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Teaching the Process of Instrument Selection in Family Research

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This paper describes a classroom exercise in selecting measurement instruments that is applicable to both undergraduate and graduate family research methods courses. The question of how to measure the construct of "family involvement" is used as a concrete illustration. This exercise is designed to sensitize students to the issues involved in defining and measuring conceptual variables in family studies, and to teach three important lessons about measurement: (a) the first step in finding appropriate instruments is to conceptualize precisely the research construct; (b) there are many ways to measure any one conceptual variable, and these multiple approaches should be compared and contrasted in relation to one's particular research application; and (c) a construct should be measured in a way that most closely matches its conceptual definition. The exercise also teaches students how to use available technology to select more effectively and efficiently family-related measures.

Perhaps the most neglected topic in research methods curricula is the process of instrumentation (Aftanas, 1994; Cone & Foster, 1991). What is the best way to measure a particular variable of interest? How does one go about finding and selecting appropriate measurement instruments for social research? Within the context of research on families, such measurement issues entail special concerns not encountered in research areas that are predominantly laboratory-based. For example, family researchers often use longitudinal designs to assess repeatedly the same individuals, seek both quantitative and qualitative assessment of subjective experience, use research populations that are diverse with respect to age, educational background, and culture, and confront unique concerns about the ethics of their research procedures in real-world settings (cf. Miller, 1986).

Moreover, because the family is a system comprised of multiple individuals, family researchers face critical decisions about units of measurement and of analysis that rarely are encountered in other research areas. Children, mothers,

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and fathers provide different viewpoints on the family system that can be considered individually or in combination. Family researchers must determine carefully the units about which they draw conclusions, and then make sure their measurements pertain specifically to those units (cf. Singleton, Straits, & Straits, 1993). Different measurement instruments provide different units of analysis, and a family systems perspective often necessitates the use of multiple measures, each of which yields a different unit of measurement. The present paper concretely addresses the process of instrument selection in the context of these special needs.

Although the crucial importance of such measurement issues is acknowledged, measurement concerns consistently receive less attention in the classroom than do issues of experimental design and statistical analysis (Aiken, West, Sechrest, & Reno, 1990; Brockway & Bryant, in press). As a remedy for this gap in the research methods curricula, a recent task force of the American Psychological Association (Brewer et al., 1993) called for more "hands on" classroom experiences to help students better grasp abstract methodological issues. In response to this call, the present paper describes a classroom exercise that can be used to teach both undergraduate and graduate students in family research methods courses the steps involved in selecting an appropriate instrument to measure a conceptual variable (or construct).

This classroom exercise is designed to teach three important lessons about measurement, namely: (a) the first step in finding appropriate instruments is to conceptualize precisely the research construct; (b) there are many ways to measure any one conceptual variable, and these multiple approaches should be compared and contrasted; and (c) a construct should be measured in a way that most closely matches its conceptual definition. In addition, the exercise teaches students how to use available technology to select more effectively and efficiently family-related measures.

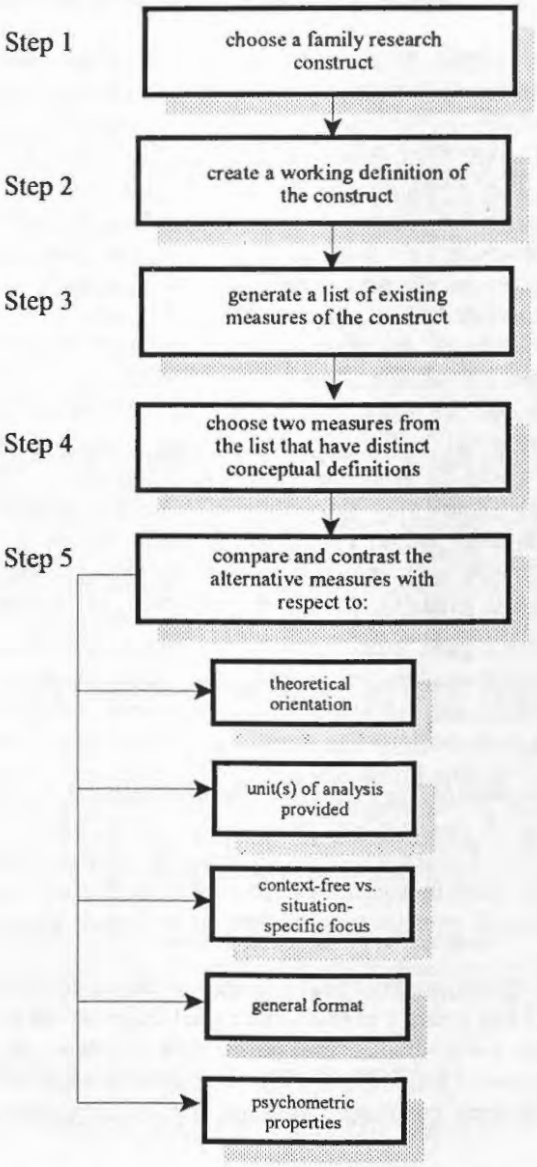
AN EXERCISE IN INSTRUMENT SELECTION

OVERVIEW

This exercise consists of five progressive steps or mini-exercises (see Figures 1A and 1B) that teach students how to locate, evaluate, compare, and select appropriate measures. Though we originally developed the exercise for use in research methods courses in psychology (Brockway & Bryant, in press), here we show how to use the exercise to teach these same lessons in family research methods.

To begin the exercise, students first choose a construct of interest (refer to Figure 1A, step 1) and create a precise conceptual definition of this construct (step 2). Then, they use a computerized information database--the Health and Psychosocial Instrument (HaPI) file (1995), accessible through many libraries and available for personal computer[1]--to generate a list of existing measures of

FIGURE 1A
Schematic diagram of the general steps involved in the measurement exercise



their construct (step 3). Finally, students choose two existing measures that are based on distinct conceptual definitions of the research construct (step 4), and compare and contrast these alternative instruments along a set of critical dimensions (step 5).

PROCEDURE

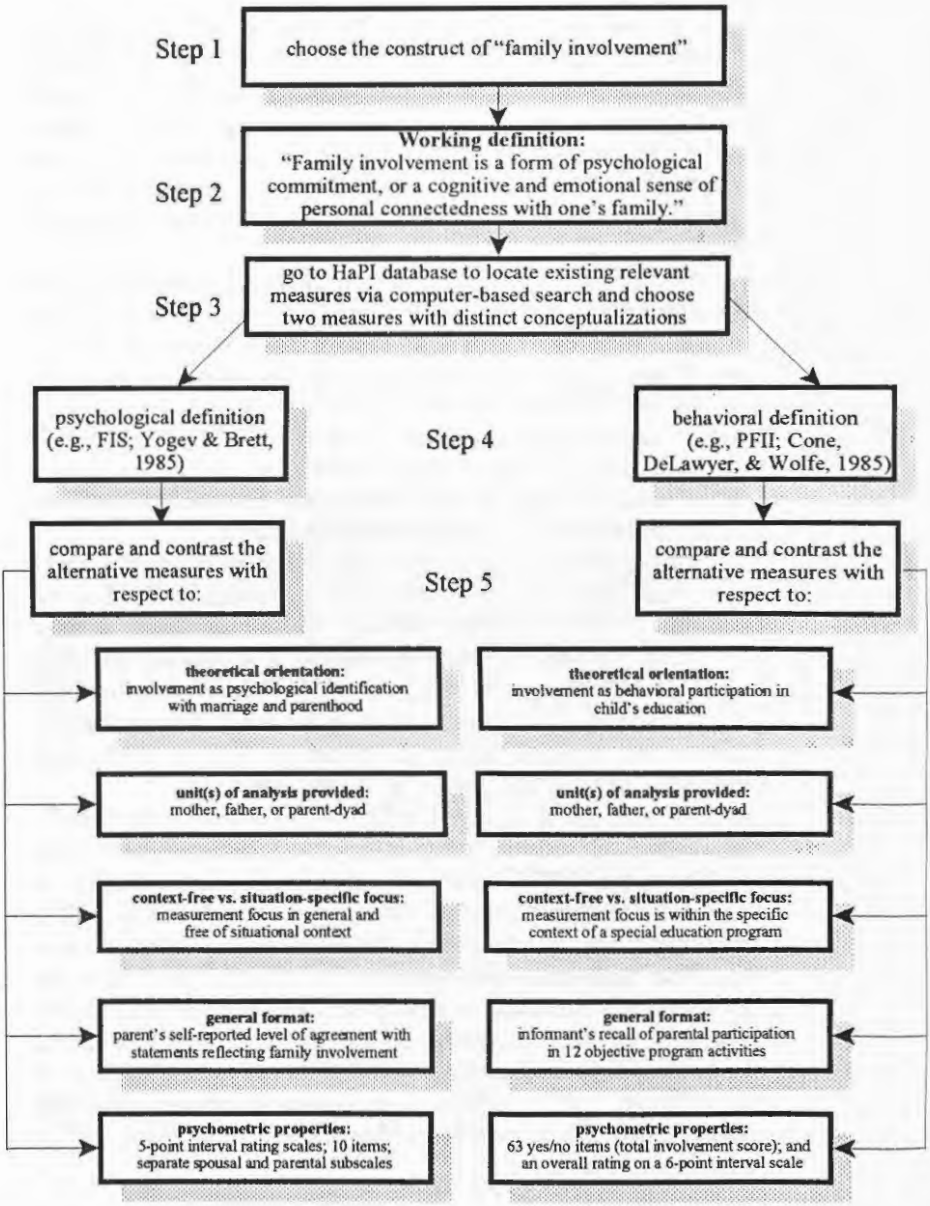
Research methods instructors should preface the exercise by discussing what psychological constructs are and how inherently difficult it is to measure phenomena that are intangible, dynamic, and subject to multiple conceptual definitions. For the exercise to work, students need to understand the difference between theoretical and operational definitions. They also need to know what validity and reliability mean in the context of measurement. Using the construct of "family involvement," Figure 1B illustrates the steps of the instrument selection exercise.

Step 1: Choose a construct to measure. After familiarizing students with key measurement concepts, the instructor asks students to choose a construct that might be of interest to family researchers. Ideally, students should select a construct for which several available measures exist. To steer students in the right direction, the instructor can generate a list of relevant constructs as examples (multiple students can be allowed to select the same construct). Possibilities include attachment, bereavement, caregiving, stress and coping, communication, emotional expression, health behaviors, child-rearing attitudes and practices, marital satisfaction, and adjustment to divorce.

The term "family involvement" has many different meanings in the family science literature, and there is no one, universally-recognized definition (cf. Keith & Lichtman, 1994). Instead, family researchers have defined "involvement" within a host of diverse theoretical frameworks, including psychological identification (Yogev & Brett, 1985), role commitment (Gilbert, Dancer, Rossman, & Thorn, 1991), centrality in self-concept (Frone, Russell, & Cooper, 1992), parent-child interaction (Smith & Krohn, 1995), and behavioral participation (Cone, DeLawyer, & Wolfe, 1985).

Reflecting this conceptual diversity, family researchers have developed a wide array of approaches to measure family involvement, including self-report questionnaires (Halvorsen, 1992), interview schedules (Crouter, Manke, & McHale, 1995), behavioral checklists (Touliatos, Perlmutter, & Straus, 1990), teacher-report forms (Cone et al., 1985), and even physiological devices (Cassell, 1983). The complexity and importance of the construct have led researchers to devise a variety of measurement tools for studying family involvement in specific contexts, including mothers' attitudes toward involving siblings in the birth of a child (Krutsky, 1985), fathers' caregiving to their infants (Ninio & Rinott, 1988), parental participation in primary education (Keith & Lichtman, 1994), single-parents' adjustment to divorce (Kent, 1984),

FIGURE 1B
Schematic diagram of the steps involved in the measurement exercise using the construct of family involvement as a concrete illustration



and grandparents' involvement with their grandchildren (Oyserman, Radin, & Benn, 1993). Besides measures worded in English, there are even "family involvement" instruments developed for use with Spanish (McGuire & Earls, 1993), Swedish (Björck-Åkesson & Granlund, 1995), and Japanese (Ishii-Kuntz, 1994) populations. This conceptual and operational diversity makes family involvement an ideal construct to illustrate the process of teaching instrument selection. The present exercise is designed to help students better appreciate the richness of this measurement diversity.

Step 2: Define precisely the construct. After students have chosen a construct, they should be reminded of the critical distinction between conceptual and operational definitions. The former involves a theory-driven explication of the particular phenomenon of interest; the latter entails a concrete representation of the latent construct in the form of observable data.

It is also crucial to teach students the order in which conceptualization and operationalization should occur in the measurement process. Before you can select the proper instrument, you first need to understand what you seek to measure. One's definition of the research construct will determine which measures are appropriate. However, most students tend to reverse the order of the conceptual and operational stages, claiming that the initial step in measuring a latent construct is to operationally define it (Brockway & Bryant, in press). Accordingly, students' first task after choosing a construct is to define thoroughly and precisely the underlying concept.

In defining the construct of family involvement, theorists have generally adopted one of at least three broad types of meanings: psychological involvement (i.e., commitment), behavioral involvement (i.e., participation), or a combination of psychological and behavioral components. For present purposes, we chose to define family involvement from a psychological perspective as a form of commitment (i.e., a cognitive and emotional sense of personal connectedness with one's family). As an alternative, one could select a different conceptualization. For instance, involvement could be defined behaviorally as the frequency with which parents participate in activities with their children. The purpose of this step in the exercise is for students to develop a clear, working definition of exactly what their variable of interest means.

Step 3: Use HaPI file to find existing measures of the construct. Having first *conceptually* defined their family research construct, students are now ready to *operationally* define it. Although students may be tempted to construct a "homemade" instrument to measure their construct, it is important for them to realize that several good (i.e., valid and reliable) measures may already exist. Why waste time "reinventing the wheel" (Phillips, 1992), if the right tools for the job of measurement are already at hand? Students (and researchers) should be encouraged to ask *not* "How do I create a measure of my construct?," but rather "What is the most appropriate existing measure of my construct? Which measure most closely matches my conceptual definition?"

A new and exciting computerized measurement database helps students and researchers answer these important questions. The HaPI file (1995) is useful particularly in finding measures that match one's working definition of a construct. Available through many college libraries, HaPI contains information on more than 40,000 behavioral and social measures. HaPI summarizes a host of instrument characteristics (e.g., intended audience, validity and reliability information, means of obtaining copies), and often provides both the conceptual definition of the construct being measured and the exact wording of several sample items. The HaPI file provides a more powerful and systematic means of identifying relevant instruments than do traditional instrument catalogs. To use HaPI, users simply type in the name of their construct and generate a list of corresponding references. Alternatively, an on-line thesaurus of key index terms can be searched for relevant clues. HaPI also enables one to combine multiple terms, such as "involvement," "family," and "work," to find only measures specifically designed to measure involvement in both family and work roles.

The need to find measures that are appropriate for specific populations makes HaPI's multiplicative search capability indispensable. Students should be urged to specify the relevant family population(s) that they wish to study when defining their construct. For present purposes, we will restrict ourselves to instruments that are designed to measure family involvement among parents (as opposed to children).

HaPI contains references to over 5,000 instruments to measure "family" research variables. When searched using the key words "family and involvement and parents," HaPI generated a list of references for 42 different instruments that were described by their originators as assessing some form of parental involvement in the family.

Step 4: Choose two measures with distinct conceptual definitions. In the next step of the measurement exercise, students select two sources from their reference list of instruments that use distinctly different measures to tap their chosen construct. The purpose of this activity is not to choose the single "best" instrument (i.e., the most popular, reliable, or valid), but rather to choose a pair of measures that are markedly different to emphasize that there are multiple ways to measure any one latent construct. If possible, students should seek one source that matches their own conceptualization as closely as possible and another source that is as different as possible from their working definition. Students should also obtain a copy of the references for these measures.

From the list of 42 "parental family involvement" measures, we looked for two sources that reflect divergent definitions of the same construct. Based on accompanying abstracts, one of these sources, Yogev and Brett (1985), matches our own conceptualization of family involvement as commitment, or psychological identification with one's family. In contrast, another source, Cone, DeLawyer, and Wolfe (1985), conceptualizes family involvement solely in terms of behaviors (i.e., as "parental participation" within the household).

The measure of parental family involvement that is based on a conceptual definition similar to our own is called the Family Involvement Scale (FIS; Yogev & Brett, 1985). The measure based on a dissimilar conceptual definition is called the Parent/Family Involvement Index (PFII; Cone et al., 1985).

Step 5: Compare and contrast the two alternative measures. Once they have found two distinct measures, students are asked to compare and contrast these measures along a variety of dimensions generated either by the instructor or by the students and the instructor. Besides each measure's overall strengths and weaknesses, other dimensions might include:

a. Theoretical Orientation (e.g., psychological versus behavioral orientation; unidimensional versus multidimensional model; state versus trait variable; context-free versus situation-specific focus).
b. Unit of Analysis (e.g., mother, father, child, parent-dyad, family system).
c. Method of Measurement: Here the alternative instruments can be compared with respect to
    (1.) Assessment strategy (e.g., self report; behavioral observation; structured interview; informant report); and
    (2.) Type of response format (e.g., closed- versus open-ended questions; Likert versus semantic differential scales; true/false items; yes/no checklist).
d. Number of Items and Scaling Issues (e.g., single item versus composite indicators; total score versus scores on multiple subscales).
e. Cost-effectiveness (e.g., time and effort required on the part of both researchers and participants; financial costs; necessary special accommodations).

Once students have carefully compared and contrasted their two measures on these dimensions, they should present their findings orally or in a brief paper highlighting the similarities and differences observed. Students also should be encouraged to explain what the assignment has taught them about measurement. This is probably the most important pedagogical component of the exercise. In the present context, how might the two family involvement measures be compared and contrasted? What lessons does this teach us about measurement?

COMPARING AND CONTRASTING THE TWO FAMILY INVOLVEMENT MEASURES

Consider first the instrument whose conceptual underpinnings match our own definition of family involvement. Yogev and Brett (1985) conceptualize involvement subjectively as "the degree to which a person identifies psychologically with family roles" and is "committed to family roles" (p. 755). Unlike Cone et al. (1985), involvement here is neither experientially-, nor

behaviorally-based, but instead is considered solely in terms of the respondent's psychological investment in family-related issues. [2]

Yogev and Brett's (1985) conceptualization of involvement is also multidimensional. Their conceptual definition contains two dimensions: involvement in one's role as a spouse, and involvement in one's role as a parent. Accordingly, their operational definition of family involvement (the FIS) consists of two subsets of questions, one of which taps spousal involvement (5 items), and one of which taps parental involvement (5 items). FIS items consist of statements rated using a 5-point scale (ranging from "strongly disagree" to "strongly agree"), and can therefore be considered as Likert-type scales. Sample items include "I would be a less fulfilled person without my role as a parent" and "Nothing is as important as being a spouse." Because it defines involvement in terms of parents' overall subjective experience, the FIS assesses general perceived levels of family involvement. Respondents are not asked to evaluate their level of involvement during specific activities or in specific settings. The intended population for the FIS is currently married parents.

In contrast, Cone et al.'s (1985) conceptual definition of family involvement differs from Yogev and Brett's (1985) in three important ways. While the Yogev and Brett's definition is psychologically-based, Cone et al.'s definition is behaviorally-based, defined as whether or not (and if so, how) parents participate in a series of educational activities. Second, Cone et al.'s family involvement is situation-specific, tapping different types of parental participation within the context of special education programs only, unlike Yogev and Brett's more general, global parental participation. Third, Cone et al.'s conceptual and operational definitions of family involvement are more complex, and encompass 12 distinct domains of involvement (e.g., home educational activities, transportation, attending parent meetings, classroom volunteering, fund-raising involvement, and disseminating information); whereas Yogev and Brett's measurement model contains just two dimensions (spousal and parental involvement).

Although Yogev and Brett's FIS is completed by parents and Cone et al.'s PFII is completed by informants, notice that both instruments provide the same units of measurement and of analysis. The FIS and PFII both yield measurements not only of each parent individually, but also of the parent-dyad as a whole. Other instruments, in contrast, provide assessments of the family as a system (e.g., Skinner, Steinhauer, & Santa-Barbara, 1983), of dyadic parent-child involvement (e.g., Crouter & Crowley, 1990), or of children's perceptions of parental involvement (e.g., Smith & Krohn, 1995).

Not surprisingly, researchers with distinct conceptual definitions also choose to operationally define their constructs differently. Cone et al.'s (1985) PFII requires a knowledgeable informant (e.g., a teacher or teacher's aide) to complete 63 items, indicating with a "yes" or a "no" whether a particular parent has engaged in each specific educational activity. A sample item is, "Parent has

observed child in classroom activity at least once." Besides these 63 yes/no questions, Cone et al. also include an "overall involvement" measure, consisting of a single rating of each parent on a 6-point scale. Despite its multiple components and 64 items, the PFII can still be completed for both parents in 12 to 15 minutes, according to the instrument's developers. Although Yogev and Brett do not discuss the ease of using their 10-item FIS, this instrument represents an 84% reduction in the number of questions asked, and is thus more cost-effective than the PFII.

This exercise addresses the crucial first phase of instrumentation; that is, finding theoretically relevant measures that match one's underlying conceptual definition and provide the desired unit of analysis. After this initial phase (steps 1-5 of the exercise), however, is the critical stage of choosing one or more measures to use in the research process. Although the choice of measures often will be clear-cut, the task of selecting instruments becomes much harder when there are two or more comparable alternatives (i.e., when there is no clear "winner"). Under these conditions, the most appropriate measure often will depend on the specific research application being considered. For example, researchers studying family involvement in educational settings might prefer a different instrument than would researchers studying involvement in home settings. Just as the validity of an instrument cannot be judged without considering its specific application (Cronbach, 1990), neither can an instrument be deemed appropriate or inappropriate without considering the specific research problem.

Additionally, this activity can be modified and expanded for more advanced students by incorporating the notion of "triangulation" into the exercise; that is, the idea that using *multiple* measures that do not share the same inherent weaknesses may enhance construct validity (Singleton, Straits, & Straits, 1993). For instance, students could locate two measures with similar conceptual definitions, and then analyze them using a multitrait-multimethod matrix (Campbell & Fiske, 1959).

EVIDENCE FOR THE EFFECTIVENESS OF THE EXERCISE

Empirical evidence confirms the effectiveness of this measurement exercise in a social psychology lab course (Brockway & Bryant, in press). Before the exercise, only 1 out of 10 students (10%) knew that (a) the critical first step in selecting appropriate instruments is precise conceptualization; and (b) given several alternative measures of equivalent validity and reliability, one should choose the measure that most closely matches one's conceptual definition. In contrast, after completing the exercise, all 10 students (100%) gave these correct answers in response to open-ended questions (both Fisher's exact $ps < .01$). A comparable group of 6 laboratory students completed pretest and posttest questions, but did not participate in the classroom exercise. Results revealed no significant changes in knowledge for this "untreated" control group (both $ps >$

.22). Although these data corroborate the effectiveness of the exercise in sensitizing students to the critical issues involved in selecting appropriate measurement instruments, there are obviously limitations to the generalizability of these conclusions. The sample lacks size and representativeness, and it is unclear what aspects of the exercise are responsible for its effectiveness. Nevertheless, these data are encouraging and support the utility of the exercise.

CONCLUSION

The conclusions that family researchers draw from their data are only as good as the measures used to obtain these data. Family research curricula should be expanded to include classroom exercises stressing the importance of the match between conceptual and operational definitions. Students need to understand that there is always more than one way to tap a latent construct. No one way of measuring is necessarily better; what is most appropriate depends on the particular application at hand.

Participating in this measurement exercise teaches students three important lessons about measurement: (a) a variety of instruments may exist to measure any family-related construct of interest; (b) instruments differ in the degree to which they match one's conceptual definition of the construct; and (c) researchers should choose the particular instrument that most closely corresponds to their conceptual definition.

NOTES

1. HaPI is available either on-line or on CD-ROM in hundreds of college and university libraries both in the United States and internationally. Alternatively, the HaPI CD-ROM can be purchased for $295 for a single work-station (1-412-687-6850).

2. Indeed, Yogev and Brett consider behaviorally-based and psychologically-based measures to be conceptually distinct, and they include both their own self-report measure of psychological involvement (the FIS) and a separate measure of role-behavior participation in their study of family involvement.

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