YOU CAN'T TAKE IT WITH YOU: Why Ability Assessments Don't Cross Cultures

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A central thesis of this article is that ability tests can be analyzed as items of symbolic culture. This theoretical perspective, based in cultural psychology, provides psychological researchers and clinicians with the tools to detect, correct, and avoid the cross-cultural misunderstandings that undermine the validity of ability tests applied outside their culture of origin. When testers use tests developed in their own culture to test members of a different culture, testees often do not share the presuppositions about values, knowledge, and communication implicitly assumed by the test. These cross-cultural issues have important relevance for ability testing in an ethnically diverse society.

The thesis of this article is that tests of intelligence and cognitive ability are cultural genres (Cole 1985; Greenfield, in press; Lave 1986). This thesis is identified with a theoretical perspective that has come to be known as cultural psychology (Bruner 1990; Cole 1990; Price-Williams 1980; Shweder 1990; Stigler, Shweder, and Herdt 1990). I develop this thesis by showing how ability tests presuppose a particular cultural framework. Most important, I demonstrate that this framework is not universally shared. Therefore, when it comes to tests of ability and intelligence, it is often the case that "you can't take it with you."

There is, however, an alternative point of view, briefly summarized as "you can take it with you." This view, generally identified with a perspective called cross-cultural psychology (Berry, Poortinga, Segall, and Dasen 1992; van de Vijver and Leung 1997), is that ability tests are intrinsically transportable from one culture to another. With appropriate linguistic translation, administration by a "native" tester, and (less frequently) the provision of familiar content, the notion is that ability tests can go anywhere. Researchers and testers working in this tradition are interested in discovering both universals and cross-cultural variability in the whole range of human attributes, ability included. They see the advantage of administering tests that have known psychometric properties and provide a universal metric for comparative purposes (Poortinga, 1989). This point of view is strongly rooted in the traditions of North American psychology (Lonner and Adamapolous 1997), with its strong preference for quantification and universalism.

In addition to the theoretical interests of cross-cultural psychologists, there are also utilitarian reasons to carry IQ and other ability measures to new cultures. Ability assessments can be used in clinical settings (e.g., to diagnose mental deficiency), in educational settings (e.g., to place children in an academic track), and in occupational settings (e.g., for job selection). In these cases, cross-cultural assessment often occurs when testers from a dominant cultural group test participants from a minority or less powerful group, using tests that originated in the dominant culture. In other words, one can cross cultures within a society, as well as between societies. This kind of cross-cultural testing, increasingly common with rising numbers of immigrants in the United States, also assumes that "you *can* take it with you."

The practice of taking ability tests across cultures for utilitarian reasons depends on the same set of assumptions that are made in cross-cultural psychology. Cultural psychology provides a theoretical framework for questioning these assumptions.

Central to cultural psychology is the human capacity for *symbolic culture*. The term *culture* implies sharing or agreement, that is, social convention. In symbolic culture what is shared are values, knowledge and communication. To say, then, that tests are cultural genres implies that they require shared values, shared knowledge, and shared communication. The thesis of this article is that IQ and other ability tests are based on social conventions in each of these three cultural domains. These conventions are presupposed or assumed by a test and its tester. However, for any test to function successfully, these conventions must also be shared by the participants. If a test travels, so must the conventions on which it is based. Otherwise, cross-cultural misunderstanding results and validity is compromised.

For a test to travel freely, its foundational conventions must be universally understood by potential participants. In each of the three cultural areas—values, knowing, and communicating—two or more foundational conventions are discussed. The transportability of cross-cultural tests either for comparative research or for utilitarian practice requires potential universality in each of these areas. However, as I show in this article, this requirement is often not met.

VALUES AND MEANING For a test to travel freely, (a) there must be universal agreement on the value or merit of particular responses to particular questions, and (b) the same items must mean the same things in different cultures, given a good linguistic translation of the instrument.

KNOWING For a test to travel freely, (a) the universal unit of knowing must be the individual, and (b) (although not for all ability tests) there must be a universal distinction between the process of knowing and the object of knowledge.

COMMUNICATION For a test to travel freely, (a) the function of questions must be universal, (b) the definition of relevant information must be universally the same, (c) decontextualized communication (communicating about something that is irrelevant to the immediate situation) must be universally familiar, and (d) communicating with strangers in an impersonal manner must be universally acceptable.

Evidence against the universality of each of these conventions is presented in turn. The problems caused by cultural variability in these conventions are analyzed and solutions proposed. For each convention, I discuss how it can be used to detect cross-cultural misunderstanding about the

requirements of an ability test and what can be done to correct or prevent this kind of misunderstanding. The ultimate goal is to specify culturally sensitive strategies for the appropriate assessment of abilities in a wide range of cultural contexts.

Values and Meaning

IS THERE ALWAYS AGREEMENT ON THE VALUE OF A GIVEN RESPONSE? AN EXAMPLE FROM COGNITIVE TESTING IN LIBERIA.

Cole, Gay, Glick, and Sharp (1971) took an object-sorting task to Liberia, where they presented it to their Kpelle participants. There were 20 objects that divided evenly into the linguistic categories of foods, implements, food containers, and clothing. Instead of doing the taxonomic sorts expected by the researchers, participants persistently made functional pairings (Glick 1968). For example, rather than sorting objects into groups of tools and foods, participants would put a potato and a knife together because "you take the knife and cut the potato" (Cole et al. 1971, 79). According to Glick, participants often justified their pairings by stating "that a wise man could only do such and such" (Glick 1968, 13). In total exasperation, the researchers "finally said, 'How would a fool do it?' The result was a set of nice linguistically ordered categories—four of them with five items each" (Glick 1968, 13). In short, the researchers' criterion for *intelligent* behavior was the participants' criterion for *foolish*; the participants' criterion for *wise* behavior was the researchers' criterion for *stupid*.

ANALYSIS OF PROBLEM When one takes a cognitive test to a cultural or ethnic group beyond the group that constructed it, how does one know if the group is being asked to act *stupid* or *intelligent*, *foolish* or *wise* in their own terms? This example dramatically shows that the testers' *intelligent* can be the *participants' foolish*. When researchers and test developers create cognitive or mental tests, it is assumed that there is general consensus between testers and participants about the criteria for an intelligent answer. In testing practice, this agreement may not be assumed on the level of each individual (e.g., a mentally retarded individual may not know what is considered intelligent in his or her group). However, such agreement is assumed on the cultural level, that is, on the level of social norms. Lack of such normative agreement, as the Kpelle response dramatically illustrates, undermines the validity of the test in question. Clearly, the example raises profound questions about assuming the cross-cultural validity of IQ tests. It shows that cultural bias cannot be eliminated simply by making item content familiar. A deeper kind of cultural bias concerns what kinds of cognitive processes are more or less valued.

But this issue goes beyond cognitive tests: When psychologists take any instrument into another group, how do they know what that test means to the participants? The bottom line is this: Whenever a psychological instrument and its standardized interpretation means something entirely different to participant and tester, the instrument's validity has been severely undermined for identifying cross-cultural similarities and differences in cognitive ability or for evaluating deficits in clinical assessment. It may, nonetheless, still have some use for assessing the functioning of an immigrant or other minority person in the dominant culture (Lopez, in press).

A major component of cultural processes is the creation of shared meaning. Glick's (1968) example shows, first, that both participants and researchers are continually engaged in the meaning-making enterprise (cf. Kihlstrom 1995). Each group has its own interpretations of what an instrument means. Under most circumstances, however, the participants do not receive an opportunity

to communicate their interpretations to the researchers, and the researchers do not communicate their interpretations to the participants. Because of the nature of standard psychological methodology, cross-cultural misunderstandings such as that in the Glick example generally go undetected. The principles and procedures of psychological research do not provide resources to detect such problems. A major goal of this article is to provide psychological researchers with the conceptual tools to detect, correct, and avoid the cross-cultural misunderstandings that undermine the validity of psychological research and assessment of intelligence and cognitive abilities.

SUGGESTED SOLUTION A number of psychological researchers have done studies of the definitions of intelligence in nonWestern cultures (Berry and Bennett 1992; Dasen 1984; Wober 1974). Often these definitions are quite contrastive with the definitions researchers take for granted: For example, intelligent people are slow and conforming in Africa (Wober 1974). In Kenya, Harkness and Super found that "parents defined 'intelligence' as the ability to do what needed to be done around the homestead without being asked" (Harkness, Super, and Keefer 1992, 105).

When a researcher or clinician wants to assess intelligence in a new cultural context, investigations can be carried out to assess the local definition of intelligence. The investigation of indigenous definitions of intelligence is a research tool for detecting a cross-cultural divergence in values that can undermine the use of intelligence and other cognitive tests in a new culture. Once the initial investigation is complete, new assessment procedures can then be constructed to assess individual differences in fulfilling the indigenous criteria of intelligence; this strategy can correct the cross-cultural misunderstandings that occur when IQ tests are given to people with a radically different set of presuppositions about the nature of intelligence. A research or clinical decision not to use tests of intelligence in a particular culture may also be made. Such a decision, made on the basis of research on indigenous conceptions of intelligence, avoids the cross-cultural misunderstanding that would undermine the validity of the tests.

On the other hand, where cultural definitions of intelligence are equivalent, the translation of a test, in conjunction with the removal of culture-specific content, may be perfectly valid. For example, schooling seems to bring with it a particular definition of intelligence (Dasen 1984; Serpell 1993), rendering more feasible a common metric for its measurement (Neisser 1976). (This issue of formal education and the cross-cultural use of tests is returned to later.)

RELEVANCE TO ETHNIC DIVERSITY IN THE UNITED STATES Immigrant groups can arrive in the United States with very different notions of the nature of valued abilities. For example, Reese, Balzano, Gallimore, and Goldenberg (1995) showed that Latino immigrants put a high value on *educacion*, the Spanish cognate for *education*. However, the meaning of *educacion* is not the same as that of *education*. The social skills of respectful and correct behavior are key to *educacion*; this contrasts with the much more cognitive connotations of the English word *education* in mainstream U.S. culture.

Mainstream society may decide that it is necessary for immigrants or other minorities to change their definitions of intelligence to adapt to the new society. However, an understanding of the contrasting values concerning intelligent behavior that immigrants may bring with them to the United States provides a different perspective on lower performance: It is not a question of innate deficiencies, but of values that actively discourage the kind of behavior deemed intelligent in their new society. Developing intelligence as defined in this society is then correctly seen as an acculturation process that requires giving up the ancestral definition of an intelligent human being.

DO THE SAME ITEMS MEAN THE SAME THINGS IN DIFFERENT CULTURES AS LONG AS LINGUISTIC TRANSLATIONS ARE GOOD?

OBJECTIVITY, PERSPECTIVE, AND BIAS Modern psychology was born from the methodological ideology of objectivity, the erasure of perspective, generally known as bias. Yet when one studies behavior in one's own culture (as most psychologists do), in fact one has an insider's cultural perspective (Greenfield 1997). Although this perspective almost always goes unacknowledged (cf. Rogoff and Morelli 1989), it is crucial. With reference to his or her own group, the insider understands the meanings and motives behind in-group behaviors that may be misinterpreted or devalued by outsiders looking through the lenses of their own cultural values. When an insider develops an assessment for his or her own cultural group, the meanings and motives of the group are implicitly, albeit unconsciously, taken into account.

One methodological implication of perspective is that, in cross-cultural comparative research, the direction of crossing makes a difference. If a piece of research originates in one of two cultures being compared, the method and issues will bear the mark of that culture, no matter how carefully a linguistic translation is done.

AN EXAMPLE This point was raised to awareness during a study in Rome and Los Angeles of attitudes toward computers and technology (Sensales and Greenfield 1995); such attitudes are an important motivational component of the kind of technological intelligence so valued in the United States and other Western societies. The research questionnaire was first developed in Rome for Italian participants. Because the Italians were very concerned about the philosophical and ideological aspects of computers, this culture-specific concern was manifest in items like the following (participants had to indicate their degree of agreement or disagreement with each statement): "Science and technology are destructive and dangerous without sure moral guidance" or "The so-called scientific attitude frequently masks dogmatic positions." (Sensales and Greenfield 1995, 236) The unfamiliarity of such concerns to people in the United States makes the point that an instrument reflects the value system of its cultural origins, even after conforming to accepted norms for linguistic translation, such as the use of back translation.

SUGGESTED METHODOLOGICAL STRATEGY If, therefore, one wants to elucidate cultural differences in an unbiased fashion, then it is best to have a bicultural (or multicultural) team and to collaboratively develop a single instrument for all the cultures before the study begins. This holds for ethnic diversity within a society, as well as for cross-cultural diversity between societies. It is important that the representative from each culture be a full participant in developing procedures from the beginning; cultural consultants brought in after the fact do not suffice. At the same time, it is also important to understand that professional collaborators may, through education, have moved away from their cultural roots and toward the culture of research. Within the limits of this caveat, egalitarian, multicultural collaboration in instrument development constitutes a powerful tool to detect and prevent the cross-cultural misunderstandings that undermine validity in cross-cultural ability testing.

Objectivity, in the sense of having no perspective, is impossible. The only questions are what perspective (or perspectives) inform a particular piece of research, to what extent the researchers are aware of their perspectives, and whether the perspectives illuminate or obfuscate the subject at hand.

Modes of Knowing

IS THE KNOWER ALWAYS AN INDIVIDUAL?

One basic example of cultural variation in epistemology comes from the difference between an individualistic and a collectivistic model of the nature of knowing. Many societies think of knowing as a group process, not an individual one. The collaborative construction of knowledge, as it often occurs in the course of conversation, is the norm (e.g., Durand and Ochs 1986).

AN EXAMPLE When I was interviewing Zinacantecan Maya girls and their mothers in Chiapas, Mexico, about learning how to weave and embroider, I envisioned each girl and each mother as an individual participant with an individual interview protocol. But that is not how my participants saw it. The notion that a girl would have an independent viewpoint, an independent piece of knowledge, or an independent perspective was not within their world view. Instead, they expected more knowledgeable mothers to answer for young girls and for members of the family grouping to answer questions cooperatively. Implicit in this process was the notion that the overall information would be as valid as possible because of it being the product of a group effort. The partitioning of this information individual by individual was at odds with their world view.

The Zinacantecans illustrate an epistemological assumption about the nature of knowledge and the process of knowledge construction that is common to many collectivistic societies (cf. Durand and Ochs 1986). However, this is not just a substantive finding about cultural variability in communication processes. It is also a methodological finding that constrains data collection procedures.

SUGGESTED SOLUTION The procedure used to collect information in such a society must permit the cooperative construction of knowledge. This is a strategy that will prevent the diminished validity of tests that can occur because of participants' discomfort with an individual interview procedure. At the same time, methods for eliciting the cooperative construction of knowledge also preclude the very notion of individual and ability assessment that is so basic to the culture of testing

RELEVANCE TO ETHNIC DIVERSITY IN THE UNITED STATES The relevance of this notion to the teaching and testing of ethnically diverse populations in the United States is great, because so many groups have their ancestral origins in collectivistic cultures (Greenfield and Cocking 1994). For example, it has been found that the collaborative construction of knowledge in school through cooperative learning methods improves assessed learning among Mexican American and African American children, but not among Euro-American children (Aronson and Bridgeman 1979; Boykin 1996), who are individualistic in their value orientation (Raeff, Greenfield, and Quiroz, in press).

The question can be raised as to whether it is adaptive to assess the results of cooperative learning in a society that values competition. Two responses suggest themselves: (a) Industry has realized that more cooperative workers can be more productive, in the manner of the Japanese; and (b) a cooperative emphasis in learning and assessment can be used to help students and their families make a smooth transition to a new culture (Quiroz and Greenfield, in press).

DO ALL CULTURES MAKE A DISTINCTION BETWEEN THE PROCESS OF KNOWING AND THE OBJECT OF KNOWLEDGE?

A radical departure from the assumption that there is a separation of the knowing subject from the known object can wreak havoc with many psychological procedures, most particularly ability assessments that require the participant to give reasons for his or her response.

AN EXAMPLE OF MENTAL REALISM In my first cross-cultural study (Greenfield 1966; Greenfield and Bruner 1969), I brought tests of conservation of quantity to Senegal to study the Piagetian stage of concrete operations (Piaget and Inhelder 1962). After I transferred water from a shorter, fatter beaker into a longer, thinner one, I asked unschooled Wolof children (in their Wolof language) if the quantity of water was the same, more, or less. After their response, I continued the Piagetian interview, asking (in Wolof) "Why do you think it is the same (or more, or less)?". Even when I changed the Wolof wording to "Why do you say it is the same (or more, or less)?", my question elicited only uncomprehending silence. Not until I changed the question to "Why is the water the same (or more, or less)?" did I elicit justifications for the original quantity judgment. At that point, the unschooled children gave me reasons for their judgments that were as articulate as those given to Piaget and his colleagues in Geneva.

These children had an epistemology of mental realism. They were not making a distinction "between their own thought or statement about something and the thing itself. Thought and the object of thought seem[ed] to be one" (Greenfield and Bruner 1969, 637). In this worldview, the idea of explaining a statement is meaningless; it is the external event that is to be explained. In other words, unschooled Wolof children had an implicit theory of their own minds' functioning; however, this theory was at variance with that presupposed by the test.

A SOLUTION FROM CULTURAL PSYCHOLOGY. VARYING THE PROCEDURE TO MAINTAIN VALIDITY IN CROSS-CULTURAL RESEARCH This example makes the important point that an exact copy (e.g., a literal translation) of an experimental procedure can lead to a very invalid conclusion. Under the standard assumption of psychological methodology, I should have maintained an exact replication of the procedure that had been used in Switzerland (Piaget and Inhelder 1962) and the United States (Bruner 1965) to facilitate comparison of results. Had I done that, however, I would have erroneously concluded that the unschooled Wolof children were not able to explain the reasoning behind their quantity judgments. I would have confounded their theory of knowledge with their knowledge of reasoning. I would have incorrectly concluded that there was a major cognitive lack vis-a-vis concrete operations. Instead, I concluded that they had a different theory of knowledge and therefore required an interview procedure that would make sense in their epistemological frame of reference.

The pilot research I did into different question formats is a possible model for detecting cross-cultural misunderstandings that undermine assessment of a particular ability. The procedure I finally adopted, based on the pilot study, was a means to prevent such misunderstanding from spoiling my assessment of the cognitive ability of conservation. Because of the two stages of identification and prevention, correction of problems through post hoc interpretation of seeming deficits was unnecessary.

PREREQUISITES FOR VALID TESTING CAN DEPEND ON FORMAL EDUCATION This example provided even more insight into the transfer of procedures and instruments from one group to another. The Wolof children who attended school responded well to the question that made no sense to the

unschooled children: "Why do you say the water is the same (or more, or less)?". They produced articulate reasons indistinguishable from the reasons of children in Switzerland and the United States. Apparently, the process of schooling had changed their epistemological presuppositions to accord with those of the psychological experiment.

Our conclusion was that it was the introduction by the school of the written word into an oral culture that had made the difference (Greenfield 1972). In the medium of writing, thoughts about the world are visibly distinct (on the printed page) from the world itself (Greenfield and Bruner 1969). It seemed likely that the written word, as used in school, had transformed an epistemology of cognitive realism into one of cognitive relativism, an epistemology in which a given person can have a variety of thoughts about the same thing, or different people can have different thoughts about the same thing.

IMPLICATIONS FOR PREVENTING CROSS-CULTURAL MISUNDERSTANDING OF TESTS

This difference between schooled and unschooled children has important implications for the kinds of populations to whom one can validly transfer ability assessment procedures: It implicates formal education as a potentially important variable in developing the implicit epistemology assumed by many psychological instruments. It is not known if equalizing formal schooling across cultures would equalize cultural groups in ability testing. Equal formal education, however, provides a level playing field on which the valid comparison of abilities can take place.

Triandis (1995) has recently pointed out that the cross-cultural importation of tests may be appropriate where the cultures being compared are not too different. In contrast, he hypothesizes that the development of different measures for different cultures may be required where the cultures are very different. I would simply add one point: A major (probably *the* major) factor that makes a culture more or less different from the cultural conventions surrounding ability testing is the degree of formal education possessed by the participants. Indeed, most multicultural surveys in cross-culture psychology restrict their samples to college students (e.g., Kim and Choi 1994) or professionals (e.g., Hofstede 1980) from each country. Where high levels of formal education are equated across cultures, I would predict that the values, epistemology, and communicative conventions of the participants would be extremely similar to each other.

IMPLICATIONS FOR CULTURAL DIVERSITY IN THE UNITED STATES

In terms of relevance to the United States, it is important to note that many immigrants, for example, from Mexico, have had little or no opportunity for formal education before arriving in the United States (Delgado-Gaitan 1994; Tapia Uribe, LeVine, and LeVine 1994). As a consequence, it is possible that they could, like unschooled Wolof participants, have presuppositions about the nature of knowledge that diverge in similar ways from those assumed in much cognitive testing, particularly with respect to a theory of one's own mind and how it functions (e.g., Flavell, Green, and Flavell 1987).

Conventions of Communication

IS THE FUNCTION OF QUESTIONS THE SAME IN EVERY CULTURE?

Perhaps the most basic problem inhibiting the universality of cognitive tests (including IQ tests) is one that has been known for a long time (e.g., Mehan 1979): The conversational convention of the test question, a presupposed form that underlies every cognitive test. The test question assumes that a questioner who already has a given piece of information can sensibly ask a listener

for that same information. This convention is assumed by every cognitive test that has right and wrong answers.

A problem arises because the test question flies in the face of a fundamental conversational convention about the question form: The questioner is asking for some information that he or she lacks. In violating this convention, the tester is in fact inviting the test taker to present redundant information, information that duplicates what the tester already knows. Redundancy in itself violates a basic conversational maxim not to be "more informative than is required" (Grice 1975).

Test questions are, of course, fundamental to the nature of schooling. In school, the teacher constantly asks test questions, both orally and in writing. It therefore seems that, across cultures, groups more familiar with schooling will also be more familiar with test questions as a communication genre (Durand and Ochs 1986).

There is another cross-cultural problem with the use of questions. In many cultures such as Asian and African ones (Harkness and Super 1977; Nerlove and Snipper 1981), knowledge traditionally flows from the top down. In such a society, adults do not normally solicit the views (or even the verbalizations) of children (see also Greenfield and Bruner 1969). In many adult-child situations, children are meant to listen and understand, not to speak (Harkness and Super 1977; Nerlove and Snipper 1981). For a child to answer an adult question is to verbalize and express a view; this can violate basic social norms of acceptable child behavior.

POSSIBLE SOLUTION This problem is a difficult one to solve, because ability testing depends so fundamentally on test questions. However, performance items, where the tester tells the participant to do (rather than to say) something, can work quite well with children (Greenfield and Childs 1977b; Greenfield 1997). This strategy accords with the anthropological finding that, in hierarchically organized cultures, children are used to responding to verbal directives with nonverbal action. This is a preferred mode of adult-child communication. By suggesting this mode of communication between participant and tester, the anthropological findings can be used to prevent the confounding of preferred mode of communication with the cognitive ability being tested. They do so by changing the communicative mode of the assessment from test question to action directive.

RELEVANCE FOR ETHNIC DIVERSITY IN THE UNITED STATES Perhaps influenced by the African model of communication and knowledge (Boykin and Toms 1985; Sudarkasa 1988), African American adults in the southern United States were found to question their children relatively little and almost never use test questions (Heath 1983). This communication model contrasted with that of a neighboring European American community, where parents questioned their children more in general and, in particular, used more test questions (Heath 1983). In a parallel ethnocultural contrast, Delgado-Gaitan (1994) found that Mexican immigrant parents used questioning as a conversational strategy less than did first-generation Mexican American parents, who were more educated and assimilated to U.S. culture; this intergenerational change was focused on test questions in particular.

This issue is directly relevant to the assessment of academic achievement. Our research has shown that when children of Latino immigrant parents go to school, the emphasis on understanding rather than speaking, on respecting the teacher's authority rather than expressing one's own opinions leads to negative academic assessment. In a study of parent-teacher conferences,

Greenfield, Quiroz, and Raeff (in press) found that the teacher often complained that children did not speak up. Furthermore, in every case, the teacher equated this trait with having a bad attitude. Only when a child did habitually speak up did the teacher evaluate the child's attitude in a positive fashion. Hence, a valued mode of communication in one culture—respectful listening—becomes then basis for a rather sweeping negative evaluation in the school setting where self-assertive speaking is the valued mode of communication. It may be important for immigrant children to eventually learn to speak up in class. But it is equally important for teachers or testers to know that, when they do not, it may not be because they are "stupid," but rather because they are being respectful, as desired and defined by their home cultures.

IS THE DEFINITION OF RELEVANT INFORMATION THE SAME IN EVERY CULTURE?

TEST RELEVANCE VERSUS TOPIC RELEVANCE Presuppositions concerning the functional utility of information can also interfere with a specific test genre, the multiple-choice question. In the multiple-choice format, the respondent is given a set of alternatives. All but one of them is functionally useless information. The problem is that participants in many cultures will assume that the communicator is presenting an ensemble of information relevant to the goal of solving the problem.

This difference in communicative presuppositions can cause grave problems in the understanding of the multiple-choice format. For example, we (Greenfield and Childs 1977b) studied Zinacantecan Maya pattern representation. We tried out two formats for assessing skill in continuing striped patterns. In one format, we placed colored sticks in a wooden frame for several repetitions of a pattern; the participant was then asked to continue the pattern by filling up the frame with additional sticks. The other format involved multiple choice. Childs drew a sample that consisted of several repetitions of a striped pattern on a small piece of paper. She then drew three alternative striped patterns on three pieces of paper; one of the alternatives was the correct continuation. Participants were asked to select the pattern that matched the sample.

Whereas our Zinacantecan participants, possessing little or no formal schooling, were able to construct the pattern continuations in the frame with great competence, they did not comprehend the multiple-choice format as it had been developed in the culture of the researchers.

These tasks elicited mass confusion. Children often placed their choice on top of the original, turned their choice around, piled all four papers on top of each other, or paired their choice with the original and then paired the two remaining patterns (Greenfield and Childs 1977b, 30).

Because they succeeded with the same patterns in a different format, it is clear that the problem lay with the test genre, not the skills that were being tested.

In all of the strategies used to make sense of multiple choice, the Zinacantecan participants tried to use the paper patterns to construct something. The idea of eliminating, rather than using, a pattern given to them by the experimenter seemed to be foreign to them. As in the case of test questions, the notion that something had no function other than to test understanding seemed to violate their implicit conventions of the nature of communication.

Grice's (1975) extended analysis of nonverbal, as well as linguistic communication, is applicable here. In this multiple-choice misunderstanding, both tester and testee are cooperating in assuming the Gricean maxim of relation: Make your contribution relevant to the aims of the ongoing

interaction. It is simply that each partner assumes a different aim. The tester assumes the aim of the alternative answers is to eliminate incorrect possibilities, while selecting the correct alternative. The testee assumes the aim of alternative answers is to use the materials given by the experimenter to construct a solution to the problem.

ROLE OF FORMAL EDUCATION This analysis indicates that multiple-choice tests, no matter what their content, can never be universally culture-fair. Their format depends on the epistemological assumptions of school culture, specifically the assumption that materials exist whose only purpose is to test. This is undoubtedly one reason why the multiple-choice Raven Progressive Matrices, developed as a nonverbal, "culture-free" test, has shown the same kind of cultural variability as earlier IQ tests that are more verbal, but do not use the multiple-choice format (Dague 1972). Indeed, given the origin of the multiple-choice test in formal education, it is not surprising that, in Africa and Madagascar, when opportunities for school education were very variable, scores on the Raven Progressive Matrices were directly proportional to length of schooling and inversely proportional to the time elapsed since leaving school (Dague 1972).

SUGGESTED SOLUTION Do not use a multiple-choice format unless any group in which it is to be used has considerable formal education. More generally, pilot test formats do not just test content in every group where the test will be administered. Once again, the pilot stage can detect barriers to valid cross-cultural ability testing. The incorporation of these findings into the procedure then prevents cross-cultural misunderstanding that would undermine the validity of cross-cultural ability assessment.

RELEVANCE FOR ETHNIC DIVERSITY IN THE UNITED STATES Our cross-cultural examples may simply present in more extreme form the issue of differential comfort with the multiple choice format within different ethnic groups within the United States. The practical implications may be that students from particular backgrounds may need help and practice with particular test formats such as multiple choice.

CAN COMMUNICATION BE DECONTEXTUALIZED?

Another assumption of ability testing is that questions can be successfully asked out of the context of present relevance. However, not all cultural groups share this assumption, in particular, those that are unschooled and nonliterate.

ROLE OF FORMAL EDUCATION Familiarity with decontextualized communication has been found to be a function of formal education (Tapia Uribe, LeVine, and LeVine 1994). Hence, the decontextualized nature of most ability assessments may put those with less formal education at a disadvantage that does not relate to the skills or knowledge being tested.

POSSIBLE SOLUTION: RECONTEXTUALIZING ASSESSMENTS Assessment methods that contextualize knowledge can be developed. For example, I was having a hard time eliciting information about play weaving and play embroidery as Zinacantecan learning experiences until I started using play textiles as stimuli when asking participants if they had ever made such items when they were little. Comprehension and response were instantaneous. This successful communication contrasted strongly with the lack of comprehension that greeted questions about absent objects and events.

This strategy prevented confusion on the part of the participants, because, to them, communication outside of a pragmatic context does not make sense. In turn, the absence of confusion then

facilitated communication between participant and researcher, which successfully elicited the requested knowledge. An incorrect conclusion—that participants do not remember childhood experiences of play weaving and play embroidery—was therefore corrected when the procedure was changed from a purely verbal one to the inclusion of both verbal and nonverbal elements.

To recontextualize assessments, both researchers and clinical testers must be familiar with the contexts to which the knowledge being tested is applied. Insofar as tester and testee come from different cultures, familiarity with the situational contexts of knowledge can be gained through the ethnographic method. This methodology will be elaborated in a later section.

IS COMMUNICATING WITH STRANGERS IN AN IMPERSONAL MANNER ACCEPTABLE?

A presupposition about communication that is held by researchers but may not be held by all participants is that the communication between researcher and participant is an impersonal process. In a psychological procedure, both participant and researcher are assumed to be strangers to each other. Another assumption is that the research assistant or interviewer who interacts with participants is a replaceable cog in the research machine. That is, he or she could be replaced by any other trained person to deliver the procedural instructions or read the questions in an interview schedule. No relationship is assumed between participant and researcher. Indeed, one could even say that it would violate the psychological norm of objectivity for there to be a relationship between researcher and participant.

However, these assumptions concerning communication in the absence of a relationship do not hold in many cultures. Communication among strangers is definitely not the norm in collectivist cultures (Kim and Choi 1994; Madsen and Lancy 1981). In these societies, many of which have produced immigrants and other minorities in the United States, communication among known parties with whom a relationship already exists is the norm. These differences in presuppositions about communication have many methodological implications.

SUGGESTED SOLUTION For participants from collectivistic cultures, the tester may need to have or to establish a personal relationship with the testee outside the testing situation before a valid assessment can be done. This strategy prevents discomfort with stranger communication from interfering with the test interview.

RELEVANCE TO ETHNIC DIVERSITY IN THE UNITED STATES Most important for ability testing is that, for children with a collectivistic model of human relations, personal rapport with a tester will be more crucial in eliciting maximum performance.

An important point to make is that the issue here is not the ethnicity of the tester. Psychology as a profession has its own cultural model of human relations; this model is consonant with the dominant model in the United States, most likely because modern psychology has itself grown out of this society. As a result of research training in psychology, I have found that researchers from any ethnic group may try to apply the model of impersonal communication in situations where it is not necessarily shared by their participant populations.

Where Can Ability Testing Go?

THE ANTHROPOLOGICAL METHOD OF ETHNOGRAPHY IS AN INDISPENSABLE WAY FOR PSYCHOLOGISTS TO ENTER A NEW MEANING SYSTEM AND TO LEARN ABOUT A CULTURE'S CONVENTIONS CONCERNING KNOWLEDGE AND COMMUNICATION

This method, part of the methodological tool kit of cultural psychology, is crucially important as the first stage of any psychological research in a new, unfamiliar setting. Ethnography involves firsthand experience of the settings in which the human activity of research interest occurs (Colby, Jessor, and Shweder 1996; Packer 1995). The classical method of experiencing settings is by participant observation, supplemented by open-ended conversations and interviews. Experimental tests of learning and cognitive ability can then be derived from ethnographic observation, as in the research of Beach (1984) in the United States or of Nunes, Schliemann, and Carraher (1993) in Brazil. Ethnography can be incorporated as a first stage into the types of comparative research designs favored by cross-cultural psychology.

Ethnography can also be of use to the clinician. By becoming familiar with the culturally diverse settings in which clients operate, a clinician can find out to what extent the assumptions concerning values, knowing, and communicating presupposed by ability tests are prevalent or not in the testee's milieu. This knowledge can be used in one of two ways: (a) in interpreting the reasons for a given test performance on a mainstream test and (b) in developing a culture-specific alternative to permit underlying ability to be expressed in a culturally appropriate way. In short, ethnography is a major tool for detecting, correcting, and preventing cross-cultural misunderstandings by expanding the common cultural ground between testers and their participants.

THE MOST VALID RESEARCH INSTRUMENTS ARE DERIVED FROM CULTURAL MEANINGS IN THE GROUP WHERE THE INSTRUMENTS ARE TO BE APPLIED

Because research instruments should be meaningful to the group being assessed, comparable abilities must be studied with different instruments in different cultures. An example is Saxe and Moylan's (1982) study of concrete operations in New Guinea, where they developed procedures for assessing conservation of length based on the Oksapmin's use of a body-part measurement system. The cross-cultural assessment of abilities will become more sensitive in assessing cognitive abilities as more tests are adapted to the cognitive socialization that has taken place in the milieu in which the assessment is taking place (e.g., Greenfield and Childs 1977a). This is a major advantage for the clinical assessment of deficits, where one does not want to confound the absence of cultural assimilation with the absence of cognitive abilities.

Contrary to the usual assumption, culture-specific assessments are not incompatible with the demonstration of universals. In fact, they often enhance the chances for finding universals in cognitive abilities by providing culturally familiar opportunities for all participants—not merely those belonging to the culture of the test—to use and demonstrate their cognitive abilities (Greenfield 1997). This is because universal abilities take particular cultural forms (Greenfield, in press).

WHEN A GIVEN INSTRUMENT IS USED BEYOND THE CULTURE IN WHICH IT WAS DEVELOPED, IT IS NECESSARY TO RESEARCH THE MEANING OR MEANINGS THAT PARTICIPANTS IN THE NEW CULTURE ATTACH TO THE INSTRUMENT AND TO ITS PROCEDURE

A cultural investigation must precede cross-cultural comparison (Boesch 1996). That is, the meaning of the test in the new culture needs to be studied. Such study, often ethnographic, can enhance the subsequent validity of a cross-cultural comparative approach. The minimal requirement for carrying out such a study would be the ability to communicate in the language of the participants. An alternative to formal ethnography is collaboration with a member of the group being studied.

This principle of understanding the meaning a test has in each culture where it is administered must make one very suspicious of taking at face validity the cross-cultural application of standardized instruments such as IQ measures. In the absence of information concerning meaning in different groups, one must be particularly wary of drawing policy conclusions, in the manner of Hermstein and Murray (1994) in *The Bell Curve: Intelligence and Class Structure in American Life.*

In other words, if you do "take it with you" in cross-cultural testing, you must interpret your results in the light of considerable culture-specific knowledge. This is the case even where ability assessments are being used to test the adaptation of minority students to mainstream culture (cf. Lopez, in press). Without knowledge of the home culture, the tester will have no idea of the causes of any performance that is not normative in the dominant culture.

Implications for Testing Practice

TESTS ARE NOT UNIVERSAL INSTRUMENTS: THEY ARE SPECIFIC CULTURAL GENRES

As such, they reflect the values, knowledge, and communication strategies of their culture of origin. This makes them appropriate measures within their own culture, but ethnocentric when taken into a new culture. The degree of ethnocentrism will depend on the degree and type of difference between old and new culture. When testing conventions themselves are not shared by participants in a new cultural context, the tester ends up measuring the participant's (deficient) knowledge of these conventions rather than measuring the intended ability.

IT IS IMPORTANT TO BE SENSITIVE TO CULTURAL SPECIFICITIES WHEN MEASURING ABILITIES

The analysis of culture-specific meanings, culture-specific ways of knowing, and culture-specific modes of communication enhances the validity of cross-cultural ability testing. In contrast, unfamiliar testing conventions can prevent the expression of the abilities a test was intended to measure. Thus, these conventions specify a set of conditions under which ability tests can be sensibly carried into a new culture, either inside or outside national borders. In this way, a cultural psychology analysis can contribute to the comparative program of cross-cultural psychology.

A FAIR CROSS-CULTURAL COMPARISON CAN BE CARRIED OUT ONLY AFTER AN INVESTIGATION OF EACH CULTURE IN ITS OWN TERMS

When cultures are not too different, one may, with equal representation from each culture, develop a common ability yardstick that is fair to each culture, using methods from cross-cultural psychology (Triandis 1995). When cultures are very different (particularly on the dimension of formal schooling), one may have to use totally different assessment methods in each culture, highlighting the approach of cultural psychology.

OBJECTIVITY IS NOT THEORETICALLY POSSIBLE

What is important is to be aware of the researcher's or tester's own perspective, with its strengths and limitations. The ideal for comparative studies is that both insider and outsider perspectives be brought to bear on the design and procedure of the study.

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REFERENCES

Aronson, E., and Bridgeman, D. (1979). Jigsaw groups and the desegregated classroom: In pursuit of common goals. *Personality and Social Psychology Bulletin*, 5, 438-446.

Beach, K. (1984). The role of external memory cues in learning to become a bartender. *Quarterly Newsletter of the Laboratory of Comparative Human Cognition*, 6 (1 and 2), 42-43.

Berry, J. W., and Bennett, J. A. (1992). Cree conceptions of cognitive competence. *International Journal of Psychology*, 27, 73-88.

Berry, J. W., Poortinga, Y H., Segall, M. H., and Dasen, P. R. (1992). *Cross-cultural psychology*. Cambridge, England: Cambridge University Press.

Boesch, E. E. (1996). The seven flaws of cross-cultural psychology. The story of a conversion. *Mind, Culture, and Activity*, 3, (2 and 10).

Boykin, A. W. (1996, August). The case of AfricanAmerican inner-city schools. In R. Serpell and B. Nsamenang (Convenors), *Basic education for the modern world: Alternatives to Western cultural hegemony*. Quebec City, Quebec, Canada: International Society for the Study of Behavioral Development.

Boykin, A. W., and Toms, F. D. (1985). Black child socialization: A conceptual framework. In H. P. McAdoo and J. L. McAdoo (Eds.), *Black children: Social, educational, and parental environments* (33-52). Newbury Park, CA: Sage.

Bruner, J. S. (1965). The growth of mind. *American Psychologist*, 20, 1007-1017.

Bruner, J. S. (1990). Culture and human development: A new look. *Human Development*, 33, 344-355.

Colby, A., Jessor, R., and Shweder, R. (Eds.). (1996). *Ethnography and human development*. Chicago: University of Chicago Press.

Cole, M. (1985). Mind as a cultural achievement. In E. Eisner (Ed.), *Learning and teaching the ways of knowing: Eighty-Fourth Yearbook of the National Society for the Study of Education* (Pt. 2, 218-249). Chicago: University of Chicago Press.

Cole, M. (1990). Cultural psychology: A once and future discipline? In J. J. Bergman (Ed.), *Nebraska Symposium on Motivation, 1989: cross-cultural Perspectives,* Vol. 37, 279-336.

Cole, M., Gay, J., Glick, J., and Sharp, D. W. (1971). *The cultural context of learning and thinking*. New York: Basic Books.

Dague, P. (1972). Development, application and interpretation of tests for use in French-speaking black Africa and Madagascar. In L. J. C. Cronbach and P. J. D. Drenth (Eds.), *Mental tests and cultural adaptation* (63-74). The Hague, Netherlands: Mouton.

Dasen, P. R. (1984). The cross-cultural study of intelligence: Piaget and the Baoul'e. In P. S. Fry (Ed.), *Changing conceptions of intelligence and intellectual functioning: Current theory and research* (107-134). New York: North-Holland.

Delgado-Gaitan, C. (1994). Socializing young children in Mexican American families: An intergenerational perspective. In P. M. Greenfield and R. R. Cocking (Eds.), *Cross-cultural roots of minority child development* (55-86). Hillsdale, New Jersey: Erlbaum.

Durand, A., and Ochs, E. (1986). Literacy instruction in a Samoan village. In B. Schieffelin and T Gilmore (Eds.), *Acquisition of literacy: Ethnographic perspectives* (213-232). Norwood, New Jersey: Ablex.

Flavell, J. H., Green, F., and Flavell, E. R. (1987). Development of knowledge about the appearance reality distinction. *Monographs of the Society for Research in Child Development*, 51, (1, Serial No. 212).

Glick, J. (1968, February). *Cognitive style among the Kpelle of Liberia*. Paper presented at the meeting on cross-cultural Cognitive Studies, American Educational Research Association, Chicago.

Greenfield, P. M. (1966). On culture and conservation. In J. S. Bruner, R. R. Olver, and P. M. Greenfield (Eds.) *Studies in cognitive growth* (225-256). New York: Wiley.

Greenfield, P. M. (1972). Oral or written language: The consequences for cognitive development in Africa, the United States and England. *Language and Speech*, 15, 169-178.

Greenfield, P. M. (1997). Culture as process: Empirical methodology for cultural psychology. In J. W. Berry, Y. H. Poortinga, and J. Pandey (Eds.), *Handbook of cross-cultural psychology,* (2nd ed., 1, 301-346). Boston: Allyn and Bacon.

Greenfield, P. M. (in press). The cultural evolution of IQ. In U. Neisser (Ed.), *Intelligence on the rise?* Washington, DC: American Psychological Association.

Greenfield, P. M., and Bruner, J. S. (1969). Culture and cognitive growth. In D. A. Goslin (Ed.), *Handbook of socialization theory and research* (633-660). Chicago: Rand McNally.

Greenfield, P. M., and Childs, C. P. (1977a). Understanding sibling concepts: A developmental study of kin terms in Zinacantecan. In P. Dasen (Ed.), *Piagetian psychology: Cross-cultural contributions* (335-358). New York: Gardner Press.

Greenfield, P. M., and Childs, C. P. (1977b). Weaving, color terms, and pattern representation: Cultural influences and cognitive development among the Zinacantecos of Southern Mexico. *Interamerican Journal of Psychology*, 11, 23-48.

Greenfield, P. M., and Cocking, R. R. (1994). *Cross-cultural roots of minority child development.* Hillsdale, New Jersey: Erlbaum.

Greenfield, P. M., Quiroz, B., and Raeff, C. (in press). Cross-cultural conflict and harmony in the social construction of the child. In S. Harkness, C. M. Raeff, and C. M. Super (Eds.), The social construction of the child: The nature of variability. *New directions in child development.* San Francisco: Jossey-Bass.

Grice, P. (1975). Logic and conversation. In P. Cole and J. L. Morgan (Eds.), *Syntax and semantics 33: Pragmatics* (41-58). New York: Academic Press.

Harkness, S., and Super, C. (1977). Why are African children so hard to test? In L. L. Adler (Ed.), Issues in cross-cultural research. *Annals of the New York Academy of Sciences,* 285, 326-331.

Harkness, S., Super, C., and Keefer, C. (1992). Culture and ethnicity. In M. D. Levine, W. B. Carey, and A. C. Crocker (Eds.), *Developmental behavioral pediatrics* (2nd ed., 103-108). Philadelphia: Saunders.

Heath, S. B. (1983). *Ways with words: Language, life, and work in communities and classrooms*. Cambridge, England: Cambridge University Press.

Hermstein, R. J., and Murray, C. (1994). *The bell curve: Intelligence and class structure in American life*. New York: Free Press.

Hofstede, G. (1980). *Culture's consequences.* Beverly Hills, CA: Sage.

Kihlstrom, J. F. (1995, June). *From the subject's point of view: The experiment as conversation and collaboration between investigator and subject.* Keynote address presented at Annual Meeting of the American Psychological Society; New York.

Kim, U., and Choi, S. H. (1994). Individualism, collectivism, and child development: A Korean perspective. In P. M. Greenfield and R. R. Cocking (Eds.), *Cross-cultural roots of minority child development* (227-257). Hillsdale, New Jersey: Erlbaum.

Lave, J. (1986). Experiments, tests, jobs, and chores. In K. Borman and J. Reisman (Eds.), *Becoming a worker* (140-158). Norwood, New Jersey: Ablex.

Lonner, W. J., and Adamapolous, J. (1997). Culture as antecedent to behavior. In J. W. Berry, Y. Poortinga, and J. Pandey (Eds.), *Handbook of cross-cultural psychology: Theoretical and methodological perspectives* (1, 43-83). Boston: Allyn and Bacon.

Lopez, S. R. (in press). Testing ethnic minority children. In B. B. Wollman (Ed.), *The encyclopedia of psychology, psychiatry, and psychoanalysis.* New York: Henry Holt.

Madsen, M. C., and Lancy, D. F. (1981). Cooperative and competitive behavior: Experiments related to ethnic identity and urbanization in Papua New Guinea. *Journal of cross-cultural Psychology*, 12, 389-408.

Mehan, H. (1979). *Learning lessons.* Cambridge, MA: Harvard University Press.

Neisser, U. (1976). General academic and artificial intelligence. In L. B. Resnick (Ed.), *The nature of intelligence* (135-146). Hillsdale, New Jersey: Erlbaum.

Nerlove, S., and Snipper, A. S. (1981). Cognitive consequences of cultural opportunity. In R. H. Munro, R. L. Munro, and B. B. Whiting (Eds.), *Handbook of cross-cultural human development* (423-474). New York: Garland.

Nunes, T. N., Schliemann, A. D., and Carraher, D. W. (1993). *Street mathematics and school mathematics.* New York: Cambridge University Press.

Packer, M. (1995, March). The logic of interpretive inquiry. Presentation at the Toward a Cultural Psychology of Development symposium, *Society for Research in Child Development*, Indianapolis, Indiana.

Piaget, J., and Inhelder, B. (1962). *Le developpement des quantities physiques chez l'enfant* (and rev. ed.). Neuchitel, Switzerland: Delachaux and Niestl'e.

Poortinga, Y. H. (1989). Equivalence of cross-cultural data: An overview of basic issues. *International Journal of Psychology*, 24, 737-756.

Price-Williams, D. (1980). Toward the idea of cultural psychology. A superordinate theme for study. *Journal of cross-cultural Psychology,* 11, 75-88.

Quiroz, B., and Greenfield, P. M. (in press). Cross-cultural value conflict: Removing a barrier to Latino school achievement. In R. Paredes and K. Gutierrez (Eds.), *Latino academic achievement.* Berkeley: University of California, Latino Eligibility Task Force.

Raeff, C., Greenfield, P., and Quiroz, B. (in press). Conceptualizing interpersonal relationships in the cultural contexts of individualism and collectivism. In S. Harkness, C. M. Raeff, and C. M. Super (Eds.), The social construction of the child: The nature of variability. *New directions in child development*. San Francisco: Jossey-Bass.

Reese, L., Balzano, S., Gallimore, R., and Goldenberg, C. (1995). The concept of educacion: Latino family values and American schooling. *International Journal of Educational Research*, 23, 57-81.

Rogoff, B., and Morelli, G. (1989). Perspectives on children's development from cultural psychology. *American Psychologist*, 44, 343-348.

Saxe, G. B., and Moylan, T. (1982). The development of measurement operations among the Oksapmin of Papua New Guinea. *Child Development*, 53, 1242-1248.

Sensales, G., and Greenfield, P. M. (1995). Attitudes toward computers, science, and technology: A cross-cultural comparison between students in Rome and Los Angeles. *Journal of cross-cultural Psychology,* 26, 229-242.

Serpell, R. (1993). *The significance of schooling: Life journeys in an African society.* Cambridge, England: Cambridge University Press.

Shweder, R. A. (1990). Cultural psychology: What is it? In J. W. Stigler, R. A. Shweder, and G. Herdt (Eds.), *Cultural psychology: Essays on comparative human development* (130-204). Cambridge, England: Cambridge University Press.

Stigler, J. W., Shweder, R. A., and Herdt, G. (Eds.). (1990). *Cultural psychology: Essays on comparative human development.* Cambridge, England: Cambridge University Press.

Sudarkasa, N. (1988). Interpreting the African heritage in AfroAmerican family organization. In H. P. McAdoo (Ed.), *Black families* (2nd ed., 27-43). Newbury Park, California: Sage.

Tapia Uribe, F. M., LeVine, R. A., and LeVine, S. E. (1994). Maternal behavior in a Mexican community: The changing environments of children. In P. M. Greenfield and R. R. Cocking (Eds.), *Cross-cultural roots of minority child development* (41-54). Hillsdale, New Jersey: Erlbaum.

Triandis, H. (1995, July). *Psychology and culture: The search for appropriate paradigms.* Discussion in symposium convened by J. Adamopoulos, European Congress of Psychology, Athens, Greece.

van de Vijver, F. J. R., and Leung, K. (1997). Methods and data analysis of cross-cultural research. In J. W. Berry, Y. Poortinga, and J. Pandey (Eds.), *Handbook of cross-cultural psychology: Theoretical and methodological perspectives* (1, 257-300). Boston: Allyn and Bacon.

Wober, M. (1974). Towards an understanding of the Kiganda concept of intelligence. In J. W. Berry and P. R. Dasen (Eds.), *Culture and cognition* (261-280). London: Methuen.