-cultural researchers should conduct full demographic assessments of samples whenever possible, examine possible relationships between demographic variables and the psychological processes of interest, and note demographic variables

that potentially confound cultural differences, sometimes even inextricably. Undoubtedly, obtaining these demographic data and isolating the source of between-country differences to specific cultural or demographic influences, even if the latter are inextricably intertwined with culture, is a step forward in establishing linkage.

What Aspect of Subjective Culture?

Another consideration for future research is the need to test competing cultural models. Over the past 15 or so years, one cultural construct has dominated theory and research: individualism versus collectivism. And it has dominated the field for good reason. For centuries, philosophers have discussed the tendencies underlying these constructs as integral to humans, and in the past century and a half, social scientists have joined this discussion. This construct seems relevant to a core understanding of human nature and to how human nature can be molded culturally. And it has served as the basis for interesting theoretical developments and empirical work in cross-cultural psychology for the past 25 years.

Still, the field's passion for individualism-collectivism may have blinded it to other aspects of subjective culture that may be equally or even more useful. A review of the literature, for instance, indicates that there are at least six major lines of research that have documented the existence of multiple cultural constructs on the ecological level (Table 1). Hofstede's (1980), of course, was first, and it initially included three constructs in addition to individualism-collectivism. One of these—power distance—was highly correlated with individualism-collectivism. Since that publication, Hofstede has added one dimension (long- vs. short-term orientation); Schwartz (2004) has uncovered seven universal value orientations; Smith, Dugan, and Trompenaars (1996) have reported two universal value orientations; House, Hanges, Javidan, Dorfman, and Gupta (2003) have reported nine value orientations related to leadership; Inglehart (1997) has reported two attitude-belief-value orientations; and Bond et al. (2004) have reported two dimensions of social axioms. Thus, there is a wide range of cultural dimensions to utilize in developing cultural theories and accounting for between-country differences in psychological processes.

Moreover, the problem posed by the existence of multiple dimensions of cultural variability is exacerbated in two-country comparisons, which are characteristic of cross-cultural research. Although two countries may differ on one dimension, they often also differ on other dimensions. In Hofstede's (2001) data, for instance, the United States ranks 1st on individualism versus collectivism, and Japan ranks 27th (of 70 countries total). This fact has been used to support the characterization of the United States as an individualistic culture and Japan as a collectivistic one (despite the fact that, in reality, Japan is in the middle of the scale). But on Hofstede's dimension of uncertainty

avoidance, Japan ranks 8th and the United States ranks 59th, an even bigger difference. On long- versus short-term orientation, Japan ranks 4th and the United States ranks 26th (out of 36 total). In fact, the U.S.-Japan difference in uncertainty avoidance can easily be used to explain the U.S.-Japan difference in anxiety reported by Iwata and Higuchi (2000).

Theoretical frameworks to account for observed between-country differences in many psychological processes may be developed using dimensions other than individualism versus collectivism. Indeed, some data suggest the importance of other dimensions. In two of our recent studies, for example, long-term orientation was the best predictor of country differences in norms governing emotional expressivity (Matsumoto et al., 2005) and emotional experience (Matsumoto, Nezlek, & Koopmann, in press).

Also, the country-level dimensions listed in Table 1 are related to one another. As already mentioned, Hofstede's (1980) individualism-collectivism was highly correlated with power distance. Other correlations among his dimensions have been reported as well (Hofstede, 2001). Hofstede's dimensions have also been correlated with Schwartz's (2004) value orientations; individualism, for instance, is correlated with intellectual and affective autonomy and with egalitarianism. In addition, Hofstede's dimensions have been correlated with the dimensions reported by Smith et al. (1996), House et al. (2003), and Bond et al. (2004). Thus, researchers may focus on individualism versus collectivism, but their frameworks may be more appropriately related to other dimensions.

We make these points not to criticize the immense contribution that the individualism-collectivism construct has made up to now (see also Oyserman, Coon, & Kimmelmeier, 2002). We do believe, however, that in the future researchers will need to examine more carefully all of the cultural constructs available to them in developing theoretical models that predict differences (and similarities) in psychological processes. In particular, models that incorporate multiple cultural dimensions in interaction may provide better, more nuanced views of how subjective culture affects behavior than do models that incorporate individualism-collectivism only. In the end, individualism versus collectivism and related constructs such as independent versus interdependent selves may be the best framework for understanding cultural differences; if competing cultural frameworks are not developed and tested, however, there is no way to know this.

In Which Direction Do the Arrows Point?

Another theoretical consideration concerns the models of the relationship between culture and behavior. The prevalent model is the *environmental causation model*, which is rooted in anthropology and evolutionary psychology. It suggests that ecological factors such as climate, natural resources, group-level affluence, and population density influence the creation of

TABLE 1
Six Theoretical Frameworks for Universal Dimensions of Cultural Variability

Framework	Dimensions
Hofstede's (2001) dimensions of work-related values	Individualism vs. collectivism Power distance Uncertainty avoidance Masculinity vs. femininity Long- vs. short-term orientation
Schwartz's (2004) dimensions of values	Embeddedness Hierarchy Intellectual autonomy Affective autonomy Egalitarianism Mastery Harmony
Smith, Dugan, and Trompenaars's (1996) dimensions of values	Egalitarian commitment vs. conservatism Utilitarian involvement vs. loyal involvement
House, Hanges, Javidan, Dorfman, and Gupta's (2003) dimensions of leadership values	Performance orientation Assertiveness orientation Future orientation Human orientation Institutional collectivism Family collectivism Gender egalitarianism Power distance Uncertainty avoidance
Inglehart's (1997) dimensions of attitudes, values, and beliefs	Traditional vs. secular-rational orientation Survival vs. self-expression values
Bond et al.'s (2004) dimensions of social axioms (beliefs)	Dynamic externality Societal cynicism

cultures. Cultures, therefore, are human-made responses to the ecology within which societies exist; cultures are created as societies adapt to their contexts in order to meet the biological and social necessities of survival.

In this model, culture is “encoded” in the form of social practices, norms, rituals, beliefs, worldviews, values, and other subjective as well as objective elements. Encoded culture is transmitted to individuals by enculturation agents across the life span, especially during formative childhood and adolescent years. Enculturation agents include parents, families and extended families, members of the community; schoolteachers, and colleagues at work; as well as social institutions such as schools, day-care centers, community recreational centers, and work organizations. In this model, individuals are relatively blank slates; cultures shape and mold their personalities, which, in turn, affect their specific mental processes and behaviors, worldviews, and phenomenological experiences. Thus, one speaks of how culture influences behavior, and the arrows in the model point this way: culture → personality-self → mental processes and behaviors.

However, it is also possible that personality traits represent basic tendencies that are rooted in biology and interact with

culture in shaping specific mental processes and behaviors. This view is rooted in the five-factor model of personality (McCrae & Costa, 1999), which suggests that traits have only biological bases, and that cultures shape the expression of traits, but not their levels (Hofstede & McCrae, 2004). In this view, regional and national differences in genes related to personality traits may give rise to some aspects of cultural differences. Differences in trait-related genes may occur because of accidents of ancestral migration, genetic drift, or even natural selection. If they exist, they may help to shape cultural values. For example, extraverts may be inherently inclined to express emotions more than introverts, and if a cultural area contains many extraverts, emotional expression may become the norm partly because of the existence of such trait-related genes. In this model of *reverse causation* (Allik & McCrae, 2002), the arrows point in a different direction: biologically based personality traits → culture → specific mental processes and behaviors.

There are undoubtedly many other theoretical models that can be created. Our point is that research that merely demonstrates the existence of differences between countries, either in mean levels of responses or in patterns of relationships among vari-

ables, cannot be used to empirically justify either of these (or other) theoretical models. Thus, causal interpretations of such differences that suggest the arrows point in one direction or another are, in fact, speculations. Yet researchers are often quick to interpret their findings within an assumed model, most often the environmental causation model (i.e., they conclude that culture caused the differences). Future researchers should consider undertaking studies that can address which model fits data better.

POSSIBLE EMPIRICAL APPROACHES

How can studies empirically link between-country differences with the active cultural ingredients hypothesized to account for those differences? In this section, we discuss two kinds of studies that can do this—unpacking studies and experiments.

Unpackaging Studies

Unpackaging studies are extensions of basic cross-cultural comparisons, but they include the measurement of a variable that assesses the active cultural ingredients thought to produce the differences on the variable (or variables) being compared across cultures. The underlying thought to these studies is that cultures are like onions, so that layer after layer needs to be peeled off until nothing is left. Poortinga, van de Vijver, Joe, and van de Koppel (1987) expressed the view this way:

In our approach culture is a summary label, a catchword for all kinds of behavior differences between cultural groups, but within itself, of virtually no explanatory value. Ascribing intergroup differences in behavior, e.g., in test performance, to culture does not shed much light on the nature of these differences. It is one of the main tasks of cross-cultural psychology to peel off cross-cultural differences, i.e., to explain these differences in terms of specific antecedent variables, until in the end they have disappeared and with them the variable culture. In our approach culture is taken as a concept without a core. From a methodological point of view, culture can be considered as an immense set of often loosely interrelated independent variables. (p. 22)

The idea of unpackaging culture is not new. Bond (1998) suggested the importance of unpackaging culture a decade ago, and these ideas were extensions of an incisive critique of cross-cultural research by Clark (1987). The Whittings also discussed these ideas in their classic studies of children (Whiting & Whiting, 1975).

In unpackaging studies, culture as an unspecified variable is replaced by more specific variables, called *context variables*, in order to truly explain cultural differences. A context variable should be measured at the level of the participants from all cultures in the comparison. The researcher then examines the degree to which this variable statistically accounts for the observed differences, typically by mediation or covariance analyses (Baron & Kenny, 1986; MacKinnon, Lockwood, Hoffman,

West, & Sheets, 2002). If evidence for mediation is obtained, then the researcher is empirically justified in claiming that that specific aspect of culture (i.e., that context variable) is linked to the differences observed. If it does not, then the researcher knows that that specific context variable did not produce the observed differences. In either case, the researcher is empirically justified in making claims about which aspects of culture are related to the variable of interest.

What kinds of context variables can be used? Basically, a context variable—be it a paper-and-pencil measure of traits, attitudes, values, opinions, worldviews, or norms or a behavioral assessment of actual cultural practices—needs to operationalize the active cultural ingredients that researchers believe account for predicted differences. In this section, we outline several possibilities. This list is intended to be illustrative, not comprehensive. Each variable we discuss has advantages and disadvantages, and we urge researchers to consider their theoretical ramifications fully.

Individual-Level Measures of Culture

As we mentioned earlier, Triandis became a major proponent of the importance of the individualism-collectivism dimension. One of his and his colleagues' major accomplishments was the development of a battery of measures that operationalized this dimension on the individual level. Hui (1988), for example, developed the INDCOL scale to measure individualism-collectivism tendencies in relation to six collectivities (spouse, parents and children, kin, neighbors, friends, and coworkers and classmates). Later, Triandis, Leung, Villareal, and Clack (1985); Triandis, Bontempo, Betancourt, and Bond (1986); and Triandis et al. (1988) built on this work to develop additional measures of individualism-collectivism. Triandis, McCusker, and Hui (1990) used a multimethod approach to measuring individualism-collectivism that represented an evolution not only methodologically but also conceptually. These researchers viewed individualism-collectivism as a cultural syndrome that includes values, beliefs, attitudes, and behaviors; they treated the various psychological domains of subjective culture as a collective rather than as separate aspects of culture. Their multimethod approach included ratings of the social content of the self, perceptions of homogeneity of in-groups and out-groups, attitude and value ratings, and perceptions of social behavior as a function of social distance. On the individual level, Triandis et al. (1985) referred to individualism as idiocentrism and collectivism as allocentrism.

Most recently, Triandis and his colleagues (Singelis, Triandis, Bhawuk, & Gelfand, 1995) have developed measures that include items assessing a revised concept of individualism and collectivism they call horizontal and vertical individualism and collectivism. This work is yet a further advance in the conceptual understanding of individual-level individualism-collectivism.

TABLE 2
Individual-Level Scales That Correspond to Hofstede's (1980) Cultural Dimensions

Cultural dimension	Individual-level scale
Uncertainty avoidance	Uncertainty Orientation Scale (Shuper & Sorrentino, 2004; Shuper, Sorrentino, Otsubo, Hodson, & Walker, 2004; Sorrentino, Hanna, & Roney, 1992) Need for Cognitive Structure Scale (Bar-Tal, 1994; Bar-Tal, Kishon-Rabin, & Tabak, 1997; Bar-Tal, Raviv, & Spitzer, 1999) Tolerance for Ambiguity Scale (Budner, 1962; Frenkel-Brunswik, 1949; Kirton, 1981) Need for Structure Scale (Neuberg & Newson, 1993) Uncertainty Coping Scale (Greco & Roger, 2001) Emotion Regulation Questionnaire (Gross & John, 2003) Emotion Regulation Scale from the Intercultural Adjustment Potential Scale (Matsumoto & LeRoux, 2003; Matsumoto, LeRoux, Bernhard, & Gray, 2004; Matsumoto et al., 2001, 2003)
Power distance	Power Scale of the Schwartz Value Survey and Portrait Value Survey (Schwartz, 1992, 1994a; Schwartz, Melech, Lehmann, Harris, & Owens, 2001; Schwartz & Sagiv, 1995) Dominance Scale of the California Psychological Inventory (Gough, 1986) Conscientiousness Scale (Costa & McCrae, 1992; McCrae & Costa, 1999) Status Differentiation Scale (Matsumoto, 2005)
Masculinity vs. femininity	Bem Sex Role Inventory (Bem, 1981) Femininity Scale of the California Psychological Inventory (Gough, 1986) Mf Scale of the Minnesota Multiphasic Personality Inventory (Butcher, 2006)
Long- vs. short-term orientation	Time Orientation Scale (Zimbardo & Boyd, 1999)

Triandis and his colleagues are not the only researchers who have developed individual-level measures of individualism-collectivism. For example, Matsumoto, Weissman, Preston, Brown, and Kupperbusch's (1997) context-specific measure and Yamaguchi's (1994) collectivism scale have been used successfully to demonstrate that individualism-collectivism mediates observed between-country differences (Matsumoto et al., 2002).

Other scales operationalize Hofstede's (1980) four cultural dimensions (see Table 2). To be sure, some of these scales were developed as individual-level measures of personality constructs, not specifically to operationalize cultural dimensions, and thus have no cross-cultural validity data. They are listed here to illustrate the kinds of scales that may be available for use on the individual level, depending on the culture-level dimension that needs to be operationalized.

Self-Construal Scales

Spurred on by Markus and Kitayama's (1991) framework, Singelis (1994) developed the Self-Construal Scale, which measures independent and interdependent self-construals. Using this scale, Singelis, Bond, Sharkey, and Lai (1999) showed that cultural differences in self-esteem and embarrassment were empirically linked to individual differences on these types of self-construals, again exemplifying the utility of unpackaging studies. Recent research, however, has challenged the cross-cultural and structural validity of this particular scale (Hardin, in press; Hardin, Leong, & Bhagwat,

2004; Levine et al., 2003), and researchers need to exercise caution.³

Attitudes, Values, and Beliefs

Attitudes, values, and beliefs can serve as important context variables that may unpackage cultural differences. Schwartz's work, for instance, focuses on values, which are defined as desirable goals that serve as guiding principles in people's lives (Rokeach, 1973; Schwartz, 1992, 1994b). He has measured values in 46 cultural groups in 42 nations and in college-student samples representing 41 cultural groups in 40 nations (Schwartz & Ros, 1995). Schwartz categorized his individual-level items into seven major ecological-level values that he proposes are universal (Schwartz & Ros, 1995). On the individual level, Schwartz has reported a 10-value typology that he suggests is universally valid and reliable (Schwartz, Melech, Lehmann, Harris, & Owens, 2001; Schwartz & Sagiv, 1995); his Conformity, Tradition, Benevolence, Universalism, Self-Direction, Stimulation, Hedonism, Achievement, Power, and Security scales measure these values. Researchers interested in accounting for observed cultural differences with values may consider using these scales as measures of context variables.

Another interesting recent line of research is that of Leung et al. (2002) on social axioms, which are general beliefs and

³Findings from these recent studies that have challenged the validity of the measurement of self-construals, in particular Singelis's Self-Construal Scale, also raise important theoretical questions about the framework from which that scale was created, and we urge researchers to consider these issues fully.

premises about oneself, the social and physical environment, and the spiritual world (e.g., “belief in a religion helps one understand the meaning of life”). Social axioms are assertions about the relationship between two or more entities or concepts; people endorse them and use them to guide their behavior in daily living. Using data from 41 cultural groups, Leung et al. created a measure of endorsement of these axioms and demonstrated the universal existence of five types of social axioms on the individual level: cynicism, social complexity, reward for application, religiosity, and fate control. Researchers interested in accounting for cultural differences with beliefs may consider using this measure to assess context variables.

Other constructs relating to attitudes, values, and beliefs may also serve as important and interesting context variables. These include culturally based attitudes, worldviews, theories of mind, and the like. Some of these may be tapped by currently available measures of values or beliefs; some may not. Regardless, their development, cross-cultural validation, and use in unpacking studies will be important in the future.

Cultural Practices

Also important in unpacking studies are context variables that assess cultural practices behaviorally. Such variables include measures of child rearing, the nature of interpersonal relationships, exposure to cultural icons, educational experiences, and opportunities for mobility. We deem these types of assessments especially important because many theoretical frameworks generated in Phase III cultural studies have suggested that socialization and enculturation, and actual social practices, play an important role in producing cultural differences. Many of the recent studies showing cultural differences in cognitive processes and styles between Americans and East Asians (Ji et al., 2004; Masuda & Nisbett, 2001; Miyamoto et al., 2006; Nisbett et al., 2001), for example, are based on the assumption that differences in social structures and social practices that are rooted in ancient histories, philosophies, and religions can account for the observed cultural differences. According to these frameworks, collectivism requires attention to people, whereas individualism requires attention to objects, and these attentional differences generalize as an individual is enculturated. A next logical step in this line of research, therefore, may be a study that actually measures differences in attentional focus during development, links them to cultural practices, and then links them to the observed differences in cognitive style.

Without a study or two that actually demonstrate the links between these potential cultural sources and the observed cognitive differences, researchers will not really know exactly what caused those differences. After all, the cultural differences in attentional recall and recognition obtained in this research (e.g., Masuda & Nisbett, 2001) may be due to differences in schooling emphases. East Asian schooling systems generally require much more rote memorization of facts than American schools do. Thus, East Asian students may remember more

background objects in animated displays or pictures than American students do simply because they are better at memorization tasks, which are reinforced through years of schooling (Stevenson, 1985; Stigler & Baranes, 1988), and not because of a long-term, systemic culture rooted in ancient collectivistic philosophies. East Asian students' better memory for background objects may also be due to their computer-game culture; computer games in East Asia embed more important figures and objects in the background than American games do. Educational practices (e.g., use of memorization tasks) and recreational activities (e.g., interaction styles in computer games) may also be used as interesting context variables in unpacking studies.

Methodological Considerations

Cross-cultural research is not easy, and it brings with it a host of complex methodological issues that researchers must address. A detailed discussion of these issues is beyond the scope of this article (interested readers are referred to van de Vijver & Leung, 1997, and van de Vijver & Matsumoto, in press). Here we elaborate on only two issues—equivalence and response bias—because these are most germane to cross-cultural comparisons and unpacking studies.

By far the most important concept that researchers need to be aware of when conducting cross-cultural research is *equivalence*, which we define as a state or condition of similarity in conceptual meaning and empirical method between cultures that allows comparisons to be meaningful. Equivalence needs to be established as much as possible for all aspects of research, including sampling methods and characteristics, language, data-collection procedures, theoretical framework, and meaningfulness and relevance of hypotheses.

Perhaps the most important area in which equivalence needs to be ascertained is in measurement. *Measurement equivalence* refers to the degree to which measures used to collect data in different cultures are equally valid and reliable. Establishing linguistic equivalence, through procedures such as back-translation, does not establish measurement equivalence. Measurement equivalence can only be ascertained psychometrically. For instance, if a questionnaire is used in a cross-cultural comparison, researchers should ascertain that its factor structures are equivalent across the cultures sampled (e.g., through confirmatory factor analysis), and that intercorrelations among factor scores within and between measures are equivalent across cultures (establishing structural equivalence). Item analyses conducted separately for each culture can ascertain the internal reliability of the items in each culture. Optimally, researchers should consider using measures that demonstrate equivalent convergence with other constructs in the cultures sampled, although this is often difficult because measures are not often validated to the same degree in different cultures, and because there are inherent cultural differences in convergent relationships between constructs. Cross-cultural validation studies that demonstrate the reliability and validity of measures

are often necessary prior to their use in cross-cultural comparisons, as well as in the development of indigenous measures.

Another important problem area in cross-cultural research is the possibility of *response bias*, which can be defined as a systematic tendency to respond in a certain way to items or scales. In cross-cultural comparisons, several different types of response bias are a potential concern. One is *socially desirable responding*—that is, the tendency to give answers that make oneself look good (Paulhaus, 1984). People of certain cultures may have greater concern about responding in socially desirable ways compared with people of other cultures. There are two facets of socially desirable responding, self-deceptive enhancement (seeing oneself in a positive light) and impression management. Lalwani, Shavitt, and Johnson (2006), for instance, demonstrated that European American university students scored higher on self-deceptive enhancement than both Korean Americans and students from Singapore, but the latter two groups scored higher on impression management than European Americans.

Other types of response bias are *acquiescence bias*, which is the tendency to agree rather than disagree to items on questionnaires; *extreme response bias*, which is the tendency to use the ends of a scale regardless of item content; and the *reference-group effect* (Heine, Lehman, Peng, & Greenholtz, 2002). The latter is explained by the notion that people make implicit social comparisons with others when making ratings on scales, rather than relying on direct inferences about a private, personal value system (Peng, Nisbett, & Wong, 1997). Johnson, Kulesa, Cho, and Shavitt (2004) examined these biases in 19 countries and correlated indices of the biases with each country's score on Hofstede's (2001) cultural dimensions. Extreme response bias was associated with cultures that encouraged masculinity, power, and status. Johnson et al. suggested that this response style achieves clarity, precision, and decisiveness in one's explicit verbal statements, characteristics that are valued in these cultures. Also, respondents from individualistic cultures were less likely to engage in acquiescence bias than respondents from collectivistic cultures.

Response biases can be viewed as methodological artifacts that need to be controlled in order to get to "true" responses, but they can also be viewed as an important part of cultural influence on data. The complexity of this issue was demonstrated in a recent study showing that when response biases were statistically controlled, between-country differences on individual-level measures of culture disappeared (Matsumoto, 2006b). Regardless of how researchers choose to view this issue, we agree with Smith (2004) in that the potential effects of response bias should be acknowledged and addressed in data analysis in cross-cultural comparisons and unpackaging studies.

Testing Cultural Versus Noncultural Sources of Influence

As we mentioned earlier, researchers conducting Phase IV studies will need to consider how to empirically demonstrate

that the source of observed between-country differences is cultural, as opposed to noncultural. There are many potential noncultural sources of observed between-country differences.

One of these is personality. As already mentioned, McCrae and his colleagues have conducted an interesting line of research demonstrating the universality of the five-factor model of personality (McCrae & Costa, 1997; McCrae et al., 2005). If one believes culture and personality are different constructs, an important issue is the degree to which between-country differences occur because of culture or because of aggregate differences in personalities in the countries being measured. Recently one of us examined this issue (Matsumoto, 2006a). American and Japanese respondents completed two measures of emotion regulation and a measure of the five-factor model of personality. As predicted, Americans scored higher than Japanese on reappraisal, a dimension of emotion regulation, whereas the Japanese scored higher on suppression. These between-country differences were entirely mediated by Neuroticism, Extraversion, and Conscientiousness. Moreover, country differences in personality were not mediated by emotion regulation. These findings suggest that apparent cultural differences in emotion regulation may not be cultural at all, but may be due to aggregate differences in levels of personality traits. Similar kinds of studies will need to tease out other potential noncultural sources of between-country differences to determine whether such differences are indeed due to culture.

Experiments

Linkage can also be demonstrated by experiments in which researchers create conditions to establish cause-effect relationships and participants are assigned randomly to the conditions. Such studies are fundamentally different from unpackaging studies because the latter are quasi-experimental, and researchers cannot create the cultural groups or randomly assign participants to those groups. We discuss three types of experiment-based linkage studies: priming studies, questionnaire-based studies, and behavioral studies.

Priming Studies

Priming studies involve experimentally manipulating the mind-sets of participants and measuring the resulting changes in behavior. If the mind-set resulting from a manipulation is related to culture, the researcher can infer that the primed cultural mind-set caused the observed differences in behavior, and a link between a cultural product (the mind-set) and a psychological process (the behavior) has been established.

For instance, Trafimow, Triandis, and Goto (1991) primed American and Chinese participants with instructions that emphasized either a private or a collective mind-set. The instructions for the private mind-set stated, "For the next two minutes, you will not need to write anything. Please think of what makes you different from your family and friends" (p. 651). The

instructions for the collective, group-oriented mind-set stated, “For the next two minutes, you will not need to write anything. Please think of what you have in common with your family and friends. What do they expect you to do?” (p. 651). After reading the instructions, all participants completed a self-attitude instrument consisting of a series of incomplete statements starting with “I am . . .” Their responses were coded according to whether they were individually oriented or group oriented. As expected, Americans as a whole produced more individually oriented responses than Chinese, and Chinese produced more group-oriented responses than Americans. But the results also demonstrated the effects of priming. Individuals who were primed with the private mind-set produced more individually oriented responses than those who were primed with the collective mind-set, regardless of whether they were American or Chinese. Likewise, individuals who were primed collectively produced more group-oriented responses than those who were primed with the private mind-set, regardless of whether they were American or Chinese. Other priming studies (Gardner, Gabriel, & Lee, 1999; Trafimow, Silverman, Fan, & Law, 1997) have provided similar evidence for linkage.

Behavioral Studies

Perhaps the most stringent experiments that can demonstrate linkage involve manipulations of actual environments hypothesized to produce cultural differences. For example, it is commonly thought that members of collectivistic cultures cooperate more with each other than do members of individualistic cultures, because cooperation is necessary for groups to function effectively, and because of the group-oriented nature of collectivism. Two classic studies on cooperative behavior demonstrate the importance of experiments in identifying the aspects of cultures that produce differences in such behavior. In the first study, Yamagishi (1986) used questionnaire responses to categorize Japanese participants as having high or low trust in other people. All the participants then participated in an experiment in which they could cooperate with others by giving money to them; in one condition, a sanctioning system provided punishments, and in a second condition, there was no sanctioning system. The results indicated that, as expected, people with high levels of trust cooperated more than people with low levels of trust when there was no sanctioning system; when the sanctioning system was in effect, however, people with low trust cooperated more than those with high trust.

Yamagishi (1988) replicated this study in the United States and compared American and Japanese responses. He found the same results for the Americans as for the Japanese: When there was no sanctioning system, high-trusting Americans cooperated more than low-trusting Americans. When there was a sanctioning system, the findings reversed. Moreover, there were no differences between the Americans and the Japanese when the sanctioning system was in effect. This suggests that the greater cooperation in Japanese relative to U.S. culture exists because

of the sanctioning system in Japan; when Americans were placed in that same type of system, they behaved in similar ways.

CONCLUSION

Cross-cultural research has been incredibly valuable for psychology and will continue to be so in the future. Previous research has documented cross-cultural similarities and differences in many aspects of psychological functioning, and this work has been important in putting culture on the map of psychology and in the minds of many mainstream psychologists. Culture is now an important theoretical construct to incorporate in models of human behavior and an important variable to consider in all areas of psychological research.

Cross-cultural theories are now more complex, elegant, and sophisticated than ever before. We argue that research methods must evolve to keep pace with theoretical developments; the methods by which researchers explore the linkage between culture and psychological processes need to evolve, as have those theories. There has been an evolution in the methods used to measure dependent variables of interest and to test for between-country differences. Consider, for example, Kitayama, Snibbe, Markus, and Suzuki’s (2004) measurement of dissonance; Ishii, Reyes, and Kitayama’s (2003) use of a Stroop interference task to measure attention; and Masuda and Nisbett’s (2001) recognition tests measuring gaze behavior. Now the field needs an evolution of methods that examine linkage, test competing cultural theories explaining between-country differences, and rule out rival hypotheses involving potential noncultural sources of those differences. Although research has made a start in this direction, there is still a long way to go, and we believe that strong assertions about specific aspects of culture causing psychological processes are probably premature. Although such assertions serve the field well by spurring debates and critical thinking about the evidence, we believe that doors cannot yet be shut conclusively on many issues concerning culture and psychology.

Of course, researchers need not and should not do everything in every study. There can and probably should be a logical ordering to the documentation of cultural phenomena. One may begin by documenting a difference, then identify culturally relevant theoretical models that may account for the difference, test different predictions of such models, demonstrate linkage empirically, test competing models, and finally rule out rival hypotheses concerning noncultural factors.⁴ Thus, we believe

⁴We agree with Trafimow’s (2003) suggestion that null-hypothesis significance testing of a single model—such as a model of the effects of individualism versus collectivism in a two-country comparison—is really not very informative. In the same vein, we acknowledge that the external validity of unpacking studies that test a single potential cultural mediator can be questioned. In null-hypothesis significance testing, it is more informative to compare competing models that account for differences. We argue in this article that multiple models—cultural and noncultural—should be tested. Unpacking studies should test multiple potential mediators of differences, generated from multiple theoretical perspectives.

that a program of research should evolve in its methodology to capture the increasing complexity and sophistication of the theories generated by previous findings, incorporating designs that test those theories and eventually establishing linkage and ruling out rival hypotheses.

As we look to the future—one that will be characterized by an increasing number of linkage studies in programs of research—we envision different types of studies that combine the various levels of effects in multilevel models. Cross-cultural data are nested: Dependent variables of interest can be measured in different contexts (Level 1), different individuals (Level 2), different countries or cultures (Level 3), and different ecologies (Level 4). Statistical techniques that deal with nested data, such as multilevel random coefficient modeling (Bryk & Raudenbush, 1992; Nezlek, in press) can greatly aid in estimating the effects of cultures precisely while statistically controlling for the effects of many of the other variables we have discussed. Multilevel studies may go beyond the Phase IV research that we described and constitute Phase V. These studies, however, will be difficult, complex, and large scale. In a two-level example, for instance, using country-culture at Level 2, Kreft (1996) proposed a 30/30 rule, that a minimum of 30 observations is required at both Level 1 and Level 2, whereas Hox (1998) suggested 50/20 or 100/10 rules. Power analyses for three- and four-level designs do not exist, but undoubtedly, considerations of power will involve considerations of the reliability of the measurements in prior levels. Clearly, future studies involving multilevel analyses will require data from more than two countries or cultures (i.e., the typical design today).

Although documenting cultural differences has clearly been important to the field, engaging in research that will link those differences to culture is the next logical step in incorporating culture into mainstream psychology. Clearly, cross-cultural research may begin with Phase I comparison studies, which may lead to the examination of the influence of culture on a psychological variable. But such work is just the beginning, and researchers need to be careful of broad, sweeping, and generalized interpretations about culture based on simple comparative data, especially if such data reflect between-country differences. Although culturally based theoretical frameworks and culturally nuanced interpretations make important contributions to the field, they need to be supported by studies that empirically link those cultural frameworks with the psychological variables studied, test competing cultural models, and eliminate rival hypotheses involving noncultural sources. We urge researchers to fully consider the spectrum of issues raised by the different phases of research we have discussed in this article and to implement programmatic lines of research on culture and psychology that identify cultural, and noncultural, effects through series of studies. Unless active cultural ingredients are empirically linked with psychological processes, competing models are tested, and noncultural effects are ruled out, elegant and nuanced cultural frameworks and interpreta-

tions about the source of between-country differences may be interesting, but, frankly speaking, can only be speculative.

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