**Journal of Mixed Methods Research**
Volume 1 Number 2
April 2007 164-182

10.1177/1558689806298181
http://jmmr.sagepub.com
hosted at
http://online.sagepub.com

# Mixed Methods in Intervention Research

## Theory to Adaptation

Bonnie K. Nastasi
*Walden University, Minneapolis, Minnesota*
John Hitchcock
*Caliber, an ICF International Company, Fairfax, VA*
*Walden University, Minneapolis, Minnesota*
Sreeroopa Sarkar
Gary Burkholder
*Walden University, Minneapolis, Minnesota*
Kristen Varjas
*Georgia State University, Atlanta*
Asoka Jayasena
*Peradeniya University, Sri Lanka*

The purpose of this article is to demonstrate the application of mixed methods research designs to multiyear programmatic research and development projects whose goals include integration of cultural specificity when generating or translating evidence-based practices. The authors propose a set of five mixed methods designs related to different phases of program development research: (a) formative research, Qual →/+ Quan; (b) theory development or modification and testing, Qual → Quan →/+ Qual → Quan . . . Qual → Quan; (c) instrument development and validation, Qual → Quan; (d) program development and evaluation, Qual →/+ Quan →/+ Qual →/+ Quan . . . Qual →/+ Quan, or Qual →← Quan; and (e) evaluation research, Qual + Quan. We illustrate the application of these designs to creating and validating ethnographically informed psychological assessment measures and developing and evaluating culturally specific intervention programs within a multiyear research program conducted in the country of Sri Lanka.

***Keywords:*** *mixed methods; intervention research; evaluation research; culture specificity*

Given the current emphasis on both evidence-based practice and culturally competent practice, it is critical for researchers and interventionists to identify models for developing culturally appropriate evidence-based practice (e.g., Ingraham & Oka, 2006; Nastasi &

**Authors' Note:** The initial phases of this work were funded by grants to the first author from the Society for the Study of School Psychology and the State University of New York at Albany. An earlier version of this article was presented at the annual meeting of the American Educational Research Association, San Francisco, April 2006. Address correspondence to Bonnie K. Nastasi, PhD, Director, School Psychology Program, Walden University, 155 Fifth Avenue, Suite 100, Minneapolis, MN 55401; e-mail: bnastasi@waldenu.edu or bonnastasi@yahoo.com.

Schensul, 2005). Mixed methods designs applicable to intervention research can take a number of forms depending on the specific purpose or stage of the project (for an in-depth discussion of mixed methods designs, see Tashakkori & Teddlie, 2003). Most mixed methods discussions (e.g., Creswell, 2003; Tashakkori & Teddlie, 2003) do not cover multiphase evaluation projects in detail, nor do they address the potential role of mixed methods designs for developing culturally appropriate practices in applied fields such as education and psychology. Morse (2003) discussed the application of mixed methods designs across individual studies within a program of research but did not present an integrative multiphase model for conducting programmatic research. Furthermore, although qualitative research designs (e.g., ethnography) are well suited for understanding culture and context, the integration of qualitative and quantitative methods to facilitate development of culture-specific instruments (e.g., psychological assessment tools) and interventions has received minimal attention (see Hitchcock et al., 2005).

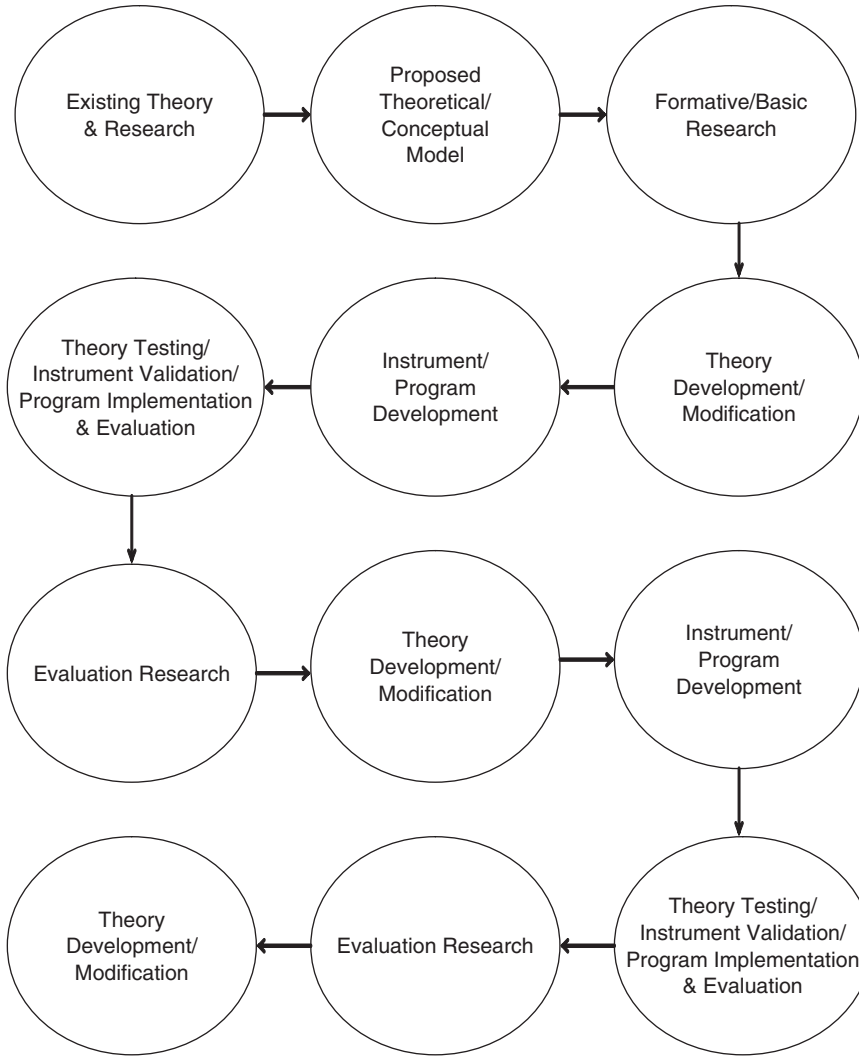
We propose that the process of program development research is best characterized by a recurring sequence of qualitative and quantitative data collection culminating in a recursive qualitative-quantitative process depicted as Qual → Quan → Qual → Quan . . . (Qual→←Quan). Qualitative methods (Qual) are used to generate formative data to guide program development, followed by quantitative evaluation (Quan) to test program effectiveness. Application in another setting can be facilitated by subsequent qualitative data collection (Qual) leading to program design adapted to the new context and participants, which is then followed by quantitative data collection (Quan) to test program outcomes. This sequence can occur across multiple settings and participant groups. Following initial adaptations to local context, program implementation and evaluation can be characterized by a recursive process (Qual→←Quan) in which collection of both qualitative and quantitative data inform ongoing modifications as well as implications for future program development and application.

The purpose of this article is to demonstrate the application of mixed methods research designs to multiyear programmatic research and development projects, whose goals include the integration of cultural specificity into development of an evidence base for practice. In particular, we illustrate the application of mixed methods designs to the development and validation of ethnographically informed psychological assessment measures, and the development and evaluation of culturally specific intervention programs.

## A Heuristic Model: Theory to Adaptation

We propose a general heuristic for depicting multiyear research and development projects as an iterative research↔intervention process (see Figure 1), based on the Participatory Culture-Specific Intervention Model (PCSIM; Nastasi, Moore, & Varjas, 2004). The research process begins with formative data collection to test the proposed conceptual model based on existing theory and research. At this stage, qualitative research methods are used to identify and define the constructs/variables specific to a particular culture or context (e.g., individual and environmental factors that explain/predict mental health, violent behavior, or academic achievement in a specific cultural group). Findings from the qualitative research are used to construct a modified model and develop assessment and intervention tools to test the model. Quantitative research methods are then used to test the model, for example, using

**Figure 1**
**Mixed Methods in Intervention Research Process: Theory to Adaptation**




instrument validation techniques and/or experimental or quasi-experimental designs. Evaluation research involves the triangulation of qualitative and quantitative methods to examine acceptability, integrity, and effectiveness of intervention methods as both a formative and summative process. The application of research as an ongoing formative evaluation process can assist in systematic modification of the intervention model and program design to meet context-specific needs (e.g., application of intervention to particular school or community). Summative research provides evidence of program effectiveness and informs application and translation to other settings. As interventions are applied to multiple populations

and settings, the iterative use of mixed methods can help to inform adaptations and development of a general intervention model.

## Applying Mixed Methods Designs to Multiyear Research and Development Projects: An Illustration

As depicted in Figure 1, the multiple purposes for research within any given multiyear project (e.g., formative research, instrument development, evaluation research) necessitate the use of mixed methods designs. Drawing on the general model (Figure 1), we propose a set of five designs applicable across various phases of the theory→adaptation process (see Table 1). The remainder of this article is focused on description and illustration of these five designs, based on our own intervention research experiences across an ongoing multiyear project, the Sri Lanka Mental Health Promotion Project (SLMHPP). (Although Figure 1 provides the heuristic for depicting the theory to adaptation process of program development, the remainder of this article is focused on representing the five designs depicted in Table 1. For other examples of the application of mixed methods to multiyear research and development projects, see Nastasi et al., 1998-1999; Nastasi, Schensul, Balkcom, & Cintrón-Moscoso, 2004; Schensul, Mekki-Berrada, Nastasi, & Saggurti, in press; Schensul, Nastasi, & Verma, 2006; Schensul, Verma, & Nastasi, 2004.)

In the SLMHPP, conducted in the Central Province of Sri Lanka, we applied various mixed methods designs to (a) conduct formative research, (b) develop and test culture-specific theory, (c) develop and validate culture-specific instruments, and (d) develop and evaluate a culture-specific intervention program. Attempts to further test and modify culture-specific theory and mental health programming in India and other Sri Lankan contexts are ongoing. Although we attempt to represent the use of mixed methods for specific purposes or phases in the theory→adaptation process, the distinctions across phases are artificial (as reflected in Figure 1). Thus, for example, formative research and theory development phases overlap as do theory testing and instrument development. Furthermore, the phases are not always sequential but may occur concurrently or recursively. (As noted throughout, some of the findings from various phases of the project have been published or presented elsewhere. This article, however, reflects an integration of the work within a multiphase mixed methods framework.)

### Formative/Basic Research Phase: Qual →/+ Quan

The application of mixed methods to the formative phase of intervention research is characterized by sequential or concurrent collection of qualitative and quantitative data (see Table 1). In SLMHPP, we used a sequential process in which initial qualitative data collection informed theory development and design of psychological measures. These measures were then used to collect quantitative data on a larger and more representative sample and, thus, extend and confirm formative research findings.

As an outgrowth of a project focused on sexual risk among Sri Lankan youth, researchers from the United States developed knowledge of the Sri Lankan youth and educational cultures, identified the need for mental health services, and formed partnerships

**Table 1**
**Mixed Methods Designs Applied to Multiyear Research and Development Projects**

| Project Phase | Design | Types of Data Collected in SLMHPP |
|---|---|---|
| Formative/basic research | Qual →/+ Quan | Focus group interviews<br>Individual in-depth interviews<br>Key-informant interviews<br>Participant observation<br>Archival materials (e.g., school records)<br>Cultural and historical literature<br>Popular mental health literature and popular media<br>Secondary data analysis (qualitative and quantitative data from previous project on sexual risk among older adolescents and young adults from same community) |
| Theory development or modification and testing | Qual → Quan →/+ Qual → Quan . . . Qual → Quan | Development of culture-specific theory and quantitative psychological measures (self- and teacher report) based on formative research data |
| Instrument development and validation | Qual → Quan | Administration of psychological measures to 600 students and 100 teachers<br>Instrument validation and theory testing through combined factor analysis of quantitative (psychological measure) data and reanalysis of qualitative formative data<br>Further theory development through parallel formative research in India (qualitative interviews) |
| Program development and evaluation | (a) Qual →/+ Quan →/+ Qual →/+ Quan . . . Qual →/+ Quan; or (b) Qual→←Quan | Program development based on formative research data<br>Formative program evaluation (program monitoring):<br>Participant observations<br>Teacher interviews/meetings<br>Session logs (teachers and observers)<br>Teacher session evaluations<br>Student session evaluations<br>Staff field notes<br>Student products (from session activities) |
| Evaluation research | Qual + Quan | Experimental pre-post control group design (summative program evaluation):<br>Pre-post student and teacher psychological measures<br>Postintervention teacher interviews<br>Final session student evaluation activity<br>Reanalysis of formative evaluation data |

Note: Qual = Qualitative methods; Quan = Quantitative methods; → = followed by [sequential design]; + = concurrent with [concurrent design]; →/+ = sequential or concurrent; →← = recursive, interactive; SLMHPP = Sri Lanka Mental Health Promotion Project.

with professionals and community members. A formative research study was conducted in Sri Lanka in 1995 to examine individual and cultural constructs related to mental health of the school-aged population in the country and to assess the need for mental health services in the schools (Nastasi, Varjas, Sarkar, & Jayasena, 1998).

Underlying the work was a conceptual model of mental health based in ecological-developmental theory (Bronfenbrenner, 1989). A major assumption of the model is that critical individual and cultural factors influence mental health. That is, mental health status of an individual is influenced by (a) *personal vulnerabilities* due to personal and family history (e.g., early school failure, family alcoholism), (b) *social-cultural stressors* (e.g., community violence), (c) the extent to which the individual possesses *culturally valued competencies* (e.g., academic competence, social skills), (d) culture-specific *socialization practices* (e.g., school discipline practices) and *cultural agents* (e.g., family, teacher, media) responsible for promoting the development of competencies, (e) *personal resources* (e.g., problem-solving skills) for coping with daily stresses and major life changes, and (f) *social-cultural resources* available to youth (e.g., peers, family, mental health facilities) to facilitate coping. This conceptual framework has been applied to the development of mental health programs in schools within the United States (Cowen et al., 1996; Nastasi et al., 1998; Nastasi, Moore, & Varjas 2004; Roberts, 1996).

Formative research data, collected in 18 schools in the Central Province of Sri Lanka, were used to develop an understanding of the individual and cultural factors (described above) that influenced mental health of youth in Sri Lanka. Qualitative data collection methods included 51 focus group interviews with students (33) and teachers (18), individual interviews with school principals and teachers, participant observation in schools, archival materials such as school discipline reports, historical and cultural literature, popular mental health literature, and popular media. In addition, secondary analysis of qualitative (in-depth interviews) and quantitative (ethnographically informed psychological measures) data from the previous sexual risk project (Nastasi et al., 1998-1999) focused on older adolescents and young adults from the same community.

## Findings

The primary qualitative data provided culture-specific definitions of the major mental health constructs (e.g., stressors, competencies) and the basis for elaboration of the proposed conceptual framework (i.e., identification and definition of factors specific to Sri Lanka; Nastasi et al., 1998). Findings from this formative stage also suggested gender differences and similarities in definition of mental health as described by the adolescent students (Sarkar, 2003).

*Competencies*. Both male and female adolescent students argued that a socially competent individual is respectful to others, loyal, trustworthy, helpful, and caring. They also suggested that such a person advises or guides others, and is socially responsible (e.g., loves her or his country, works for its development). However, friendliness was viewed as an important quality only by the female students. (Unless otherwise indicated, the qualitative findings presented in this section are drawn from Nastasi et al., 1998, and Sarkar, 2003).

Student definitions of academic competencies were directly associated with high academic achievement and striving for maximum performance in academics. An academically competent person is one who is "good at studies as well as at extracurricular activities." In defining behavioral competence, students identified good behavior, humility, and obedience as the most important qualities of a behaviorally well-adjusted person. Students argued that such an individual follows rules, obeys laws of the land, and does not harm the country. Showing respect to the elders was another critical feature of behavioral competence as indicated by the students irrespective of their gender.

*Adjustment difficulties*. Students recognized several adjustment difficulties among Sri Lankan adolescents. For example, smoking, substance abuse, and suicide were viewed as major adjustment difficulties. Suicide rate was reportedly high among the adolescents in Sri Lanka (Nastasi et al., 1998), and the concern for adolescent suicide was reflected in the interviews with students as well. Female respondents indicated that they suffered from anxiety, whereas male respondents described that they felt restless due to the uncertainty of their future. Students from both genders argued that academic adjustment difficulties were primarily related to poor academic achievement or concerns about performance. These included neglecting studies, academic failure (e.g., failure in the examination), and performance anxiety (e.g., "worry about results in the examination").

Social adjustment difficulties among the Sri Lankan students included aggression, neglecting responsibilities or duties, and being untrustworthy and not helpful to others. Sri Lankan boys also described engagement in criminal activities such as stealing, robbing, and joining gangs as forms of social adjustment problems. Sri Lankan girls suggested that interfering in others' personal affairs and slandering or stigmatizing others were indicative of social adjustment difficulties.

*Stressors*. Academic stressors identified by students included academic failure, rigorous examination processes, high level of academic pressure with limited opportunities for recreation or leisurely activities, parental or societal pressure for high academic achievement, high level of competition in academics, and uncertainty about the future due to limited access to higher education and high rate of unemployment. Only about 2% of students are allowed access to university study and economic prospects are limited for the rest.

Major family stressors included alcoholism of parents (mainly fathers), poverty or financial difficulties, domestic violence, parental fights, parental divorce or separation, and separation from parents. Students also considered lack of care and attention from parents and abandonment by parents as stressors. Adolescents discussed parentification of children (e.g., children assume household responsibilities in absence of their parents). This was particularly visible in the families where mothers were working in the Middle East. Adolescents also described the physical and sexual abuse of the children in absence of their mothers. Both Sri Lankan males and females spoke of restrictions on male-female interaction in their culture as problematic.

Students also identified financial problems and poverty as major social stressors. In addition, male students spoke of war, terrorism, and injustices in the society as other social problems. Unemployment was another problem that was cited frequently by male students as social stressors. On the contrary, girls did not mention unemployment as a problem. This

may be linked to the societal emphasis on the role of men as the primary providers of the family. Furthermore, girls identified gender inequity (such as lack of freedom for women and differential expectations for men and women) and sexual harassment as social stressors specific to their gender. The male students indicated that the ethnic conflicts within Sri Lanka were a major concern for them. In addition, male students exhibited concern about the political violence and the widespread corruption in the country.

Students suggested death of loved ones, loss of relationships, betrayal, and misunderstandings as relationship stressors. According to them, peer ridicule, fighting with friends, and being ignored or neglected by friends hurt their feelings. In addition, fighting with parents, being pushed by the parents to study without recreation, or the controlling behavior of the parents strained the adolescents' relationships with their parents. Despite these relationship concerns, adolescents viewed peers and parents as potential sources of support in the event of relationship stressors.

*Vulnerability*. Students also indicated poverty, lack of family support, alcohol and drug abuse, and academic failure as major personal history factors that made them vulnerable to mental health problems. A striking gender difference was noted in reports of anxiety, nervousness, and health problems, which were restricted to female respondents.

*Socialization*. When describing socialization processes and agents, adolescents from Sri Lanka argued that the educational system played an important role in the process of socializing youth. Students discussed the cultural emphasis on high academic achievement and the resultant pressure on adolescents for academic study with limited time for recreation. Students also indicated heavy reliance on tuition classes (private tutoring) for additional academic support that could be related to the prime importance of academic performance. In addition, adolescents indicated the Sri Lankan society valued and underscored the importance of professional jobs (e.g., doctors, engineers). Performance on standardized examinations at Grades 10 (O/L, ordinary level) and 12 (A/L, advanced level) determined admission to government-funded colleges and one's major area of study (those with highest scores were admitted to medicine, then engineering, etc.).

*Cultural norms*. With regard to cultural norms, students suggested that society reinforces high levels of respect for elders in Sri Lanka. This norm influences parent-child relationships and may explain reported social and emotional distancing between adults and children. Students also indicated a restriction on male-female interaction. They talked about parental and societal disapproval of relationships between boys and girls. Respondents, particularly females, described the lack of freedom or independence of girls, in contrast to the boys, who were considerably more independent. Among other prominent cultural norms, Sri Lankan adolescents spoke about arranged marriage (i.e., parents arrange and/or approve marriage) and the practice of dowry.

Data collected at this formative stage not only contributed to development of culture-specific theory but also contributed to development of culture-specific assessment, intervention, and teacher training materials that continued over a period of 5 years. The subsequent steps also reflect mixed methods designs.

## Theory Development/Modification and Testing Phase: Qual → Quan →/+ Qual → Quan . . . Qual → Quan

The process of theory development and testing can be depicted as a sequence of qualitative data collection to inform theory development, followed by testing theory quantitatively and modifying theory through qualitative data collection conducted sequentially or concurrently, followed by quantitative methods to test modified theory, and so on. The repeated application of mixed methods across cultures, contexts, and populations can be used to develop theory that reflects both universal and culturally specific constructs. In the SLMHPP project, we developed a culture-specific framework for conceptualizing the individual and social-cultural factors related to mental health (see previous formative stage). The combined use of qualitative and quantitative data analysis informed theory development. This work is reflected in the next section on instrument development. In addition, subsequent qualitative data collection in Calcutta, India, helped to extend theory development to another Asian country (Sarkar, 2003). Ongoing work will examine the application within posttsunami contexts within Sri Lanka.

## Instrument Development and Validation Phase: Qual → Quan

A number of sources suggest that assessment of abstract psychological phenomena will differ by culture (see Hitchcock et al., 2005); and this is the case when assessing self-concept (Harter, 1999). Instrument development in the SLMHPP project was predicated on the application of mixed methods to instrument development, using a sequential qualitative-quantitative design to develop culturally relevant measures. Qualitative research methods were used to gather data to inform instrument development. Quantitative methods were subsequently employed to conduct instrument validation. As discussed later, this approach has the potential to yield findings that quantitative or qualitative approaches, by themselves, cannot yield. In the SLMHPP, we employed a sequential qualitative-quantitative design to develop culture-specific instruments designed to assess psychological constructs related to mental health. The process of instrument development and validation illustrated in this section overlaps with the process of theory development and testing, which involves a repeated Qual → Quan design as described in the preceding section.

Psychological instruments were developed based on the aforementioned findings on culturally valued competencies, generated via formative research, and self-concept theory of Harter (1999). Harter suggested that positive adjustment requires congruency between culturally valued expectations and self-rated competencies. For example, a male United States–based researcher would typically be in a culture that values skills with statistical analysis over, say, cross-stitching. If this researcher believed he had adequate skills with statistics, there would be congruency between his perceived competencies and what is valued. Meanwhile, his competency with cross-stitching would likely have no impact on the valence of his self-beliefs.

The investigators entered the context with this general theory of self-concept, believing that Sri Lankan adolescent mental health concerns might be tied to disparities between their perception of their competencies and what is valued in the culture. To clarify, we made limited a priori guesses as to what competencies might be valued but did assume that congruence

between values and self-beliefs would indicate positive adjustment and vice versa. An example of an a priori expectation we did make was that an adolescent would be experiencing distress if she did not consider herself to be a strong student. Recall that Sri Lankan society places great expectations on educational achievement; indeed, it was believed that a student can shame family members by not performing well on exams, which are high-stakes in nature because they are a gateway to postsecondary education. Other a priori expectations were that Sri Lankan adolescents would have culturally specific stressors, coping mechanisms, support structures, and ways of expressing emotions related to stress. It also was believed that some of these phenomena would be gender-specific. Qualitative data collected during the formative research phase (see previous section) provided the basis for testing these assumptions and developing culture-specific understanding of key constructs.

Two types of scales were developed via a series of individual studies combining ethnographic and factor analytic techniques. The first scale type (a total of five scales were developed) assesses the relationship between culturally specific competencies and values (Nastasi, Jayasena, et al., 1999a). The second scale type (a total of seven scales) includes culturally specific scenarios that adolescents should find stressful (based on formative data), and follow-up items to assess how adolescents might respond to such stress (i.e., emotionally and via active coping, seeking support, or maladjusted behavior; Nastasi, Jayasena, et al., 1999b). Scales in the latter type were used as outcome measures for an exploratory evaluation of an intervention tailored to the needs of Sri Lankan youth (in the forthcoming evaluation design).

The work presented in the *Journal of School Psychology* (Hitchcock et al., 2005) illustrated a mixed method approach for this sort of Qual → Quan instrument development and validation. The article offered a detailed illustration of the approach using the responses 611 Sri Lankan adolescents provided to five ethnographically informed psychological measures. Such instruments offer a key connection between the primary methodologies used (i.e., ethnographic and factor analytic approaches) as they are predicated on qualitative inquiry, can translate these ideas into quantitative data and allow for the application of factor analysis. If the qualitatively derived constructs are comparable to factor analytic results, then triangulation across methods is achieved and a standardized measure can be developed that is sensitive to culturally specific phenomena. The illustration of this approach used data from an ethnographically informed psychological measure of self-concept, which, again, was predicated on Harter's (1999) work.

The scales were back-translated (e.g., English → Sinhala → English to ensure accuracy of meaning), piloted, and refined after obtaining input from local experts with knowledge of the target culture. They were then administered to students ($n$ = 611; 315 males, 296 females), Grades 7 to 12, ages 12 to 19, across six schools that represented the range of the student population in terms of ethnicity, religion, and socioeconomic status. A reanalysis of data from focus groups and individual interviews (i.e., with students, parents, and school personnel) and archival information from the culture (e.g., newspapers, school documents, etc.) resulted in the identification of the range of responses to various target questions/issues. Examples of these might be as follows: describe a stressful school scenario, or describe a stressful home scenario, and so on. Qualitative analyses inform the generation of psychological constructs to explain the variation of responses and in turn the development of psychological measures that are highly targeted toward the context of interest.

Secondary analyses of quantitative data were conducted because prior analyses of qualitative data (Sarkar, 2003) indicated that the constructs identified via the factor analyses might be gender specific (Hitchcock et al., 2006). Factors from the first self-concept measure (self-rating of competencies and behaviors) were used to develop subscale scores. MANOVA analyses were performed to test for gender differences. Statistically significant differences were found, as expected, on the Suitable Behavior subscale. Furthermore, structured means analyses demonstrated that the Unsuitable Behavior scale was different for boys and girls. That is, boys and girls appeared to recognize the Unsuitable Behavior construct but report on it in different ways. To summarize, no gender differences were evident on the Personal/Interpersonal Needs construct. Girls reported higher values on the Suitable Behaviors construct, suggesting they engage in suitable behaviors more often than boys. Boys and girls differed on how they answered Unsuitable Behavior items. This last finding is probably due to the fact that the (quantitative) construct/factor is formed by items that deal with joining gangs, carrying weapons, and substance abuse; and the qualitative data indicate that these behaviors are only relevant to males. Meanwhile, female behavior is more rigid and less permissive. Of course, cross-method data triangulation was needed to reach the conclusions and to develop a scale that is sensitive to both gender and culture.

As noted previously, this mixed method approach to scale development yielded insights to Sri Lankan youth culture that could not have been obtained with singular approaches. The formative ethnographic work provided the initial identification of culturally relevant constructs. These constructs in turn generated items that could be administered to hundreds of students (of course, it is generally inefficient to apply qualitative methods when working with larger samples). Analyses of responses provided additional insights into the culturally relevant constructs via cross-method triangulation, clarification of how the constructs appear in quantitative factors, and the opportunity to apply statistical tests of null hypotheses to verify presumed gender differences. One result of SLMHPP is an assessment battery that can be used for future work, and as noted below, this general method also yielded culturally specific outcome measures that can be employed in randomized controlled trials testing culturally specific interventions.

Recall that the second set of scales we developed assessed how Sri Lankan adolescents might respond to culturally specific stressors. Hypothetical stressors were identified via a series of group and individual interviews with stakeholders in the culture, specifically, students, administrators, teachers, and parents (see formative research phase). Three types of stressors emerged from the data: academic, family, and social. Respondents also noted that stressors might be dealt with via emotion-focused coping (or lack thereof), problem-focused strategies, and seeking support from others.

To assess how students might respond to hypothetical culturally specific scenarios, seven scenarios were generated from prior qualitative analyses conducted in the formative research phase (see Table 2) and presented as vignettes in the ethnographically informed psychological measures (Nastasi et al., in press). A series of follow-up items were generated, also from prior qualitative analyses of the formative data, to assess how students might respond to these scenarios and the resulting scales were used as outcome measures to evaluate the effects of a culturally specific intervention (more on this below). Each scenario (and follow-up item) was translated into the primary language of the group, using a back translation

**Table 2**
**Hypothetical Scenarios for Assessing Coping With Stressors**

| |
|---|
| Academic Scenarios |
| Scenario #1 |
| You are currently studying for O/L exams. Your mother is a doctor and your father is an engineer. Your parents want you to be a doctor, so it is important you do well on your O/Ls. You attend tuition 7 days a week and spend all of your free time studying. You have no time to visit with friends or for recreation. |
| Scenario #2 |
| You have failed A/L exams by a few points and are concerned about your future. You want to be an engineer. Your family cannot afford to send you to private school or to study abroad. You are not sure what you should do. |
| Scenario #3 |
| You are in a mathematics class with 50 other students and the teacher is explaining a new topic in math. You don't understand but don't ask the teacher because the other students will get at you for using class time. |
| Relationship Scenario |
| Scenario #4 |
| You have been having a secret love affair. You and your boy/girlfriend just broke up. You cannot talk to your family or your teacher about it. You have trouble sleeping. Your parents and teachers have asked you what is wrong but you cannot talk to them. You do not know what to do. Meanwhile one of the prefects who searched your school bag found a love letter and gave the letter to the class teacher. The class teacher called your parents. The parents and teacher forbid you to communicate with your lover. |
| Family Scenarios |
| Scenario #5 |
| You are living on the street with your family. You have a school uniform but no shoes. You usually feel hungry and sleepy at school, but are a very good student. You like to do handwriting and ask the teacher for her lunch bag to practice writing. After school, you and your sisters and brothers beg on the street. |
| Scenario #6 |
| Your mother has been working in the Middle East for about a year. She sends money home regularly for the family, but there is little direct communication with the children. You are the eldest child and have been taking care of the four younger children. Your father has brought a stepmother from the village to live with you to help with household tasks. When you object to the stepmother living in the house, your father beats you severely. Because of the severe abuse, you are considering leaving home. Some of your friends have already left home and have formed a gang and invited you to become a member. |
| Scenario #7 |
| It [is] the day before a big exam in school. You [come] home from school and, when you [enter] your home, your father is yelling at your mother. You father has been drinking arrack. He asks your mother for dinner. She says that dinner is not ready because she had to find money to buy rice. Your parents start arguing about money. When your mother serves dinner, the rice is overcooked. Your father starts yelling and throws the rice on the floor. Your mother says, "I'll cook more," and begins to cry. Your father tells you to clean up the mess he has made. Your mother says that you should study, not to clean up the mess that your father has made. Your father then starts beating your mother. |

Source: Reprinted with permission of Sage Publications from Nastasi et al. (in press).
Note: O/L = ordinary level; A/L = advanced level.

method (e.g., English → Sinhala → English) to ensure accuracy of meaning. The instruments were then administered to 120 Sri Lankan students coming from urban and suburban areas, a range of socioeconomic status (SES) levels, and different ethnic groups.

With the exception of the demographic questions, each item utilized a 3-point response format (i.e., *a lot, some, not at all*), and adolescents were asked to rate themselves on a set of culturally defined items capturing perceptions of stress and coping. To assess reactions to each scenario, students were asked to respond to items that assessed their emotional responses; coping strategies; social support (i.e., emotional or instrumental help from others); and behavioral, emotional, or health-related difficulties resulting from stressful experiences such as alcohol abuse, suicidal ideation/attempts, aggression toward peers, and physical symptoms such as headaches or stomachaches.

Qualitative analyses generated the a priori expectation that students would, if faced with the hypothetical stressors, identify with the indicators of adjustment difficulties, coping strategies, and social supports listed in the measure. Note, however, that it was anticipated that factors would likely include a mix of feelings, coping, support, and adjustment difficulty items. To verify these expectations, principal component analyses (PCAs) were conducted (Nastasi et al., in press). Across all scenarios, the analyses yielded the following factors: Adjustment Difficulties—Externalizing, engaging in acting-out behaviors labeled "undesirable/unsuitable" in the culture; Social Support, perceived effectiveness of social resources (family, peer, school/mental health personnel); and Feelings of Distress, affective reactions (e.g., sad, angry, confused) without active coping. The analyses yielded scales that were consistent with qualitative expectations. Furthermore, the factor analyses indicated variation in reactions to stressors as a function of stressful situation and raised questions about the cultural meaning of suicide. Overall, these factors are largely consistent with qualitative findings, providing additional evidence that the three constructs for responding to the scenarios presented above are valid in Sri Lankan youth culture. To assess the reliability of these scales, alpha coefficients computed separately by scenario indicated good to excellent internal consistency (alphas ranging from .70 to .95).

## Program Development and Evaluation Phase: Qual →/+ Quan →/+ Qual →/+ Quan . . . Qual →/+ Quan; Alternatively, Qual→←Quan

Mixed methods applied to program development and evaluation (see Table 1) is characterized by repeated sequential or concurrent use of qualitative and quantitative methods, to design, modify, and evaluate the program. For example, formative qualitative and quantitative data inform program design, and formative evaluation through concurrent or sequential qualitative and quantitative data collection during program implementation informs program modification or adaptation to meet local needs. Alternatively, this process might be characterized as an interactive or recursive process, in which qualitative and quantitative data collected on an ongoing basis inform program design, formative evaluation, and modification/adaptation.

The formative research phase of the SLMHPP provided the basis for designing a mental health promotion program (Nastasi, Varjas, et al., 1999), which was pilot tested in one school in the Central Province of Sri Lanka. The researchers employed a randomized-controlled

trial to test the effectiveness of the program, and concurrent and sequential qualitative-quantitative data collection for the purposes of formative evaluation, program monitoring and adaptation, and outcome evaluation. The program consisted of 18 sessions conducted each weekday over a 4-week period with 60 students in Grades 7 through 12. Sessions were cofacilitated by teachers (from participating school) and teacher educators (from participating local university). Students engaged in individual, small group, and large group activities designed to facilitate identification of cultural expectations, stressors, coping mechanisms, and social supports in key ecological contexts (community, family, school, peer group); development and practice of culturally appropriate coping strategies; and participation in peer support activities. An example of the cultural specificity of the program was the sequence of ecological contexts in which students were encouraged to identify stressors and social supports. In contrast to typical social-emotional learning curricula designed for U.S. population, the SLMHPP curriculum focused on the self only in relationship to others (with minimal focus on the self in isolation) and began with an exploration of self within community/societal context and progressing to increasingly more intimate contexts such as school, peer group, and family. Typical programs in the United States begin with focus on self-identity (and self-care), progress to self within interpersonal relationships (caring for others), and conclude with self within society/community (community service).

During program implementation, researchers collected formative evaluation data for each session that focused on examining program acceptability, cultural relevance and social validity, integrity, and immediate impact. The data collection tools included participation observation of curriculum sessions and weekly teacher training meetings; key informant interviews with teachers, students, and school administrators; session evaluation forms completed by students, teachers, and observers; and session products (e.g., student narratives, visual depictions of stressors and supports within ecological contexts; more detailed information about evaluation methods and tools can be obtained from the first author). These data were reviewed after each session and used to inform curricular adaptations and ongoing teacher training and support. Subsequent data collection provided feedback about the success of adaptations and teacher training and support. Thus, an iterative process was reflected in the ongoing integration and application of qualitative and quantitative data to inform decision making during program implementation.

## Evaluation Research Phase: Qual + Quan

Application of mixed methods to evaluation research can be characterized by concurrent use of multiple qualitative and quantitative data collection methods to facilitate data triangulation and evaluate programs in a comprehensive manner. Comprehensive approaches to program evaluation extend beyond traditional notions of evaluating effectiveness to assessment of program acceptability, social validity (application to daily life) and cultural specificity (relevance and appropriateness to cultural background and experiences of participants), integrity or quality of program implementation, immediate and long-term outcomes, and sustainability and institutionalization of program efforts (see Nastasi, Moore, & Varjas 2004). Furthermore, comprehensive evaluation includes data collection from multiple informants and interpretation from multiple perspectives.

A concurrent qualitative-quantitative design was reflected in the evaluation of the SLMHPP pilot program. As described above, formative evaluation (reflecting an iterative mixed method design) addressed issues of acceptability, social validity and culture specificity, integrity, and immediate program impact. In addition, outcome evaluation was conducted using a pre-post control group design ($N = 120$; 60 experimental, 60 control) with concurrent qualitative and quantitative data collection. Outcome measures included student pre-post self-report measures (culture-specific psychological measures designed from formative data; described in an earlier section), student feedback reflected in final session products (resulting from structured session activity designed for evaluative purposes), and postintervention group interviews with program implementers (teachers and teacher educators).

We used a series of null-hypothesis significance tests and estimates of effects to analyze program impacts, supplemented by analysis of qualitative data collected during program implementation. A $2 \times 2$ multivariate analysis of covariance (MANCOVA; controlling for pretest scores) was performed for each of the stressful scenarios (depicted in Table 2) to test for intervention effects and gender by intervention group. Tests of the overall MANCOVA were significant for Scenarios 4 (romantic relationship), 5 and 6 (family scenarios); follow-up tests indicated a significant Group $\times$ Gender interaction for those scenarios (Nastasi et al., 2006). (The full presentation of outcome data is beyond the scope of this article. Please contact the first author for more information.)

The quantitative outcomes indicated that the SLMHPP may have heightened the awareness of girls, but not boys, to the potential feelings of distress and limited helpfulness of social support, particularly with regard to situations in which they may have limited control. In addition, exploratory analyses of anticipated responses to complex family stressors (parental alcohol abuse and domestic violence) suggests that the intervention may have heightened girls' awareness of the potential negative impact of such stressors for them personally, that is, internalizing adjustment difficulties. However, the intervention may also have heightened girls' sense of responsibility for resolving complex family problems. The quantitative results were consistent with qualitative data collected during the intervention sessions and during the formative research phase. For example, the heightened sense of responsibility resulting from complex family problems such as absent mother or family alcoholism was evident also in qualitative depictions of stressful situations. These findings have important implications regarding the need for gender specificity in mental health promotion and social-emotional learning programming, and the need for addressing context specificity (e.g., family vs. peer contexts) of coping.

Program acceptability data indicated that students responded positively to activities and opportunities to discuss common stressors and ways of coping. Observations and student reports indicated enjoyment of opportunities to be creative; curriculum activities provided opportunities to express themselves through drawing, writing, role-playing, and discussion. Teachers responded well to on-site support and ongoing skills training. They generally responded favorably to the curriculum; these responses seemed to be influenced by student responses and participation (Bernstein, 2000). For example, teachers reported satisfaction with the program when students showed interest and enjoyment and seemed to benefit from activities. Teachers reported gaining a better understanding of the lives of their students and perceived themselves in a new role as facilitator of students' social-emotional development.

These perceptions were consistent with students' favorable reports of emotional support from teachers during the program. Furthermore, in follow-up interviews after program completion, teachers reported that students (both those who had participated in the program and those who were nonparticipants) sought them out for emotional support in the larger school context.

Keep in mind that the initial piloting of the intervention was a small, exploratory study designed to obtain preliminary findings on the effects of a culturally specific intervention. Hence, multiple analyses were conducted using promising outcome measures but nevertheless are still in a development phase. The number of analyses elevate the possibility of making a Type I error, and in all cases the tests were underpowered. In addition, the program was implemented in one school in one community of Sri Lanka and thus the results may not be generalizable to all students and schools within the country. Despite these limitations, the data yield important findings that can be used to guide future intervention work and larger experimental investigations.

As an extension of this work, Nastasi and Jayasena are currently engaged in developing long-term recovery programs for students and parents living in tsunami-affected coastal communities of Sri Lanka. The ongoing data collection using mixed methods designs as described herein is providing information about the applicability of the intervention program to address context-specific stressors such as natural disasters and to extend the program by involving parents as agents for promoting children's mental health. For example, the adapted intervention program included focus on coping with environmental stressors such as natural disasters (Nastasi & Jayasena, 2006). (For more information on this work, contact the first author.)

## Implications: Mixed Methods Designs in Intervention Research

The work presented in this article illustrates the application of mixed methods designs to the development and evaluation of culturally specific psychological assessment measures and interventions. In this work, formative qualitative data collection was used to identify culturally relevant constructs and develop a culturally specific model of mental health. This model and the qualitative data were then used to develop assessment measures and an intervention program. Mixed methods were used to validate the assessment measure and evaluate the acceptability, integrity, social validity, and outcomes of a pilot intervention. For example, the combination of qualitative analysis of ethnographic data and factor analysis of quantitative data was used to validate scales to measure constructs related to self-concept and coping with stress, which in turn could serve as outcome measures for interventions. Similarly, the evaluation of intervention outcomes was informed by both quantitative indices and qualitative data collected during program implementation. Furthermore, mixed methods were used to monitor and adapt the program to meet context-specific and individual needs of students and teachers. Finally, a new cycle of mixed methods research was instituted to adapt the program model to a new population and context (i.e., students and parents living in tsunami-affected communities).

The repeated application of a recursive research↔intervention process using mixed methods can facilitate the development of culture-specific interventions and translation of

evidence-based practices to diverse populations and settings. Using a mixed methods approach, researchers can engage local stakeholders (e.g., community members, educators, school administrators) in developing intervention programs that address local cultural, contextual, and population needs (e.g., community violence, drug abuse among middle school students, poor academic performance within a school district); adapting programs across multiple settings (e.g., adapting a sexual risk education program across grade levels and diverse student populations); and translating evidence-based practices to new contexts and populations. The successful application (or translation) of evidence-based interventions developed through randomized-controlled trials to naturalistic settings requires research to identify the conditions necessary for ensuring established program outcomes (see National Institute of Mental Health, 2001). Mixed method designs, as described in this article, are particularly relevant to the comprehensive evaluation of conditions necessary for effective intervention and can thus help to facilitate translational research (e.g., extension of the worked portrayed herein to tsunami-affected areas as described above).

The illustration presented here reflects a multiyear effort to develop and test theory, instruments, and interventions that are specific to culture and context, with the purpose of demonstrating the application of mixed methods designs across the multiple phases of research and development projects. The designs can of course be applied to shorter term and more focused efforts to develop culturally and contextually appropriate interventions. Moreover, as the illustration suggests, the process of ensuring cultural specificity is ongoing through the multiple stages of program design, implementation, evaluation, and translation. Mixed methods designs provide an important mechanism for facilitating development of culturally sensitive interventions and evidence-based practices.

Finally, this article also contributes to the development of multistage program evaluation models. Bamberger, Rugh, and Mabry (2006) and Stufflebeam (2001) noted that mixed methods evaluations are complex and can take the form of multistage projects. However, there appears to be a dearth of examples of such projects in the literature. We have attempted to address this shortcoming here, while advancing mixed methods conceptual frameworks to help others think through how to plan multiphase evaluation projects that use mixed methods.

## References

Bamberger, M., Rugh, J., & Mabry, L. (2006). *Realworld evaluation working under budget, time, data, and political constraints*. Thousand Oaks, CA: Sage.

Bernstein, R. (2000). *A demonstration of the acceptability of a mental health project through a participatory culture-specific model of consultation in the country of Sri Lanka*. Unpublished doctoral dissertation, Department of Educational and Counseling Psychology, State University of New York at Albany.

Bronfenbrenner, U. (1989). Ecological systems theory. In R. Vasta (Ed.), *Annals of child development* (Vol. 6, pp. 187–249). Greenwich, CT: JAI.

Cowen, E. L., Hightower, A. D., Pedro-Carroll, J. L., Work, W. C., Wyman, P. A., & Haffey, W. G. (1996). *School-based prevention for children at risk: The Primary Mental Health Project*. Washington, DC: American Psychological Association.

Creswell, J. W. (2003). *Research design: Qualitative, quantitative, and mixed methods approaches*. Thousand Oaks, CA: Sage.

Harter, S. (1999). *The construction of the self: A developmental perspective*. New York: Guilford.

Hitchcock, J. H., Nastasi, B. K., Dai, D. C., Newman, J., Jayasena, A., Bernstein-Moore, R., et al. (2005). Illustrating a mixed-method approach for identifying and validating culturally specific constructs. *Journal of School Psychology*, *43*(3), 259-278.

Hitchcock, J. H., Sarkar, S., Nastasi, B. K., Burkholder, G., Varjas, K., & Jayasena, A. (2006). Validating culture- and gender-specific constructs: A mixed-method approach to advance assessment procedures in cross-cultural settings. *Journal of Applied School Psychology*, *22*(2), 13-33.

Ingraham, C. L., & Oka, E. R. (2006). Multicultural issues in evidence-based interventions. *Journal of Applied School Psychology*, *22*(2), 127-149.

Morse, J. M. (2003). Principles of mixed methods and multimethod research design. In A. Tashakkori & C. Teddlie (Eds.), *Handbook of mixed methods in social & behavioral research* (pp. 189-208). Thousand Oaks, CA: Sage.

Nastasi, B. K., Hitchcock, J. H., Burkholder, G., Varjas, K., Sarkar, S., & Jayasena, A. (in press). Assessing adolescents' understanding of and reactions to stress in different cultures: Results of a mixed-methods approach. *School Psychology International*.

Nastasi, B. K., & Jayasena, A. (2006). *Mental health promotion post-tsunami curriculum*. Minneapolis, MN: Walden University.

Nastasi, B. K., Jayasena, A., Hitchcock, J., Burkholder, G., Varjas, K., & Sarkar, S. (2006, April). *Reactions of female adolescents to a school-based mental health program*. Paper presented at the 10th National Convention on Women's Studies, sponsored by Centre for Women's Research, Columbo, Sri Lanka.

Nastasi, B. K., Jayasena, A., Varjas, K., Bernstein, R., Hitchcock, J. H., & Sarkar, S. (1999a). *Student questionnaire: Perceived competencies measure for Sri Lanka Mental Health Promotion Program*. Albany: School Psychology Program, State University of New York at Albany.

Nastasi, B. K., Jayasena, A., Varjas, K., Bernstein, R., Hitchcock, J. H., & Sarkar, S. (1999b). *Student questionnaire: Stress & coping measure for Sri Lanka Mental Health Promotion Program*. Albany: SUNY Press.

Nastasi, B. K., Moore, R. B., & Varjas, K. M. (2004). *School-based mental health services: Creating comprehensive and culturally specific programs*. Washington, DC: American Psychological Association.

Nastasi, B. K., & Schensul, S. L. (2005). Contributions of qualitative research to the validity of intervention research. *Journal of School Psychology*, *43*(3), 177-195.

Nastasi, B. K., Schensul, J. J., Balkcom, C. T., & Cintrón-Moscoso, F. (2004). Integrating research and practice to facilitate implementation across multiple contexts: Illustration from an urban middle school drug and sexual risk prevention program. In K. E. Robinson (Ed.), *Advances in school-based mental health: Best practices and program models* (chap. 13). Kingston, NJ: Civic Research Institute.

Nastasi, B. K., Schensul, J. J., deSilva, M. W. A., Varjas, K., Silva, K. T., Ratnayake, P., et al. (1998-1999). Community-based sexual risk prevention program for Sri Lankan youth: Influencing sexual-risk decision making. *International Quarterly of Community Health Education*, *18*(1), 139-155.

Nastasi, B. K., Varjas, K., Bernstein, R., Hellendoorn, C., Brewster, M., Hitchcock, J., et al. (1999). *Program for Mental Health Promotion in Sri Lankan Schools: Curriculum manual & instructional guide.* (Developed for implementation in the Central Province Schools, Kandy, Sri Lanka). Albany: School Psychology Program, State University of New York at Albany.

Nastasi, B. K., Varjas, K., Sarkar, S., & Jayasena, A. (1998). Participatory model of mental health programming: Lessons learned from work in a developing country. *School Psychology Review*, *27*(2), 260-276.

National Institute of Mental Health. (2001). *Blueprint for change: Research on child and adolescent mental health* (Report of the National Advisory Mental Health Council Workgroup on Child and Adolescent Mental Health Intervention Development and Deployment). Washington, DC: Author.

Roberts, M. C. (Ed.). (1996). *Model programs in child and family mental health*. Mahwah, NJ: Lawrence Erlbaum.

Sarkar, S. (2003). *Gender as a cultural factor influencing mental health among the adolescent students in India and Sri Lanka: A cross-cultural study*. Unpublished doctoral dissertation, State University of New York at Albany.

Schensul, S. L., Mekki-Berrada, A., Nastasi, B. K., & Saggurti, N. (in press). Healing traditions and men's sexual health in Mumbai, India: The realities of practiced medicine in urban poor communities. *Social Sciences and Medicine*.

Schensul, S. L., Nastasi, B. K., & Verma, R. K. (2006). Community-based research in India: A case example of international and interdisciplinary collaboration [Electronic version]. *American Journal of Community Psychology*. Available from http://dx.doi.org/10.1007/s10464-006-9066-z

Schensul, S. L., Verma, R. K., & Nastasi, B. K. (2004). Responding to men's sexual concerns: Research and intervention in slum communities in Mumbai, India. *International Journal of Men's Health, 3,* 197-220.

Stufflebeam, D. L. (2001). Evaluation models. *New Directions for Evaluation, 89,* 7-99.

Tashakkori, A., & Teddlie, C. (2003). *Handbook of mixed methods in social & behavioral research*. Thousand Oaks, CA: Sage.