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CULTURAL DISTANCE, LEVELS OF ABSTRACTION, AND THE ADVANTAGES OF MIXED METHODS

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Two progressive trends in research have converged and are crossing paths at the beginning of the 21st century. The first is a greater concern to incorporate cultural diversity in social science research, toward the identification of etic (universal) and emic (local) features of human behavior, and the second is a concern to incorporate methodological diversity in the social sciences (for related discussions, see Gubrium & Holstein, 1997). However, this fortunate crossing of paths can prove fruitful in the long term only if careful attention is given to at least three fundamental issues. The first concerns the consequences for methodology of the admission of cultural considerations into the foundations of psychology and of social science research in general. The second concerns the methodological consequences of taking levels of abstraction into account. The third concerns the apparent dichotomy between a natural science methodology, based on publicly observable data, and a phenomenological methodology, based on reports of personal experience. In examining these issues, our main focus is on the discipline of

psychology, and our references to positivism or postpositivism as the "traditional paradigm" is in the context of psychology.

The first issue is complicated by the fact that not only have "anthropological" matters been imported into psychology, qualifying the traditional universalistic presuppositions, but mainstream psychology has come to be seen as one culture among others (e.g., the "three worlds" of psychology [Moghaddam, 1987]). Attention to culture has led to different mixtures of methods needed to do justice to the scope of phenomena we now presume to be the proper domain of psychology.

The second issue is related to the first in that there is a methodological tension between seeking knowledge at the highest levels of generality and the rich material that is revealed by research methods that pay close attention to the concrete and lowest levels of abstraction. Similarly, attention to cultural factors limits the scope of research domains from all people at all times and places to those that are local and historically situated.

The third issue is related to both the first and second issues in that the natural science paradigm is deeply interwoven into the culture of mainstream psychology. Paradoxically, the most advanced natural science methodology, brain scanning, depends absolutely on the verisimilitude of participants' reports of their personal experiences.

This chapter has three major sections and is organized around the three themes just noted. Thus, in the first section, we explore the methodological consequences of attending to cultural matters in research. After reviewing the concept of culture and the cultural turn in psychology, we introduce the concept of *cultural distance*, the gap between the culture of researchers and participants, so as to highlight the crucial importance of attending to culture. An integral feature of the culture of traditional psychology, as well as much research in other major social sciences, is the causal model, which we argue is flawed because it excludes cultural factors. We conclude the first section by considering the specific research domain of aggression and how the addition of qualitative methods contributes to our understanding of the meaning of behavior.

In the second section, we argue for the need to pay greater attention to the issue of levels of abstraction of explanation because it has important implications for the type of methodology most appropriate for a particular study (see also Morse, Chapter 7, this volume). We elaborate this point through more detailed discussions of levels of abstraction in single and multiple cultural domains, paying particular attention to Hardcastle's (1999) concept of functional explanation.

In the third section, we explore an intriguing turn of events: that the cultural biases in traditional psychology, which have meant greater and greater focus on new "hard science" technologies, have in some ways made the discipline more reliant on subjective reports and qualitative methods. Using examples from research in auditory perception and cognitive neuroscience, we argue that the cultural bias toward more "objective" technologies, such as new brain imaging techniques, have made it more important that qualitative methodologies assessing subjective perceptions also be incorporated into the research design. This demonstrates the advantages of mixed methodologies, albeit in unexpected ways.

Our discussions lead to five *interim conclusions* and five *proposals for mixed methods*, designed to bring our discussions to more concrete conclusions. Building on previous discussions concerning scientific criteria, culture, and mixed

methods (see Moghaddam & Harré, 1995), these conclusions and proposals underline the proposition that mixed methods have strong advantages that can be realized when the role of culture is explicitly taken into consideration in science.

ON THE MEANING OF "MIXED METHODS"

At the outset, it is important that we clarify our particular approach to the meaning of "mixed methods." Perhaps the dominant approach has been to distinguish between quantitative and qualitative methods and to define as mixed methods any study that incorporates both. Although this distinction may appear simple to apply, in practice many complexities arise. For example, consider a standard laboratory experiment on the impact of heat on aggression in which the level of temperature in a laboratory (independent variable) is manipulated to measure its impact on the level of aggression (dependent variable) a participant shows toward another participant. Such experiments routinely involve interviews with participants and the gathering of qualitative data, sometimes as a check to see how well the experimental manipulations worked. Given that the qualitative data do feed back into the results in one way or another, is this type of experiment mixed methods? While some would answer "no," others would agree the answer is "to some extent." But what threshold has to be passed before such a study is accepted as mixed methods? We raise these questions to point out that even the "simple" interpretation of mixed methods as involving quantitative and qualitative methods employed in the same study can be problematic (see Teddlie & Tashakkori, Chapter 1, this volume).

An additional, rather than a competing, interpretation of mixed methods is that it involves a variety of quantitative and qualitative methods adopted by *different* researchers in *different* studies but focusing on the *same* research phenomena and questions. Thus, for example, we discuss the case of aggression as an area in which this is taking place, and we point out that the recent addition of qualitative (discursive) methods to the traditional quantitative ones, albeit by different researchers, holds the promise that we will arrive at a better idea of *meaning* in relation to aggressive acts.

This second interpretation of mixed methods takes as the unit of analysis the whole body of research addressing a particular research question rather than just a single study. Thus, the question becomes "Are researchers *as a group* studying aggression using mixed research methods?" rather than just "Were mixed methods used in this single study?" We believe that the alternative "group-based" interpretation of mixed methods is also essential because the research enterprise is a collective one, which generates a view of some aspect of the world through multitudes of contributions. It is of great value if these contributions adopt a variety of quantitative and qualitative methods, even if any given single contribution is not adopting mixed methods in and of itself. This "holistic" interpretation of mixed methods is also more in line with the cultural perspective we adopt, with culture itself involving collective, shared, and collaboratively constructed processes. Thus, in discussing the advantages of mixed methods in relation to culture, we have in mind a wider interpretation of mixed methods, one that considers the methods mix of a whole research literature as well as single studies.

◆ *Methodological Consequences of Attending to Cultural Matters*

THE CULTURAL TURN IN PSYCHOLOGY

An important development in psychology since the 1970s has been the increasing importance of culture in how we see the scope of psychological research. This is clearly indicated by the enormous number of publications that espouse a cultural perspective (see Moghaddam, 1998). Even mainstream texts in psychology typically now have special boxes inserted in strategic places, highlighting "cultural cases" and discussing aspects of life outside of Western (typically American) White middle-class urban culture. Culture has to be taken into account. Parallel to this movement, there is more acknowledgment that research itself takes place in a cultural context.

What Is Culture? For a working definition of culture, we presume that a culture is a normative system, integral to which are norms, rules, and other indicators of how people should "behave" in particular roles and particular places. For example, in the United States, the normative system indicates how Joan Smith, a professor, and Jim James, a student, should interact in the classroom. Here, it is clear that the culture influences what the people do as to what it is proper or desirable to do. If Mr. James wants to ask Dr. Smith a question in class, there are particular ways he should behave. He should put up his hand, wait to be called on, and then ask a question. There are other ways he should not behave. He should not shout and interrupt Dr. Smith while she is talking with another student. The normative system of another culture would endorse a different pattern of classroom behavior. For example, in some Islamic countries, it would not be appropriate for a male student to be taught by a female professor. If male and female students sit in the same class, a curtain would separate them.

The Culture and the Individual. By its very nature, culture is social, shared, continually changing, collaboratively constructed, and collaboratively sustained (Moghaddam, 2002). Individuals appropriate cultures as they grow up in a society. Not only do they behave in ways demanded by local norms, but they come to have culturally distinctive subjective and private experiences. For example, how a sound is heard will depend on all sorts of cultural matters, including the local musical conventions.

The cultures people appropriate are already there when people are born into the world, and they will be there when people leave. The cultures of the Amish in Pennsylvania, the White Anglo-Saxon Protestants in Philadelphia, and the Irish in Boston continue to survive the comings and goings of particular individuals. Shaping individuals, cultures are shaped by individuals. This is the pervasive phenomenon that Giddens (1984) called "double structuration." Cultures continually change. They are sustained in being by the very people whose actions they influence, just in the doing of those very actions, albeit never in exactly the same manner.

Scientific Paradigms as Cultures. Nothing stands outside of culture, not even the scientists or the scientific methods adopted in science. Cultural meaning systems allow scientists to develop and use research methods as well as to recognize and interpret data. At the same time, as paradigms, such meaning systems constrain the scope of what is acceptable as science. This means that both the research psycholo-

gists and the persons being studied are in important ways influenced by culture. How, then, can psychologists come to an accurate understanding of the persons they are studying given that the psychologists themselves see the world through a cultural lens?

Accommodating Culture in Science. How should we blend cultural matters into a scientific research methodology? In addressing this important question, we put forward two main propositions. First, we propose that in collecting evidence and interpreting findings, researchers should give full and serious consideration to the role of *cultural distance,* which refers to the difference between the culture of the researchers and that of the participants in the research projects on which the investigators are embarked. Second, we show how researchers can better cope with the opportunities and limitations imposed by the recognition of the role of culture in the realm of human thought and action through adopting mixed methodologies.

Although the concept of cultural distance is our innovation, we believe that this concept has been implicit in various critical discussions about the shortcomings of mainstream psychology and particularly the methods used therein (e.g., Cole, 1996; Fox & Prilleltensky, 1997).

CULTURAL DISTANCE BETWEEN PSYCHOLOGISTS AND PARTICIPANTS

Since the 1980s, there has been increasing criticism of the "wholesale" exportation of psychological science from Western to non-Western societies (Moghaddam, 1987). One basis for this critical attack is the ethnic gap between researchers, who are for the most part White, middle-class Western males living in affluent urban centers of industrial societies, and the majority of the people in non-Western societies, who are relatively more rural, illiterate, materially poor, and religious (Moghaddam & Taylor, 1985). This line of criticism is coupled with attempts to develop "indigenous psychologies" that are more in line with local needs (Sinha, 1997).

This is a striking example of the fact that both the culture of respondents and the culture of researchers and research disciplines need to be taken into consideration. Researchers select and approach research topics from particular cultural perspectives and are influenced by the normative systems of their own cultures. The research topics they select, as well as the research methods they adopt, are selections from an indefinitely extensive repertoire of possibilities influenced by their own cultures.

Three Examples of Cultural Distance. In the 21st century, it is very popular to examine brain activity and to try to explain behavior as a function of such activity. This approach is an aspect of Western assumptions about the relation between brain processes and patterns of behavior as well as the particular stage of technological development reached in the West. People in other cultures, such as the Yanomamo in northern Brazil and the Bahktiaris in Iran, or people in medieval Europe would find it very strange that discovering the sites of brain activity, as indicated by functional magnetic resonance imaging (fMRI), and correlating this with types of behavior should tell us anything about why humans do what they do. Many such peoples explain what people do by reference to social situations and sometimes supernatural causes. Even within Western social sciences, there are subcultural differences in presuppositions, such as the number of respondents it is "correct" to include in a study, as well as

broader methodological differences between those adopting nomothetic generalizing approaches and those adopting idiographic individualizing approaches.

Cultural distance between researchers and participants was also highlighted by feminist psychologists and continues to be a major theme of feminist critical writing (e.g., Wilkinson, 1996). Most famously, Bem (1974) argued that measures of gender roles developed by men are not a valid technique for "measuring" androgyny, and Gilligan (1982) argued that tests of moral development constructed by Kohleberg and other men do not accurately reflect moral thinking in women. Mertens (Chapter 5, this volume) cites other examples from feminist scholars as well as examples from minority scholars and scholars with disabilities.

In a recent study demonstrating the importance of the cultural distance between psychologists and participants, Weinfurt and Moghaddam (2001) explored how six groups of respondents (English Canadians, French Canadians, Jews, Greeks, Indians, and Algerians) answered questions on the Bogardus Social Distance Scale. This technique has a long history (Bogardus, 1925). Respondents are asked to indicate the extent to which they are willing to have a member of a different group (e.g., Jews, Indians, Algerians, English) (a) marry into their group, (b) be a close friend to them, (c) be a next-door neighbor, (d) work in the same office, (e) be a speaking acquaintance, (f) be a visitor to their nation, and (g) be barred from their nation. The answers are supposed to indicate the degree to which members of different social categories are socially distant from one another.

One of the assumptions of the Bogardus scale is the ordering assumption: that the relative ordering of the seven categories in terms of social distance is the same for all respondents in all cultures. Like most such scales, the Borgardus scale tested its assumptions in a particular cultural context, specifically the United States—an individualistic industrial society with a long history of immigration and high geographical mobility. In such a society, the interpretation of "family," "neighbor," and so on would be very different from how such terms are interpreted in more traditional societies with more static populations. Weinfurt and Moghaddam (2001) discovered that the closer the culture of the respondents to the culture of the researchers and the original samples, the more they shared the same assumptions. When the respondents were from a culture that was a greater distance from the culture of the researchers (i.e., Algerian and Indian), their responses tended more to reflect different assumptions.

Of course, these are just a few recent examples of a well-established problem: how to take account of a cultural distance. When tests developed by Western researchers using one set of samples are assessed in non-Western contexts with non-Western samples (for other examples, see Tashakkori, Barefoot, & Mehryar, 1989; Tashakkori & Kennedy, 1993), the test may bear little relation to psychological reality.

The idea that research methods and instruments are influenced by cultural distance is not new, nor is it novel to assert that researchers from a particular culture will tend to share certain assumptions about the world that are different from assumptions of people in other cultures. Cross-cultural researchers have taken some steps to try to bridge such differences, using back-translation procedures, developing culturally equivalent questions, using more elaborate sampling methods, and so on (see Moghaddam, 1998, chap. 2). The effect of these moves is to obscure the deep problem of cultural distance in psychological phenomena as

created in the interpretations of Western psychologists and as lived by indigenous participants who may be radically different. The cultural distance between the researchers who construct measures and conduct a study and the respondents who are studied still tends to be neglected, even though it is of fundamental importance.

Can mixed methods offer a solution? In examining this question, it is important to realize that mainstream psychology is not a benchmark from which other cultures diverge and to which they must be accommodated. Cultural distance is a symmetrical relation. Middle-class American culture, of which the culture of mainstream psychology is but a species, is as distant from Buddhism and its dependent psychology as Buddhist psychology is from middle-class American culture.

MAINSTREAM PSYCHOLOGY AS ITSELF AN INDIGENOUS CULTURE

Cultural distance between psychologists and the participants in their studies is maintained and exaggerated by the peculiarities of the culture of mainstream psychology. Implicit norms are maintained through the participation of individuals in regular social practices. Consider, for example, just two norms within this culture. One concerns the setting of the criteria for statistical significance as $p < .05$ and $p < .01$. The other specifies the "correct" number of respondents that a research study must include to be an acceptable contribution to "science."

In nearly all psychological journals, it has become customary for researchers to report findings as "statistically significant" if the probability of their findings is computed to be less than .05 and to (wrongly) treat them as "highly significant" if it is less than .01. Even though these cutoff points are arbitrary (after all, there is no objective reason why the cutoffs should not be .075 and .015 or any other of an infinite set of possibilities), they are collaboratively maintained through an array of social practices involving "data gathering," "report writing," "journal publishing," and so on. Interestingly, $p < .05$, $p < .01$, and $p < .001$ all are answers to one question: "Has this phenomenon come about by chance?" They provide no information about the magnitude of effects, about the relationships between the conditions and the observed outcome, or about the nature of the psychological process that has brought them about. "Highly significant" and "significant" are cultural constructions.

Consider another pervasive norm in psychology. It concerns the number of respondents that "must be" included in a participant panel for a psychological study to be considered "correct." The number considered correct varies considerably across subdisciplines. In social psychology, a sufficient number is typically taken to be 80 to 100 or more. In developmental psychology, the sufficient number is taken to be 10 to 15 or more. Why this difference? Why should it not be 500 or more in social psychology and 1,000 or more in developmental psychology? Clearly, these numbers are scientifically arbitrary. They are not based on objective criteria. Rather, they have evolved out of social conventions and demands of practicality and convenience. Naturally such social conventions can and often do evolve to be different in each subdiscipline. For example, it is relatively easy for academic researchers to involve 80 to 100 students in their research, so social psychologists typically include at least this number of respondents in their studies. On the other hand, 10 to 15 infants is a convenient number to get ahold of, so this is the number considered to be satisfactory for studies in developmental psychology. On the

Complete separation	**Complete fusion**
Laboratory	**Ethnography**
Experiment	

Figure 4.1. The Traditional View of Culture and Research, as Depicted by a Continuum Showing Two Extremes of Complete Exclusion of Culture From Research Methods to Complete Fusion of Culture and Research Methods

basis of objective criteria, one may well argue that the number of respondents required in developmental studies should not be any different from the number required in social-psychological studies.

There were about 6.5 billion humans at the last count. So, a sample of 50 or 200 or more is scientifically worthless unless one already believes in a deep cultural and biological uniformity across the whole of humankind. If one has this belief, then there is no point in studying 50 rather than 1!

The origins of these culture-defining norms have been traced by Danziger (1990). They have their roots in extra-scientific exigencies such as the needs of army recruitment and mass education policies.

HOW MAINSTREAM RESEARCH METHODS EXCLUDE INDIGENOUS CULTURES

For convenience, we use the expressions "local culture" and "exotic culture" in referring to the foundations of mainstream psychology and to the norms of other cultural systems, respectively.

Human Sciences Distinguished by Degree of Inclusion of Explicit Cultural Factors. An important goal in traditional research has been to include only very small and controlled aspects of exotic culture in research methods when studying human behavior. That is, typically all of the "variables" are controlled except for the independent variable(s), and in this way indigenous culture is automatically kept out while the culture of researchers is included, even in the very idea of psychological research. We can conceptualize this as a range of possible ways of interpreting the intrusion of "cultural context" to research methods, with "complete separation" at one extreme of the continuum and "complete fusion" at the other extreme (Figure 4.1).

According to the traditional view, either culture is completely excluded or only one or two elements of culture are included in the research context, and this allows for an isolation of cause-effect relations. In essence, except for the selected aspects of culture that are included to serve as independent variables, the rest of culture becomes a group of "nuisance" variables that have to be controlled and excluded from the study. We have pointed out that the traditional view focuses exclusively on the culture of the respondents and neglects the culture of the research discipline and the researchers themselves.

An alternative approach encourages us to think more critically about the various cultures of participants and researchers when considering various research methodologies (see Maxcy's discussion of "methodological pragmatism" in Chapter 2 of this volume).

Interim Conclusion 1

Realizing that cultural distance is symmetrical throws doubt on the current hegemony of Western research methods and the associated psychological concepts because these are themselves culture bound. Is there a way in which a fruitful balance between local and exotic cultures could be struck?

Mixed Methods Proposal 1

The common distinction between quantitative and qualitative methods does not apply to the resolution of the problems posed by the recognition of the ubiquity and symmetry of cultural distance. The traditional Western methods of research presume an *etic* or abstract, culture-free, and therefore universal conceptual system, which we now see as local and culture bound or actually *emic*. The problem is to devise a way of integrating two or more emic systems for analyzing, categorizing, and explaining psychological phenomena.

Catherine Lutz's deservedly famous study of an exotic emotion system (Lutz, 1988) could serve as an exemplar of how to achieve a mixing of methods considered as indigenous cultures. She presented the American emotionology as it would be expressed (with difficulty) in the concepts of the Ifaluk system and presented the Ifaluk emotionology as it would be expressed (with difficulty) in the concepts of American English. By studying both presentations, the English-speaking reader arrives at an intuitive understanding of "how the Ifaluk system goes." By the same token, if the whole text were in Ifaluk, then an Ifaluk speaker could get an intuitive grasp of "how the American system goes."

THE CAUSAL PARADIGM EXCLUDES CULTURAL FACTORS

Consider the following methodological advice:

> Whether you use a randomized laboratory experiment or any other technique, you must satisfy three criteria if you are to infer that one variable (smiling at others) causes a change in another variable (others helping you). Specifically, you must establish covariation, temporal precedence, and control of irrelevant factors. (Mitchell & Jolley, 1992, p. 367)

The preceding statement is quoted from the text *Research Design Explained,* but it could have been derived from any one of hundreds of other social science texts on research design published during the past half century that follow a traditional positivist view of causation in human behavior. In discussions of research methods, it is commonly understood that experimental designs are the only designs that may provide the opportunity for causal inference. But this understanding is often set aside in practice through correlational studies being incorporated in discussions of causal models of behavior. Even in traditional social psychology, the goal of research is stated as the discovery of the causes of behavior (see Moghaddam, 2002), and correlational studies are cited and appropriated, albeit indirectly, as part of the causal model.

The traditional assimilation of a correlational finding to a causal account has persisted in psychology despite the fact

that this specification of causality does not represent the way this notion is used in the natural sciences or how it is used in the management of everyday life. There would need to be a good working hypothesis—or, best of all, a good working model—of the intervening productive process by which the effect event or state was generated on the occasion of the occurrence of the cause event or state for a correlation even to *indicate* the possible existence of a causal process. The rule or convention a person is following consciously cannot be the cause of what that person does. For a start, it does not necessitate the action. Rules, unlike causal processes such as gravity, can be disobeyed, ignored, disrespected, flouted, and so on (Wittgenstein, 1953).

It is commonplace that cultures differ in the rules that are in play in maintaining the orderliness of the actions of the members. If causation displaces rule following as the ubiquitous paradigm of psychological explanation, then cultures as systems of rules, customs, and conventions are thereby excluded.

There are cultural differences between the *contexts* in which orderly behavior occurs as well as between the processes by which such behavior is controlled and monitored. This neglect is in spite of at least passing reference to "cultural context" in discussions of research methodology and design.

LOGICAL LIMITATIONS ON THE CREATION OF VARIABLES

To get correlational results, we must create variables—attributes that take different values in different circumstances in the same person, different values in different circumstances in different people, and so on. Variables are not given. They are constructed by analysis of patterns of behavior and the nature of the circumstances in which it occurs. The initial identification of psychological aspects of a situation must be in the vernacular.

Any attempt to detach features of the antecedent conditions of human actions and thoughts from the complex environment in which they occur, or to partition that environment into elements that could serve as independent variables, must pay strict attention to Vygotsky's Rule (Vygotsky, 1962, 1978). The rule forbids the partitioning of a psychologically relevant situation or a psychologically meaningful pattern of behavior into units that drop below the level of meaning of the whole. The idea of internal relations between the parts of a complex is not new. In modern times, we owe to Hegel the idea that any phenomenon derives parts of its characteristics to the context in which it exists. More recently, Gestalt psychologists popularized the edict that "the whole is more than the sum of its parts," proposing that behavior must be studied in relation to context. In the developmental domain, Vygotsky made the issue more explicit. To accomplish the plan for the kind of experimental design described previously, one must be able to partition the actual situation into components that could serve as independent and dependent variables. In accordance with Vygotsky's Rule, these components must retain their original significance and efficacy when detached from the structural totality in which they usually exist, or else the original phenomenon is not being studied. The topic of research, perhaps some aspect of remembering, is defined only relative to some such totality. These structural totalities, such as a legal trial in which a certain kind of remembering is demanded, are cultural objects. It follows that if we continue to be constrained by Vygotsky's Rule, the components manipulated in an experiment are relative to the culture in

which the original structure is a meaningful phenomenon.

For example, in the debate between van't Hoof and Leach on the nature of smiling (see Hinde, 1972), van't Hoof tried to partition smiles into kinds depending on the musculature involved in their production. This gave him two kinds of smiles. Experimental smile research might involve using this two-member set as the independent variable. Leach argued that smiles cannot be partitioned into kinds independently of the cultural context in which they occur. He conjectured that, given the cultural context, there are probably at least 59 kinds of smiles if we admit cultural context into the domain of the study.

Interim Conclusion 2

Admitting cultural factors into research design puts the correlational method and the associated causal hypotheses of mainstream psychology into question. Is there a way of fruitfully mixing causal and normative or rule-following explanation formats?

Mixed Methods Proposal 2

Clearly, neither explanation format can be reduced to a species of the other. However this is just the kind of situation in which we can invoke the concept of complementarity from quantum physics to suggest a way forward. Wave analysis and particle tracking are two radically different research methods. Niels Bohr showed how they can be mixed fruitfully. Any human activity has three aspects apropos of our coming to understand the sources of its orderliness. There is a causal aspect, for example, the cough reflex. There is a conventional or customary aspect, for example, the use of the cough to discreetly attract someone's attention. And there is the habitual aspect, for example, the nervous cough that derived originally from consciously clearing one's throat to conform to the norm of clear speech. The totality of the field of phenomena denoted by "the cough in human life" can be captured only by the juxtaposition of three *complementary* explanatory modes. In just this way, the totality of the domain of the phenomena denoted by "electron-matter interactions" can be captured only by juxtaposing two complementary explanatory modes: the one based on the particle model and the other one based on the wave model of the nature of electrons.

AGGRESSION: A RESEARCH DOMAIN ALREADY USING A VARIETY OF METHODS

What Is the Domain of the Term Aggression? What do we mean by aggression? At first consideration, this seems like a typical academic question, prodding us to provide a definition of a term. For example, this question could lead us to visit a traditional definition such as "Aggression is behavior intended to harm another person." However, when we ask the question "What is aggression?" in cultural context, we are confronted by a more complex picture, in part because of the complexities involved in deciding intent. How exactly do we know that Person A intended to harm Person B?

Consider the case of Salman Rushdie, the author of *The Satanic Verses*. Rushdie, a Pakistani author living in England, was accused by the Iranian leader Ayotollah Khomeini of blasphemy and attempting to harm Islam. Millions of Muslims in Islamic countries, and thousands in Western societies, demonstrated in support of the death sentence issued by the Ayotollah against the author. From their viewpoint, Rushdie had committed an unforgivable

act of aggression. However, from the perspective of Western democracies and supporters of fundamental human rights such as freedom of expression, it was the Ayotollah who was the aggressor. By inciting demonstrators who burned books and shouted "death to Rushdie," the cleric was intending to harm an author who was simply exercising his basic rights as stipulated in the *Universal Declaration of Human Rights*. Such cases clearly show that even though we might adopt specific definitions of aggression such as "behavior intended to harm others," what we identify as aggression depends on our cultural viewpoint.

The Variety of Methods in Use. The topic of aggression is particularly suitable for demonstrating the advantages of mixing quantitative and qualitative methods because each approach provides an interesting but incomplete picture. For our purposes, it is useful to contrast traditional quantitative methods with alternative qualitative methods. Quantitative methods are far better known and have already been discussed extensively, including neurophysiological ones focusing on chromosomal abnormality and aggression (Witkin et al., 1976), "aggression centers" in the brain (Moyer, 1976), the biochemistry of the body and aggression (Nelson et al., 1995), genetic similarity (Chagnon, 1992; Daly & Wilson, 1990), and heat and aggression (Anderson, Anderson, & Deuser, 1996). A wide range of quantitative social-psychological methods have also been employed, focusing on explanations in terms of conflicts of interests over resources (Sherif, 1966), explanations by reference to a "culture of honor" (Nisbett & Cohen, 1996), and a search for a more positive social identity (Tajfel & Turner, 1979). These studies adopting quantitative methods attempt to attain a high level of objectivity and detachment, but they nearly completely neglect the issue of meaning: How do participants interpret the situation, and what meaning do they give to actions? The issue of meaning is more directly addressed through qualitative research, which has received far less attention than it deserves in psychology.

Discursive Analyses in Terms of the Meanings of Aggressive Acts. Billig (1978) and others have shown that a critical involvement with the participants themselves can be more fruitful. In his study of the National Front (an extremist right-wing paramilitary organization in the United Kingdom), Billig demonstrated that it was not enough to used standardized questionnaire procedures and rating scales that yielded "objective" numbers because members of the National Front would intentionally deceive the researcher. To really understand what the participants were up to, it was necessary for Billig to conduct interviews from a critical perspective and rely on qualitative data, which then had to be interpreted in context and with reference to the larger political situation.

According to the methodology of discursive psychology, the job of the psychologist is to find the meanings of actions and to classify them according to some plausible model. That done, it is possible to try to discern the norms that are effective in regulating the action.

Among the qualitative approaches that have attempted to adopt this more critical approach are studies in discursive psychology such as the research into the nature of football hooliganism in the United Kingdom (Marsh, Rosser, & Harré, 1978). Each Saturday afternoon, literally thousands of young men take part in large-scale aggressive displays. The study was based on the analytical method, recording and analyzing many examples of these complex events. The research was

aimed at solving three problems. The first concerned the meaning of the aggressive or seemingly aggressive acts to the participants, to the bystanders, and to members of the general public who encountered these acts only in newspaper descriptions. The second concerned the explanation of the regularity and precision of the repetition of extremely complex sequences of acts on occasion after occasion. The third concerned the social order that was both required and created by these events.

The overall model was dramaturgical, taken from Burke (1969) and Goffman (1959). Riots were viewed as if they were the staging of dramas, with actors, costumes, scenes, directors, audiences, and scripts. Within this general frame, another more fine-grained model was inserted: the model of ritual. These acts rarely resulted in serious physical injury but were highly effective in transforming the social rankings of those engaged. Honor played a very large part in the interpretation of the performance of any of the many young men engaged in ritual combat. The ancillary model of a medieval joust also proved useful.

Interim Conclusion 3

Understanding social phenomena in-depth inevitably involves research into the meanings of social actions for the participants themselves. In the case of aggression, a combination of research into the physical and physiological conditions of propensities to aggression with studies that lead to an understanding of the particular social forms and social motivations of aggressors is indispensable.

Mixed Methods Proposal 3

The distinction between the conditions under which a psychological phenomenon occurs and the particular form it takes provides a natural unity between the use of quantitative methodologies and discursive analyses of meanings. The form can reveal everything from economic conditions, to the state of the material environment, to the genetic makeup of people prone to aggression. The form of the social phenomenon highlights the structure of actions and their social consequences. Both should be part of the standard repertoire of social psychologists in particular.

◆ *Mixing Methodologies at Different Levels of Abstraction*

LEVELS OF ABSTRACTION AND ATTENTION TO CULTURE

In addition to the *type* of explaining one wants to accomplish when crafting an explanation of a phenomenon—causal or normative—one should also be concerned with the level of abstraction of that explanation. At a high level of abstraction, culture is irrelevant. This is the domain of etic studies. For example, brain laterality is an etic property of the human organism. At the more concrete level of the distinction between left- and right-handedness, cultural factors are relevant as well. For example, the explanation of the proportion of left-handed people in a population needs to take account of local attitudes to sinistrality. The type of explaining changes as one moves from one level of abstraction to another. Any change in explanation type requires additional supporting evidence for the new hypotheses (see Morse's discussion of the "triangulation of results" in Chapter 7 of this volume).

At higher levels of abstraction, we create universal generalizations that encompass the broadest domain of the phenomenon in question. Explanations at this level are usually correlational and therefore scientifically weak. To explain the phenome-

non at lower levels of abstraction, we need to create more complex and more concrete and realistic explanatory models. As we step through the levels of analysis to ever decreasing degrees of abstraction, models of the explanatory mechanisms become ever more concrete and detailed. The "mechanisms" invoked may be based on very different processes from those to be observed in the phenomena they are used to explain. For example, differences in colors are explained by reference to wavelengths of electromagnetic radiation and ultimately by the physics of photons. We must use additional methodology that examines the phenomenon from tangential viewpoints. Information gathered from these additional methods gives our models increased explanatory power.

This point can be illustrated by the search for explanations of cognitive skills by reference to brain function in the neurosciences. At the highest levels of abstraction, the claim can be made that brains are for thinking in general. It was not always obvious to biologists that this was generally so. But species of thinking, such as calculating, are cultural artifacts. For example, Australian Aboriginals used only the first five integers, thereafter treating all larger aggregates as numerically equivalent. We may claim that a particular brain nucleus is for some generic function such as "remembering." At this level of abstraction, we can compare this claim across individuals, cultures, or even species so long as a nervous system exists in each on which to make the comparisons.

LEVELS OF ABSTRACTION WITHIN A SINGLE CULTURAL DOMAIN

We have already pointed out how each scientific discipline can be viewed as an indigenous culture in its own right. When we move to less abstract levels of analysis in the field of neurosciences alone, we begin to ask "how" questions such as "How is this particular brain nucleus involved in remembering?" To get at the answers to questions such as these, we need to increase the number of different experimental methods used, exploring the viability of more concrete and hence more local models.

Learning and Memory: The Role of the Hippocampus. For example, to explore the role of the hippocampus in learning and memory at a fairly high level of abstraction, we need only assert the highly abstract claim that hippocampi are used for learning and memory. This could be tested by comparing the capacities of people with intact hippocampi to the capacities of those with hippocampal damage such as the exemplary patient "H. M." (see Moghaddam, 2002, chap. 10). At this level of abstraction, we could also compare the processes of animals with rudimentary nervous systems with those of animals with more complex ones on some behavioral memory task. This is the rationale behind Kandel's Nobel Prize-winning experiments with the sea snail *Aplysia californica* (Kandel & Schwartz, 1982). Hardcastle (1999) termed this level of abstraction the "functional explanation." The role of this explanatory level is to capture abstract patterns and relations between otherwise diverse phenomena. At this level of abstraction, we can easily describe the similar functioning of brains or brain areas across species and ignore any interspecies variations.

The general rule at the most abstract level of analysis is that the explanation is less complex than what is being explained.

To move to subsequent levels of abstraction or analysis, we begin to seek explanations with increasing restricted analytical approaches and with less abstraction. At these levels of analysis, we need to approach the "how" questions (or *explanations of origins or causes*) from

different angles and directions. This is required because we will now have to account for the parameters we whittled away to create the generalizations at the functional level of analysis. It is important to note that these additional parameters require multiple methods to explain them because they are often of different forms.

LEVELS OF ABSTRACTION WITHIN A MULTIPLE CULTURAL DOMAIN

The higher the level of abstraction, the more cases that will be covered but the less content the explanation will have. The more concrete and detailed the content of the explanation, the more convincing it will be but the fewer cases it will cover.

Now, we can see how cultural considerations assume more and more importance as the level of explanation moves from the abstract to the concrete. The more concrete the explanation, the more detail that is required in the content and the more likely it is that local cultural considerations will be playing a greater and greater part.

In addition to the cultural relevance for what is being explained, allowance must be made for the cultural consideration of the researcher. As we move from the abstract to the concrete, the theories we use to support and generate the experiments to explain the phenomenon are more culturally based. The categories of "learning" and of "memory" are cultural categories, not natural ones. Therefore, we should be concerned not only with the cultural perspective of the phenomenon being explained but also the cultural perspective of the researcher. This is particularly important in neuropsychology. The assumption that neural processes or brain function is universal across cultures, or universal across the entire subpopulation being examined, is crucial. The idea that fMRI results might have relevance to deficits in mental functioning is a Western cultural assumption.

Interim Conclusion 4

All sciences develop research programs at both high and low levels of abstraction. At high levels of abstraction, it is possible, but not necessary, that some universals across the whole domain of concern may be revealed. Only at lower levels of abstraction are the generative mechanisms and processes by which phenomena are produced able to be studied in concrete conditions.

Mixed Methods Proposal 4

The use of mixed methods in light of these considerations is relevant for two additional reasons:

1. Using mixed methods from across cultural biases (albeit human cultures or experimental cultures) keeps the connection to the general (abstract) phenomenon. It ensures that we do not violate Vygotsky's Rule as we move through the levels of abstraction from abstract to concrete.
2. Diversity in methodologies, with each having its own cultural bias, makes it less likely that one would be relying on any *one* set of cultural assumptions so as to explain some well-defined psychological phenomenon.

◆ *Phenomenology and Neurophysiology and Anatomy*

AUDITORY PERCEPTION: PHENOMENOLOGY AND PHYSIOLOGY IN TANDEM

Perception is an active process that starts with a stimulus in the environment and then consists of transducing that stim-

ulus into a type of energy that can be read by the nervous system. From there, neuronal processing occurs, and then finally the act of perception takes place. However, for most perception researchers, the journey does not stop there; the perceptual processes continue to include recognition of that environmental stimulus and finally some action or behavior by the perceiver. This is an active process because the information at each step is constantly changing. For example, we are rarely standing completely motionless while perceiving (via any of our senses) an object that is also completely motionless. In reality, the stimulus is often moving in relation to us, or we are moving in relation to it, or both. Therefore, our brains are constantly updating the information from the stimulus that is being transduced from one energy form to another. This, in turn, constantly alters the perception, recognition, and/or action to that stimulus.

To study this complex process, perception researchers focus on relationships among the various steps in the perceptual process via a variety of methodological approaches. By examining the link between the stimuli in the environment and the perception that stimulus creates, the behavioral-phenomenological approach to perception focuses on presenting objects to participants and recording the perceptions that the objects cause. To do this, a number of methods are used that fall into two categories: *phenomenological methods* and *psychophysical methods*. Phenomenological methods consist of simply presenting a stimulus to participants and asking them to describe what is perceived. For example, in a color-naming experiment, a color is shown and the participants are asked to name the color. However, as expected, this type of data is usually very qualitative. To counter this subjectivity and to provide a more quantitative connection between the stimulus and the perception, researchers employ psychophysical methods. These methods consist of presenting a stimulus, with varying intensities, multiple times to participants to record the *threshold,* or just detectable, level of perception. In these methods, distinct stimulus intensity-perception relationships can be drawn.

To explore the link between the stimulus and the amount of neural firing, however, the physiological approach is used. Physiological methods usually consist of using an animal model of the sensory system under study and applying a stimulus of a known intensity while recording changes in neuronal properties directly from the nervous system. Via these techniques, stimulus strength (action potential number, neurotransmitter release amounts, or ionic conductance relationships) can be calculated. These techniques can also demonstrate which brain systems are activated during presentation of environmental stimuli and which physical features of these stimuli activate particular aspects of these brain systems. Examples of this use are Hubel and Wiesel's (1970) experiments with vision during the 1960s. In addition, experiments that examine the correlation between stimulus intensity and thresholds for neuronal firing can also be conducted using the physiological approach to perception. However, neither the behavioral approach nor the physiological approach can entirely explain the complexity of sensory *perception*. Therefore, a combination of methods is often used to "fill in the gaps" of perceptual knowledge.

This combination of both the phenomenological and physiological approaches has recently emerged as the field of cognitive neuroscience. This field of research consists of using brain-imaging techniques such as fMRI and positron emission tomography (PET) scanning. By using these noninvasive mapping techniques in addi-

tion to a perceptual or cognitive task, such as listening to the tone of a specific frequency or reading silently, researchers are able to "watch" the brain in action. One should note, however, that these scanning techniques are coarse-grained, picking out regions of the brain each of which may contain millions of neurons. These pictures of the brain can then be combined with the psychophysical assessments of the task from the participants. Examples for the need to use such a variety of methodologies so as to uncover the complexity of sensory perception can be drawn from the study of auditory perception.

THE PERCEPTION OF PITCH

The complexity of our sense of hearing can be illustrated by the following old query: "If a tree falls in the woods and there is no one there to hear it, does it make a sound?" Most would answer "yes," assuming that sounds exist in our world even in the absence of detectors or perceivers (some of our students have used the fact that animals or insects would be there to hear it as a rationale for their answer). Alternatively, some philosophers would argue "no," suggesting that they could conceive of a wood totally devoid of *any* perceivers and that in this case in this barren wood, no *sounds* would be emitted. The answer we give, much to the dissatisfaction of our students (at first), is "it depends." It all depends on what definition of the word "sound" one is using. In some contexts and to some people, sound refers to the physical properties of the pressure wave of air (or other medium) that is created when two or more things collide. In this case, we can say "yes," the tree has created a moving pressure wave in the air as it moved through it (on its way down) and also when it struck the surrounding trees and ground after it fell. These physical properties would be present even if no one (animals and insects included) were around. However, we can also define sound as the *perception or experience of hearing* (Goldstein, 1999). In this case, even in the presence of the pressure waves just described, if there is no one in the woods to perceive or have the experience of these physical stimuli, then the answer is "no," the tree has made no sound.

With these definitions in place, it is easy to see that in order to hear a sound, we need *both* the sound stimulus and some psychological representation of the stimulus. It is here that information derived from mixed methods has yielded dividends. For example, experiments derived from the physical sciences have revealed properties of the physical characteristics of the pressure or sound wave. They have shown us that the sound stimulus can resemble a sine wave that can be described in terms of the number of cycles of pressure changes per second, or *frequency,* measured in units called hertz (named after the 19th-century German physicist Heinrich Hertz). The sound stimulus can also be described in terms of the longitudinal size of a single sound wave. These measurements, termed the *wavelength,* give additional information about the frequency of the pressure wave because there is an inverse relationship between frequency and wavelength. Additional experiments have described complex sound stimuli in terms of their *harmonics,* or the various combinations of sound waves that have merged to create the complex stimulus (Fourier analysis), and the relative strength of the stimulus, or *amplitude,* as measured by the height of the pressure wave.

Knowledge of these physical sound stimulus properties is required to study how we hear sounds. Researchers who examine the perceptual experience caused by sounds are analyzing how the characteris-

tics of the stimulus combine with the anatomy of the hearing system so as to be translated into a particular sound. Specifically, the amplitude, frequency, and harmonics of the sound stimulus give rise to the psychological perception of *loudness, pitch, and timbre* of the sound. Determining how this is accomplished is one of the goals of auditory perception research. The complexity of this endeavor can be best illustrated by pitch perception. Experiments in pitch perception can be divided into two groups: physiological and psychophysical.

Physiological Approach. Physiological theories for how the auditory system codes for pitch were proposed as early as the beginning of the 20th century. One early theory, called resonance theory and proposed by Herman von Helmholtz, stated that the sound stimulus entered the ear and vibrated specific fine fibers of the basilar membrane (the membrane running through the cochlea hearing organ in the inner ear) similarly to a piano string. The particular frequency of the stimulus directly caused a particular fiber to vibrate the most, which corresponded to the particular pitch of the sound. Later work by von Bekesy (1960) demonstrated that the basilar membrane vibrates as a whole as a traveling or rolling wave (similar to when a person holds a rope tight and snaps one end of it, sending a wave rolling down the length of the rope). Bekesy concluded that different frequencies of the stimulus created a rolling wave at different points along the membrane and that the pitch of the sound was related to where along the membrane this wave was created.

These results confirmed earlier electrophysiological work by Culler, Coakley, Lowy, and Gross (1943) that examined the electrical responses of the neuronal cells in the inner ear to stimuli of varying frequencies. This work revealed that low frequencies excited neuronal cells toward the tip of the membrane, while high frequencies stimulated cells toward the base of the membrane. Work by Russell and Sellick (1978) demonstrated that each neuron responded to a specific narrow range of frequencies of the stimulus. These results suggest that both the place on the membrane that was activated and the frequency of the stimulus are related to neuronal firing. However, psychophysical experiments were needed to make the link between the frequency of the stimulus and neuronal firing and the perception of pitch.

Psychophysical Approach. Experiments that used this approach for the perception of pitch demonstrated that the pitches that are perceived rely on the sound stimulus activating a specific population of auditory neurons. During the 1950s, Egan and Hake conducted a series of sound-masking experiments in which the thresholds of hearing a range of pitches were measured (see Goldstein, 1999). After this measurement, a sound stimulus of white noise (masking sound stimulus) was delivered to the auditory system, and the pitch thresholds were remeasured. The results showed that the threshold for hearing test tones closely tuned to the range of frequencies covered by the masking sound stimulus (365-455 Hz, centered at 410 Hz) increased, thus masking the perception of these test tones. The frequencies of the test tones closest to the range of the masking stimulus were masked more strongly than test frequencies farther away from the frequency range of the masking stimulus. The explanation for this effect, which relates back to the physiological experiments discussed previously, is that the masking stimulus activated the same group of auditory neurons as did the test tones. Once these neurons were already "occupied" with the masking

stimulus, it took more test tone stimulus to enable the detection of that specific frequency.

The utility of using *both* of the preceding approaches is quickly realized when we consider that at times having data from only one of these gives a confusing picture of behavior. Specifically, when discussing pitch perception as it relates to stimulus frequency and neuronal firing patterns, we soon realize that this cannot explain the phenomenon. We can detect and identify pure tone frequencies that are higher than any neuron can repeatedly fire. Therefore, if detection of high frequencies were dependent on the absolute firing rate of neurons in the auditory system, we would be able to perceive tones only up to 1,000 Hz. Because humans can detect frequencies near 7,000 Hz, something else needs to account for pitch perception.

Early in the 20th century, the "volley principle," which states that high-frequency neuronal firing can be achieved if neurons work as functional groups, was proposed by Wever and Bray (see Goldstein, 1999). According to this theory, a collection of neurons would fire at every fifth cycle of the sound wave. In this fashion, the summed response of a sufficient number of neurons could be perceived as high-frequency information, even though each neuron is limited by its refractory period. Later researchers discovered evidence for this idea and termed it "phase locking" (Rose, Brugge, Anderson, & Hind, 1967). Therefore, high-frequency pitch perception is dependent on the activity of specific neurons in the inner ear *and* the perceptual machinery.

The realization that hearing is often more than *just* the working of the neuroanatomical components of the auditory system brings us back to the issue of causation. Does the function of the auditory system *cause* us to hear? The answer would have to be "no" because the use of a variety of experimental methods has demonstrated that we can still perceive and derive meaning from a complex stimulus in the absence of a completely detected physical stimulus. However, this is not to suggest that hearing could occur in the complete absence of a functioning auditory system. Some input into the system *is* required, but the complete experience of hearing occurs only when physical and nonphysical components of the system work in tandem.

The relationship between *musical* experience and perception of auditory stimuli is also complex. Here is an example of how phenomenological analysis and cognitive hypotheses both are required to begin to understand an important facet of *music* as perceived and music as produced.

THE PERCEPTION OF RHYTHM

Music comes to us as a mode of auditory and kinesthetic experience. It has a distinctive phenomenology. The problems for the psychologist of music are presented in those terms. How is felt tension created in a melody? How are expectations, technically the pitch vectors of notes, brought into being? What is the character of the experience of unity or coherence in a melody? And so on. There would scarcely be a psychology of music if the psychologist were confined to measuring frequencies and tracking the vibrations from tympanum to cochlea to auditory cortex.

However, once one sets out on a deeper analysis, hypotheses about abstract structures seem to be required. These are the Schenkerian structures—major triads and perfect fifths—on which the whole of Western music and some Oriental music is based. This discovery seems to lead straight to computer modeling of the processes of structural cognition. One would say that the processes proposed, extending

far beyond the simple four laws of gestalt apprehension, must be realized in the human brain. It seems natural to use artificial intelligence (AI) simulations as the basis for a further level of hypotheses as to what corresponds to machine processing in the auditory cortex. So far, the results of experiments on hypotheses developed along these lines have proved very disappointing.

Here is an example. A beat progression at a certain rate is established, and musicians are asked to perform two tasks: one perceptual and one performative. The perceptual task is set up as follows. After several beats, a tap is introduced a certain fraction of a beat after one of the established beats. The participants are asked to name the fraction, eighth note, quarter note, or whatever seems to be right to them. They consistently choose a name for a longer interval than has objectively—that is, physically—been produced. They overestimate the temporal span. In the second experiment, after the beat sequence has been established, the participants are asked to tap or, using their usual musical instrument, to indicate when an eighth beat or a quarter beat or whatever the experimenter asks has elapsed. They consistently come in early with respect to the time elapsed that would be physically defined by the note name, consistently underestimating the temporal span. This effect persists for however many trials each participant undergoes. The degree of over- and underestimates is specific to the performer.

How, then, can an orchestra ever play together and satisfy an audience? There are various cognitive hypotheses "on the table," so to speak. They share the problem of accounting for the apparent difference between time estimation in perception and performance of rhythms. Feedback will not do because the effect is independent of the number of trials. The most likely suggestion is that performers share a common virtual beat, while the audience members share a different but common virtual beat. In this way, there could be a coordinated performance and a coordinated appreciation, each running on a different time scheme. The only problem with this is the role of the conductor who is both performing and auditing. There is other work that suggests that bodily movement dominates rhythm apprehension. So long as the conductor goes on beating with the baton, all will be well.

Clearly, we have here a mixed methods project. Phenomenology of musical experience sets the problem and determines whether a satisfactory answer has been achieved. Cognitive science provides tentative answers by using the AI-neural process link to propose hypotheses about unobservable mechanisms.

Interim Conclusion 5

Because there could be no way in which the relevant physiological mechanism could be identified without participants' phenomenological reports of personal experience, cognitive neuroscience necessarily requires the mixing of methods. The relevance of this example to our general theme is that the recent history of mainstream psychology reveals a transformation—as yet incomplete—of its cultural foundations. The admission of personal data into the scientific domain is a cultural event of the greatest significance for the future of this hybrid discipline.

Mixed Methods Proposal 5

One must acknowledge that psychology is a hybrid discipline and that the understanding of the processes of behavior, such as those involved in the perception of sound and rhythm, demands a combination of quantitative and qualitative methods—cross-checking and cross-

validating experimenter assumptions. Advances in technology that allow for increasingly detailed measures of biological processes must be accompanied by increased accuracy in capturing subjective experiences in cultural context.

◆ *Concluding Comments*

We have argued that research methods not only are intimately interwoven with cultural practices, they *are* cultural practices. They are not independently justifiable or even intelligible in the absence of explicit reference to the cultural context in which they are used. Consequently, research methods tend to reflect cultural biases, although this might not be easy to see. However, there is some variation in the particular cultural biases reflected by different research methods. Not all methods reflect the same biases to the same degree. For example, the natural science paradigm, combined with phenomenological individualism, is influential to a greater degree in certain brain imaging methods used in neuroscience than it is in observational field research.

Psychology espouses the ambition to become a science of human behavior. But it is debatable whether to achieve this goal, psychology must search for universals in behavior. If this were a sine qua non of scientific status, then many studies, such as geology, would be ruled out of the catalog of sciences. This quest necessarily means that psychology must explore similarities in cognitive procedures—patterns of social behavior and the relevant neural mechanisms—across many cultural groups. This involves the issue of levels of abstraction. Universality is bought at the cost of adopting a high level of abstraction. To achieve anything like the kind of detailed understanding of the generation of psychological phenomena that we find in the natural sciences, we must drop to lower levels of abstraction. Inevitably, this requires the adoption of a multimethods approach.

Even when biological universals are involved, culture can play a powerful role in how such biological characteristics become manifest in behavior. The most exciting examples of current research clearly demonstrate this point. For example, it has been known for some time now that there is a strong genetic component in dyslexia, a language disorder that creates difficulties in reading and writing. However, it has also been argued that there is a cultural component because the rate of identified dyslexia varies considerably across cultures. About twice as many individuals are recognized as dyslexic in the United States as in Italy. Using PET scans, researchers showed that British, French, and Italian adults identified as dyslexic showed lower neural activity in the same part of the brain identified as vital for reading (Paulesu et al., 2001). However, because the lexicography and pronunciation conventions of written English and French are more complex than those of written Italian, people find it harder to overcome their difficulties in recognizing word forms if they are trying to read English and French than if they are trying to read Italian.

This research illustrates very clearly the point about levels of abstraction. At the furthest distance from the actual practice of reading and writing in one's mother tongue are the brain mechanisms normally used by skilled users of language. Not surprisingly, the method appropriate to that level of analysis is the one that involves the least role for the intentional or meaningful qualities of the material on which the subject is working, namely PET scans of activated brain regions. The most concrete situation occurs when someone is

using his or her mother tongue for some purpose for which the meaning of the forms of words is paramount. There, the cultural aspect comes to the fore. In this experimental program, we have the whole story of culture and its relation to noncultural aspects of human functioning perfectly portrayed.

There is a basic methodological principle that we can now state or restate firmly: In using any neuroscience methodology to study the brain mechanisms people use for various tasks, we must give priority to the subjective realm so as to identify the relevant brain processes. Any psychologically relevant use of fMRI or PET techniques requires the participant to perform tasks that are always defined in terms of that participant's skills and subjective experience. If someone is doing a PET scan to try to find a lesion that is suspected to exist, the participant will be asked to try to perform the task or think the thoughts that are thought to be related to activities in characteristic regions of the brain. Disordered thoughts or disruption of normal skills is related to brain defects "top-down." One could not possibly study brain science unless one took for granted the phenomenology of psychologically relevant experience. Phenomenological analysis of experience and neuroscience need one another. In this domain, the mixing is not just a matter of practical technique but also a matter of logic. The identification of relevant brain states and processes depends on the ability of participants to identify their subjectively presented mental states and processes efficiently and adequately.

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4

CULTURAL DISTANCE, LEVELS OF ABSTRACTION, AND THE ADVANTAGES OF MIXED METHODS

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Two progressive trends in research have converged and are crossing paths at the beginning of the 21st century. The first is a greater concern to incorporate cultural diversity in social science research, toward the identification of etic (universal) and emic (local) features of human behavior, and the second is a concern to incorporate methodological diversity in the social sciences (for related discussions, see Gubrium & Holstein, 1997). However, this fortunate crossing of paths can prove fruitful in the long term only if careful attention is given to at least three fundamental issues. The first concerns the consequences for methodology of the admission of cultural considerations into the foundations of psychology and of social science research in general. The second concerns the methodological consequences of taking levels of abstraction into account. The third concerns the apparent dichotomy between a natural science methodology, based on publicly observable data, and a phenomenological methodology, based on reports of personal experience. In examining these issues, our main focus is on the discipline of