

Chapter 3

Scale Construction and Development

The definitional framework upon which this Scale is based proposes that self-determination is an educational or adult outcome. When students leave school they should have acquired the attitudes and abilities that enable them to become self-determined young adults. Self-determination is an outcome that emerges based on learning across the lifespan, and chronological age and level of self-determination should be positively correlated. However, although children and adolescents can be self-determined, full self-determination is primarily an adult outcome. The reality is that most children and adolescents are, by their status as minors, not fully capable of nor allowed to be self-determined. It is only when one moves into adulthood, and assumes the responsibilities of adulthood, that one is fully able to express self-determination.

Given this framework, the construction and development of *The Arc's Self-Determination Scale* followed a dual process. First, the characteristics of adults with cognitive disabilities who were identified as self-determined and those who were not self-determined were examined and those characteristics that supported self-determined behavior were isolated. Second, items were identified for inclusion in the Scale which mirrored the characteristics indicated through the research process. Scale domains and subdomains were identified in a top-down manner; examining the self-determination of adults with cognitive disabilities and applying this knowledge to the development of an assessment of this construct for adolescents with cognitive disabilities. The following description provides a summary of this research. A detailed description is available from Wehmeyer, Kelchner and Richards (1994).

Identification of Scale Domains and Subdomains

Procedures

To identify domains and subdomains for the Scale, a series of structured interviews with (primarily) adults with mental retardation were conducted across the nation. The interview questions examined the contribution of essential characteristics of

self-determined behavior to the achievement of behavioral outcomes closely associated with self-determination.

The research sample included 408 adolescents and adults with mental retardation who lived in 10 states. The mean age for the sample was 36.34 years ($SD = 11.28$, Range = 17 to 72). Fifty-five percent of participants were female ($n = 226$, Mean age = 35.69, $SD = 11.36$, Range = 17 to 72), 45% were male ($n = 182$, Mean age = 37.16, $SD = 11.17$, Range = 19 to 68). Eighty-one percent of the sample identified themselves as Caucasian, 9% as African-American, 5% as Native American, 2.5% as Hispanic, and 2% as Asian-American. Study participants were recruited through self-advocacy groups (consumer organized and run advocacy organizations) across the nation, identified to ensure geographic representation and ethnic and socioeconomic diversity.

Informed consent was obtained from all participants and/or their legal guardians. Project personnel, trained to administer each assessment described below, traveled to each site and conducted data collection activities with two exceptions, where group advisors, with direction from project staff, collected data. Data collection typically occurred in the context of a regularly scheduled self-advocacy meeting. All measures used were designed for individual or small group administration. At most sites assessments were group administered, but in some cases data were collected through one-to-one interviews. Participants were assisted, when necessary, by project staff and group advisors / volunteers and questions were read orally to all participants. Individuals with limited mobility or speech impairments were given necessary adaptations to participate.

To provide information about level of disability, respondents evaluated themselves on seven questions assessing the amount of assistance or help they required. Each question addressed functioning in one of the seven areas of "major life activities" used to determine the presence of a developmental disability (e.g., self-care; learning; mobility; self-direction; receptive and expressive language; capacity for independent living; and economic self-sufficiency). Participants responded in one of three ways (None, A little, A lot) to each of the questions. Each "None" answer was awarded 0 points, each "A little" answer 1 point and each "A lot" answer 2 points. The sample averaged 5.3 points ($SD = 3.26$, Range 0 - 14), suggesting that the sample was composed primarily of individuals with milder degrees of mental retardation. This assumption is bolstered by the fact that the process required respondents to complete a series of written assessments that, even when read orally, pose considerable difficulties for individuals with more significant levels of disability and, practically, precluded their involvement in research activities.

Measuring Self-Determined Behavior

Because there were no measures of self-determination available to evaluate the definitional framework, it was determined that the most appropriate indicator of this outcome would be the performance of behaviors generally agreed upon as reflecting self-determination. These behaviors were identified through a review of the extant literature, research from and discussions with personnel from federally-funded model demonstration and research projects to promote self-determination, and input from people with disabilities.

The use of multiple measures to evaluate the definitional framework required a sample size large enough to draw conclusions from research activities. It was not possible to conduct behavioral observations for each individual. Instead, project personnel used an extant survey, the *National Consumer Survey*, to determine behavioral self-determination. The *National Consumer Survey* (NCS) was constructed as part of a large evaluation of the independence, integration and productivity of people with developmental disabilities and was used to interview more than 13,000 people with disabilities around the country. The NCS consists of 79 questions in six sections: a) Eligibility and screening; b) Demographics; c) Services satisfaction; d) Independence; e) Integration; and f) Productivity. More detail concerning the development process and the survey is available in the *Final Report of the 1990 National Consumer Survey of People with Developmental Disabilities and their Families* (Jaskulski, Metzler, & Zierman, 1990).

The instrument has subsequently been used to examine quality of life issues for people with disabilities and to examine the self-determination of people with mental retardation. Wehmeyer and Metzler (1995) selected 7 demographic variables and 27 questions from the NCS to examine the self-determination of more than 5,000 survey respondents who had mental retardation. Kozleski and Sands (1992) used a modified version of the NCS to compare quality of life for individuals with and without disabilities.

Participants responded to a series of questions from the NCS reflecting relative self-determination in six principal domains: (a) Home and Family Living; (b) Employment; (c) Recreation and Leisure; (d) Transportation; (e) Money Management; and, (f) Personal / Leadership. Questions assessing choice and control in each of these domains were selected. This involved nine questions directly from the NCS, all using a common question/response system identical to that used during the initial NCS survey. Participants answered each question with one of 10 response

options. Responses to these questions were assigned values, ranging from 0 points for the most self-determined response (Yes, unassisted) to 4 points for the least (No, agency/staff member). Thus, participants scored from 0 to 36 points on these nine questions and lower scores reflected higher self-determination.

The final domain area, Personal/Leadership, consisted of six questions referring to actions and activities about leadership and personal advocacy. These questions were generated by project staff because no comparable questions existed on the NCS. Participants responded in a "yes/no" format to each question, with a "yes" answer reflecting a self-determined action and awarded 0 points. A "no" answer reflected a lack of self-determined behavior and was scored "4" points. The Personal/Leadership domain, then, accounted for 0 to 24 points. Thus, on the survey as a whole, scores could range from 0 to 60, with "60" reflecting the least amount of self-determination and "0" indicating the most.

Wehmeyer, Kelchner and Richards (in press) determined that this survey had adequate structural and concurrent validity and internal stability (Chronbach alpha = .82). Total scores for the survey correlated strongly with estimations of level of caregiving needed and independence, with respondents scoring more positively on the survey requiring less support in caregiving and indicating greater independence. A Lilliefors test of normality did not reach significance, indicating that the scores approximated a normal distribution. In addition, for a subset of the sample, survey results correlated significantly with group advisors' ratings of self-determination.

Measuring Essential Characteristics of Self-Determination

A series of self-report measures were used to examine each essential characteristic of self-determination. Autonomy was measured with a self-report version of the *Autonomous Functioning Checklist* or AFC (Sigafoos, Feinstein, Damond & Reiss, 1988) and the *Life Choices Survey* (Kishi, Teelucksingh, Zollers, Park-Lee, & Meyer, 1988). Self-regulation was evaluated using the *Means-Ends Problem Solving* technique (MEPS) (Platt & Spivack, 1989) and the *Children's Assertiveness Inventory* (Ollendick, 1984). Perceptions of psychological empowerment were measured with the *Adult version of the Nowicki-Strickland Internal-External Scale* (Nowicki & Duke, 1974), and the Ollendick scales of social self-efficacy and outcome expectancy (Ollendick, Oswald & Crowe, 1986). Self-realization was measured using the short version of the *Personal Orientation Inventory* (POI) (Jones & Crandall, 1986).

The first measure of autonomy used was the Autonomous Functioning Checklist. The AFC is a parent-completed checklist measuring the behavioral autonomy of adolescents. The scale has 78 items and is subdivided into four conceptually distinct subscales: Self and Family Care, Management, Recreational Activity, and Social and Vocational Activity. Questions in the first three domains describe activities to which parents respond by selecting one of five alternatives [(a) does not do; (b) does only rarely; (c) does about half the time there is an opportunity; (d) does most of the time there is an opportunity; and (e) does every time there is an opportunity]. The fourth domain poses questions with a yes/no answer. Likert-scale responses are scored from zero (does not do) to four (does every time), while dichotomous yes-no responses are scored with zero or one. High total (out of 252 possible) and subscale scores indicate that an individual exhibits behaviors associated with autonomy.

Sigafoos, et al., (1992) found that the AFC subscales had high levels of internal consistency (coefficient alpha from .76 to .86). There were consistent and significant correlations between each subscale and adolescent leadership experience (.21 to .36) and three of four subscales and number of extracurricular activities (.34 to .45), providing further evidence for construct validity. The AFC was adapted in the present study as a self-report measure for use by adults with disabilities by presenting instructions and items in first-person tense instead of second person. The five-point Likert format used in the original scale was maintained, but responses were made singular and first person. Wehmeyer and Kelchner (1994) found that the factor structure of the self-report version replicated that of the original version and that this version had adequate criterion-related validity as demonstrated by significant differences in scores dependent upon individuals' status on two other behavioral indicators of autonomy (living independently and self-care).

A second measure of autonomy was the *Life Choices Survey* (Kishi, et al., 1988). The LCS has ten items measuring major life decisions and daily choices. Respondents answer on a five-point scale indicating how often they have the opportunity to make decisions and choices. Questions explore opportunities and choices people have at meals and snacks, what they watch on television, and who lives with them. The survey was designed to be completed in an interview format and yields a score reflecting total amount of choice (minimum 10, maximum 40). Kishi, et al., (1988) found that the survey predicted differences in life choices between adults with and without mental retardation. Stancliffe (1995) evaluated the degree to which acquiescence response bias posed a threat to the validity of the *Life Choices Survey* and found

a negligible level of acquiescence (1.4% of all responses from adults with mental retardation were associated with acquiescence).

The *Means-Ends Problem Solving* (MEPS) technique (Platt & Spivack, 1989) was used to measure self-regulation. The MEPS has been used in numerous studies to examine interpersonal cognitive problem-solving of children, adolescents and adults. The MEPS procedure uses a series of story items portraying situations where a need is introduced at the beginning of a story and satisfied at the end. The respondent completes the story by filling in events that might have occurred to fulfill the need (Platt & Spivack, 1989). Responses are written and can be as long or short as necessary. Because people with mental retardation require additional time to read (or have read to them) the stories and respond, and because several of the stories in the MEPS require knowledge not typically held by people with mental retardation, only 4 of the 10 scenarios were selected for administration.

Stories are scored according to the number of means, no means, irrelevant means, or no responses provided by the respondent. A mean was defined as "any relevant unit of information designed to reach the goal or to overcome an obstacle, a purposeful action taken by someone with the intent to reach a goal" (Platt & Spivack, 1989). A score of "no means" was given when the subject failed to provide a response necessary to reach the goal. A score of "irrelevant means" was given for a response that was not effective within the context of the story. "No response" was recorded if the participant failed to respond to the story. The MEPS procedure manual (Platt & Spivack, 1989) provides a list of relevant means from which to choose, but scorers are also given the latitude to include other means as relevant if they make that determination. There are no limits on the number of means a respondent can generate. For the four scenarios used in the present study, the average total number of relevant means identified for the scale was 7.89 for college students and 5.58 for non-college adults.

The number of relevant means were tallied for each story then added to calculate the total relevant means score for each participant (the MEPS procedures allow respondents to list as many means per story as they can generate). The manual documents the instrument's construct, discriminant, predictive and concurrent validity. For the present study, a second rater scored the MEPS for 100 of the participants. Interrater reliability for each question (calculated using $\frac{\text{agreements}}{\text{agreements} + \text{disagreements}}$) were .74, .80, .81 and .86. (Wehmeyer & Kelchner, 1994).

As a second indicator of self-regulation, participants completed the *Children's Assertiveness Inventory* (Ollendick, 1984). This is a 14-item assessment examining the degree to which someone

initiates interactions, gives and receives compliments, stands up for his or her own rights and refuses unreasonable requests.

Respondents answer items with a yes or no response. Higher scores reflect more assertiveness. The scale has adequate test-retest reliability (.76) and correlates with other conceptually related measures, including measures of self-concept, locus of control, and role-play assertion (Ollendick, 1984). The scale was identified for use because of its simple reading level. The questions are all pertinent to adults as well as children.

Psychological empowerment was measured using a locus of control scale and two related measures of social self-efficacy and outcome expectancy. Rotter (1966) defined locus of control as “the degree to which a person perceives contingency relationships between his or her actions and outcomes.” People who see themselves as in control of outcomes in their lives have an internal locus of control. Those who perceive outcomes as controlled by others, fate or chance hold an external locus of control. The *Adult version of the Nowicki-Strickland Internal-External Scale* is a widely used measure of general locus of control. The ANS-IE consists of 40 items answered with a "yes" or "no" and yields a final score based on the number of items answered in an external direction. Higher scores reflect more external orientations. The scale has reported split-half reliability figures ranging from .74 to .86, with Test-Retest Reliability figures ranging from .63 to .76. Although normed with adults without disabilities, the instrument has been used to determine locus of control orientation for individuals with cognitive impairments in previous research efforts (see Wehmeyer, 1994a). Wehmeyer (1993; 1994b) determined that the factor structure of the ANS-IE, when used with individuals with mental retardation, was comparable to that for youth and adults without disabilities and that the scale was reliable for use with individuals with mental retardation, despite some problems with acquiescence.

Self-efficacy and outcome expectancy were measured by two related, 10-item scales, the *Self-Efficacy for Social Interactions Scale* and the *Outcome Expectancy Scale* (Ollendick, Oswald & Crowe, 1986). Self-efficacy is the belief that one has the capacity to perform behaviors needed to achieve a specified outcome. Outcome expectancy refers to the belief that if specific behaviors are performed, anticipated outcomes will result. On the self-efficacy measure respondents indicate how sure they are that they could perform a set of socially-related behaviors. Scores range from 10 to 50 with higher scores progressively more adaptive. Questions on the outcome expectancy measure replicate those on the self-efficacy measure, with 10 questions answered on a five-point scale. This scale focuses instead on the expected outcome if

the student actually performed the described behavior. Both scales have adequate reliability (test-retest over a 3-month period of .75 and .78, Ollendick & Schmidt, 1987). Ollendick, Oswald and Francis (1989) used these scales with students who were "at risk" for school failure due to aggression and withdrawal.

The Short version of the *Personal Orientation Inventory* (Jones and Crandall, 1986) was used to measure self-realization. The POI is a 15-item measure of an individual's understanding of his or her emotions, abilities and limitations, and the degree to which he or she is influenced by others or by his or her own motivations and principles. Items are answered with a yes/no response and higher scores reflect higher self-realization. Jones and Crandall (1986) found that the index had adequate test-retest reliability (.69) and internal consistency ($\alpha = .65$) and total scores were correlated with conceptually related measures. Tucker and Dyson (1991) found that the factor structure of the assessment for minority students replicated that of the original.

Analyses

A multiple discriminant function analysis was conducted to identify essential characteristics that are important for distinguishing between people with mental retardation who were self-determined and those who were not. From the original sample of 408 participants, 312 were included in this analysis. The remainder of the sample was excluded due to missing data on one of the eight predictor variables (essential characteristics). Missing data was most frequently the result of a failure to answer all questions on the specified assessment. This sample consisted of 137 males (mean age = 37.55) and 165 females (mean age = 36.68). The sample was then divided into two dichotomous groups based on a frequency distribution of NCS total scores. Scores below the midpoint (30), reflecting higher levels of self-determination, were assigned to the high self-determination group (group high), scores above the midpoint were assigned to the low self-determination group (group low). There were 166 people in the high self-determination group (mean age = 35.69, mean NCS score = 19.11) and 146 in the low self-determination group (mean age = 37.82, mean NCS score = 39.43). It was hypothesized that there would be significant differences between groups on the measures of essential characteristics of self-determined behavior, with participants in the high self-determination group scoring in a more adaptive direction on each instrument.

Results

Univariate statistics generated by the discriminant function analysis procedure indicated differences between predictor variables based on group membership. Nine of the 11 predictor variables reached significance ($p < .05$) when examining differences between groups and in each of those cases the direction of the difference was more favorable for individuals in the high self-determination group. In discriminant analysis the emphasis is on analyzing the variables together instead of just individually. On the basis of all 11 predictor variables, a single discriminant function was calculated with *Chi-square* = 119.29 ($p = .00001$) and omnibus *Wilks' Lambda* = .74159. Examination of the canonical discriminant functions evaluated at group means (or group centroids) showed that this discriminant function distinguished group 1 (high self-determination, function = .59030) from group 2 (low self-determination, function = -.58740), accounting for all between-group variability. Of the total number, 71.5% of the cases were correctly classified using this function. A loading matrix of correlations between predictor variables and the discriminant function and a review of the means of the predictor variables by group indicated that measures of autonomy, particularly the management, social and vocational activities, and self and family care subscales, were the primary variables distinguishing between groups. Accordingly, measures of self-awareness (*Personal Orientation Inventory*), self-regulation (assertiveness and problem-solving), and psychological empowerment (locus of control), were significantly different between groups, and followed in importance.

On all scales the mean scores for group high were more positive than those for group low, as predicted. For the group as a whole, the NCS survey scores were significantly correlated, in the predicted direction, with all measures except the self-efficacy and outcome expectancy measures. The strongest relationship ($r = -.48$) was with the *Autonomous Functioning Checklist*. The other meaningful correlations with the NCS were the *Life Choices Survey* ($r = -.23$), and the MEPS ($r = -.22$). The ANS-IE correlated with the NCS at $r = .17$ and the POI at $r = -.16$. While efficacy and outcome expectancy scores were neither predictive of differences between groups nor significantly correlated with the NCS scores, they were strongly correlated with several of the other measures. For example, the *Self-Efficacy Scale* was significantly correlated with the *Children's Assertiveness Scale* ($r = .21, p = .0001$) and the POI ($r = .29, p = .0001$). The *Outcome Expectancy Scale* was related to the *Life Choices Survey* ($r = .26, p = .0001$) and, to a lesser degree, the assertiveness measure ($r = .19, p = .0001$) and the POI ($r = .17, p = .001$).

Item Identification and Question Generation

The above cited research activities validated the utility of the definitional framework of self-determination for individuals with cognitive disabilities. Project personnel decided, based on these data and other research conducted at The Arc, that *The Arc's Self-Determination Scale* should provide a measure of overall self-determination as well as domain scores reflecting each of the four essential characteristics described in the **Theoretical Issues** section; *Autonomy, Self-Regulation, Psychological Empowerment* and *Self-Realization*. Items were generated in each of the four domain areas using two methods: (1) adapting questions from extant measures of the essential characteristics; and, (2) author generated items. When feasible, the first strategy was used since this provides additional reliability and validity indicators for the questions. The following section discusses the relevant essential elements and item generation in each domain.

Autonomy

Questions 1 - 32 on *The Arc's Self-Determination Scale* reflect the autonomy of students with disabilities. These items were adapted directly from the *Autonomous Functioning Checklist* (Sigafoos, Feinstein, Damond & Reiss, 1988) with permission from the authors of this scale. As described previously, the original version of the AFC was a parent-completed checklist designed to measure the behavioral autonomy of adolescents. The scale has 78 items and is subdivided into four conceptually distinct subscales: Self and Family Care, Management, Recreational Activity, and Social and Vocational Activity. The Self and Family Care subscale includes items that measure basic daily living activities, specifically routine personal care, and family-oriented activities. Each item describes an activity (e.g., Prepares food that does not require cooking; Shops for and purchases family groceries) to which parents respond by selecting one of five alternatives presented in a Likert-type format. These alternatives are: (a) Does not do, (b) Does only rarely, (c) Does about half the time there is an opportunity, (d) Does most of the time there is an opportunity, and (e) Does every time there is an opportunity.

The Management subscale (questions 23 - 42) includes items measuring the degree to which adolescents independently handle their interactions with the environment. This includes self-management activities, the use of available resources, and assumption of personal responsibility for commitments and obligations. Like the Self and Family Care subscale, parents respond to items describing Management activities (e.g., Uses the

telephone and telephone directories, Plans activity for his/her free time) using the five-point Likert-scale ranging from does not do every time. The Recreational Activity subscale, which also uses the Likert response system, contains 16 items that indicate the youth's recreational and leisure time activities. The final subscale, Social and Vocational Activity, contains 20 items that measure the adolescent's social involvement and vocational goals, plans, and activities. This scale has questions phrased to elicit a yes-no response (e.g., Has casual friendships with teenagers of the opposite sex; Works or has worked to earn money by using a special skill).

The AFC is scored by assigning values to each response. Likert responses are scored from zero to four while dichotomous yes-no responses are scored with zero or one. High total and subscale scores indicate that an individual exhibits behaviors associated with autonomy. There are 252 points possible. Sigafos, et al., (1992) found that the subscales had high levels of internal consistency (coefficient alpha from .76 to .86) and provided normative data for a sample of 349 families. Interrater reliability was examined by having both parents in a subset of families (n = 52) complete the survey. Resulting correlation coefficients ranged from a low of .46 for the Self and Family Care subscale to .62 for the Recreation subscale. Lower range correlations were attributed to the five-point Likert-scale and variability in parental perceptions of their adolescent's functioning. There were significant correlations for three of four subscales with chronological age (.36 to .44) suggesting a developmental progression and providing preliminary evidence of concurrent validity for the scale. In addition, there were consistent and significant correlations between each subscale and adolescent leadership experience (.21 to .36) and three of four subscales and number of extracurricular activities (.34 to .45), providing further evidence for construct validity.

The AFC was adapted as a self-report measure for adults with disabilities for use in research activities by rewording instructions and items in first-person tense instead of second person. For example, one item on the AFC originally read 'My teenager keeps (his/her) own personal items and belongings in order (for example, makes bed, puts away own clothing and belongings). The self-report form of the question read 'I keep my own personal items and belongings in order (for example, make my bed, put away my own clothing and belongings).' Virtually all questions were modifiable in this straightforward manner. The five-point Likert format used in the original scale was maintained, but the responses were made singular and in first person (e.g, from 'Does not do' to I do not do'). Although the adaptations were made so that adults with disabilities could report their level of autonomy,

the questions were still relevant to adolescents, since the original AFC had targeted this audience. Because The Arc's research activities indicated that the AFC was a strong contributor to overall self-determination, the authors contacted the developers of the AFC to obtain permission to use modified versions of the questions to measure autonomy. Permission was granted and a factor analysis of the scores from the sample described previously was conducted to identify questions which most strongly clustered together to reflect autonomy for this population.

As described in the **Theoretical Issues** chapter, autonomy has been conceptualized in The Arc's framework of self-determination as reflecting two interrelated outcomes; acting independently and acting on the basis of preferences, beliefs, values and abilities (referred to as the *Choice* subdomain). To capture these two subdomains, we conducted a factor analysis of the item-by-item scores on the AFC collected during the research phase of scale development. To provide further information to users, we included as part of the interpretation of this factor analysis two distinct areas within the *Independence* subdomain and four areas within the *Choice* subdomain. For the *Independence* subdomain, this involved interpreting factors related to Personal Care and Family Oriented Functions as one distinct area and Interaction with the Environment as the second. The *Choice* subdomain was compartmentalized into actions in four areas; (1) Recreational and Leisure Time; (2) Community Involvement and Interaction; (3) Post-School Directions; and (4) Personal Expression. The factor analysis identified eight items clustered together which were interpreted as reflecting Personal Care and Family Oriented Functions and five questions reflecting Interaction with the Environment. Five questions were interpreted as reflecting actions in the area of Recreational and Leisure Time, four questions clustered together reflecting Community Involvement and Interactions, seven questions indicated Post-School Directions, and two questions represented Personal Expressions.

To ensure there were adequate an adequate number of items to represent subdomain areas, yet limit the total number of questions to a manageable few, it was determined that each area should have between 4 and 6 questions, with each subdomain represented by at least 10 questions. Questions were eliminated from each area that had more than 6 items, based on individual weights and redundancy. For the Personal Expression subdomain, the authors generated items that used the AFC answering system. All question wording was modified to be at a fourth-grade level or less and the answering format was adapted to make it more accessible for individuals with cognitive disabilities. The questions measuring autonomy are as follows:

Subdomain: Independence

Routine Personal Care and Family Oriented Functions

1. I make my own meals or snacks.
2. I care for my own clothes.
3. I do chores in my home.
4. I keep my own personal items together.
5. I do simple first aid or medical care for myself.
6. I keep good personal care and grooming.

Interaction with the Environment

7. I make friends with other kids my age.
8. I use the post office.
9. I keep my appointments and meetings.
10. I deal with salespeople at stores and restaurants.

Subdomain: Acting on the Basis of Preferences, Beliefs, Interests and Abilities

Recreational and Leisure Time

11. I do free time activities based on my interests.
12. I plan weekend activities that I like to do.
13. I am involved in school-related activities.
14. My friends and I choose activities that we want to do.
15. I write letters, notes or talk on the phone to friends and family.
16. I listen to music that I like.

Community Involvement and Interaction

17. I volunteer in things that I am interested in.
18. I go to restaurants that I like.
19. I go to movies, concerts, and dances.
20. I go shopping or spend time at shopping centers or shopping malls.
21. I take part in youth groups (like 4-H, scouting, church groups)

Post-School Directions

22. I do school and free time activities based on my career interests.
23. I work on school work that will improve my career chances.
24. I make long-range career plans.
25. I work or have worked to earn money.
26. I am in or have been in career or job classes or training.
27. I have looked into job interests by visiting work sites or talking to people in that job.

Personal Expressions

28. I choose my clothes and the personal items I use every day.
29. I choose my own hair style.
30. I choose gifts to give to family and friends.
31. I decorate my own room.
32. I choose how to spend my personal money.

Self-Regulation

The number of components of self-regulation that can be measured using a self-report indicator like *The Arc's Self-Determination Scale* are limited. It was determined that the important, measurable components of self-regulation were the subdomain areas of Interpersonal Cognitive Problem-Solving and Goal-Setting and Task Performance.

As described previously, The Arc's research activities included the use of the *Means End Problem-Solving* (MEPS) process to measure the degree to which individuals with disabilities who were and were not self-determined possessed skills related to interpersonal cognitive problem-solving. The MEPS uses a story-based format where respondents are provided the beginning and ending of a story. The beginning poses a problem, the ending reports the outcome. The respondent is instructed to tell what happened in the middle of the story that connects the two. In essence, respondents are asked to generate the means by which the outcome was achieved, given the problem. The MEPS process provided a useful model for measuring this outcome, and *The Arc's Self-Determination Scale* uses a similar method to measure interpersonal cognitive problem-solving. However, each of the six stories included on *The Arc's Self-Determination Scale* were generated by the authors of the Scale and the instructions to respondents and scoring are different than that employed by the MEPS. The MEPS allows respondents to generate as many means as they possibly can and these are scored as being relevant or irrelevant. To provide some standardization in the process, we have asked students to generate only the BEST answer for the middle of the story. This answer is then evaluated along a scale of 0 to 2, with 0 being no means or completely irrelevant means and 2 being a relevant means (see **Scoring and Interpretation** chapter). The stories from this section are:

33. **Beginning** --You are sitting in a planning meeting with your parents and teachers. You want to take a class where you can learn to work as a cashier in a store. Your parents want you to take the Family and Child Care class. You can only take one of the classes.

Ending -- The story ends with you taking a vocational class where you will learn to be a cashier.

34. **Beginning** -- You hear a friend talking about a new job opening at the local book store. You love books and want a job. You decide you would like to work at the bookstore.

Ending -- The story ends with you working at the bookstore.

35. **Beginning** -- Your friends are acting like they are mad at you. You are upset about this.

Ending -- The story ends with you and your friends getting along just fine.

36. **Beginning** -- You go to your English class one morning and discover your English book is not in your backpack. You are upset because you need that book to do your homework.

Ending -- The story ends with you using your English book for homework.

37. **Beginning** -- You are in a club at school. The club advisor announces that the club members will need to elect new officers at the next meeting. You want to be the president of the club.

Ending -- The story ends with you being elected as the club president.

38. **Beginning** -- You are at a new school and you don't know anyone. You want to have friends.

Ending -- The story ends with you having many friends at the new school.

The second subdomain in the *Self-Regulation* domain is Goal-Setting and Task Performance. *The Arc's Self-Determination Scale* measures this by asking students to identify a goal in each of three major transition areas (living, working and transportation), and list the steps they will need to take to meet each goal. Students are asked to identify if they have planned for each of these outcomes, and if so, if they have set goals and know what it will take to achieve these goals. Scores are based on the number of goals and tasks students generate.

Psychological Empowerment

As described in the **Theoretical Issues** chapter, psychological empowerment refers to the related constructs of locus of control, self-efficacy and outcome expectancy. These three constructs provide an overall indicator of perceived control. Items within this domain were generated by the authors using a forced-choice format. We selected this format to avoid redundancy between this section and the agree/disagree format in the *Self-Realization*

domain questions and to provide some control for acquiescent responses.

Self-Realization

The items in this section were identified to provide information on several components of self-realization, including self-awareness, self-acceptance, self-confidence, self-esteem and self-actualization. The items were originally drawn from the *Short Index of Self-Actualization* (Jones & Crandall, 1986) based on a factor analysis of scores on this scale from the research sample. This factor analysis yielded a factor containing 11 items that represented the multiple aspects of self-realization. All items from this factor were selected and the remaining four items in this domain were generated by the authors.

Pilot Testing of The Arc's Self-Determination Scale

Once items were identified for inclusion or generated by the authors, a pilot version of the Scale was developed along with guidelines for implementation. This version of the Scale was distributed to teachers working with students with cognitive disabilities in three states, Texas, Alabama and Virginia. There were a total of 261 secondary-age students with cognitive disabilities involved in the pilot-test. Data collected from these sites were subjected to factor analysis. (Details about the factor analysis procedures are provided in section describing the field-testing of *The Arc's Self-Determination Scale*.) Separate factor analyses were conducted for each domain area, with the exception of the second domain, *Self-Regulation*, which does not lend itself to factor analysis. In the *Autonomy* domain the rotated factor matrix indicated six factors. Factor I consisted of 12 items, mainly consisting of items from the *Acting on the Basis of Preferences, Beliefs, Values and Abilities* (e.g., *Choice*) subdomain in the areas of Personal Expression and Recreational and Leisure Time. Factor II consisted of five items primarily from the *Choice* subdomain, Post-School Directions area. Factor III involved four items from the *Independence* domain, primarily from the Interaction with Environment area. Factors IV, V and VI each included three items reflecting Personal Care and Family Oriented Functions (IV), Post-School Directions (V), and Community Involvement and Interaction (VI). Thus, each of the areas postulated under the two subdomains were represented by at least one unique factor.

Factor analysis for the *Psychological Empowerment* domain yielded three factors. Factor I had four items, three of which represented self-efficacy. All of these items had the theme of

focusing on one's ability, which would be expected for a factor related to self-efficacy (the belief in one's ability to accomplish a task). Factor II also included four items, two of which applied to outcome expectations, and one each to locus of control and self-efficacy. This factor had as a common theme choice and the opportunity to experience choice, once again consistent with a factor estimating outcome expectations. Factor III consisted of four items reflecting locus of control. Of the total number of 16 items, only four were not interpretable within these three factors. These clustered together in two groups of two, one representing a general belief about outcomes related to interpersonal relationships and the other relating to the role of luck in one's life. Again, these factors adequately represented the constructs items were selected to represent.

The factor analysis for domain 4, *Self-Realization*, yielded three factors incorporating 11 of the 15 items. Factor I included five items, four of which were interpretable as representing self-esteem and self-confidence. Factors II and III included three items each, with both factors interpretable as reflecting self-knowledge and self-awareness.

The results of these factor analyses indicated that the instrument had adequate construct validity and factors within each domain roughly reflected the constructs they were identified to measure. A correlation analysis at this phase supported these conclusions. Relationships between total and subscale scores from *The Arc's Self-Determination Scale* and conceptually related measures were examined. The relationship between the *Nowicki-Strickland Internal-External Scale*, a locus of control measure described previously, was most highly correlated with the psychological empowerment subscale scores ($r = .41$, $p = .0001$) while scores from the *Intellectual Achievement Responsibility Scale (IARQ)*, a measure of student attribution of responsibility for academic success and failure, correlated highly with both the self-regulation score ($r = .46$) and the *Psychological Empowerment* score ($r = .48$). Based on these analyses and feedback from pilot-test sites, the Scale was subjected to a more comprehensive, wider field-test.

Field-Testing of The Arc's Self-Determination Scale

The field-test of the Scale involved 500 students from five States; Texas, Virginia, Alabama, Connecticut and Colorado. The demographic characteristics of this group are presented in **Chapter 5**. The majority of the students in the sample were adolescents with mild mental retardation and learning disabilities. A revised draft of *The Arc's Self-Determination Scale* was distributed to teachers from each of these school districts. These protocols were

completed, returned to The Arc and scored by project personnel. Data were analyzed to determine the validity and reliability of the instrument. Only the factor analyses are presented in this section, with other findings reported in the **Norms** and **Reliability and Validity** chapters. Data were factored using a principal components analysis (Norusis, 1976). Factors producing eigenvalues greater than 1.0 were selected for further analysis and remaining factors were subjected to varimax rotation with the resulting factor pattern analyzed for content. Criterion for item inclusion was a factor loading of at least .30. A minimum of three items was required to establish a coherent theme for a factor.

Factor analysis for the *Autonomy* domain yielded seven factors with eigenvalues greater than 1.0, accounting for 52% of the variance. The rotated factor structure yielded five factors, accounting for 30 of the 32 items. **Table 3.1** lists each factor with its pertinent items. Factor I consisted of 12 items. Nine of these twelve were in the *Choice* domain. Four of the first five items, sorted by weights, were from the Personal Expression area of the *Choice* subdomain. Three of the remaining items were from the *Choice* subdomain, Recreation and Leisure area. This factor was best interpreted as representing student’s actions based on preferences, beliefs, values and abilities in the area of personal expression, with some interaction effects from acting on these principles in one’s recreational and leisure time.

Table 3.1: Factors by Question # for Factor Analysis within Autonomy Domain

Factor I	Factor II	Factor III	Factor IV	Factor V
29	13	19	27	10
32	22	20	26	5
28	11	15	25	8
16	23	21	24	1
31	7			
30	17			
14				
4				
6				
18				
12				
9				

Factor II consisted of six items, the majority of which were in the *Choice* subdomain (5/6). The coherent theme for this factor related more to question content than subdomain areas, although the theme of choice and acting on the basis of preferences, beliefs,

values, and abilities dominated. Most items reflected student functioning in school, either in the Recreation and Leisure Time area or the Post-School Directions area. Factor III consisted of four items, three of which were from the Community Interaction and Involvement area of the *Choice* subdomain. Factor IV consisted of four items from the Post-School Directions area. Factor V consisted of four items from the *Independence* subdomain.

Factor analysis in the *Psychological Empowerment* domain yielded five items with eigenvalues greater than 1.0. The rotated factor structure yielded three factors accounting for 12 of 16 items. These factors matched those from the analysis in the pilot study very closely. **Table 3.2** provides item by factor structure for this analysis. Factor I consisted of five items, three of which reflected self-efficacy indicators. The overall content for all five items reflected one's ability to perform behaviors, again consistent with a factor interpreted as representing self-efficacy. Factor II contained three items, two of which were related to outcome expectations and all of which reflected the belief that students had choices that they could exercise or not. Factor III contained four items, all reflecting locus of control.

Table 3.2: Factors by Question for Psychological Empowerment Domain

Factor I	Factor II	Factor III
54	56	42
50	57	43
48	53	44
52		45
46		

The initial solution for the *Self-Realization* domain yielded five items with eigenvalues in excess of 1.0, accounting for 49.3% of the variance. The rotated structure yielded two factors, depicted in **Table 3.3**. The first factor included six items that related primarily to self-esteem and self-confidence, the second factor consisted of three factors related to self-awareness.

Table 3.3: Factors Question Number for Self-Realization Domain

Factor I	Factor II
68	63
72	61
64	59
71	
70	

A final factor analysis was conducted on items from all three domains. The initial solution yielded 18 factors with eigenvalues in excess of 1.0 accounting for 56.4% of the variance. The rotated solution yielded five factors, three which were interpreted as representing a unique domain area, and two which combined items from more than one domain area. Factor I had 32 items, 28 of which were from the *Autonomy* domain. Factor II had 10 items, 4 from the *Psychological Empowerment* domain, and 3 each from the *Self-Realization* and *Autonomy* domains. Factor III had five items, 4 from the *Psychological Empowerment* domain. Factor IV had six items, 3 from the *Self-Realization* domain, 2 from the *Psychological Empowerment* domain, and one from the *Autonomy* domain. Factor V consisted of 7 items, 5 from the *Self-Realization* domain.

These analyses support the construct validity of *The Arc's Self-Determination Scale* as a valid measure of self-determination as a multifaceted construct. Although factors do not unequivocally replicate the specific subdomains and areas that form the structure of the assessment, they do closely approximate the structure. There is enough theoretical overlap between domain areas to account for the differences between factor solutions and hypothesized areas. The factor analysis of the three domains together illustrates this fact. Three factors were clearly interpretable within the hypothesized domains, while two factors combined items from multiple domains.

Based on these analyses it was concluded that *The Arc's Self-Determination Scale* has adequate construct validity. Prior to the layout of the final protocol, some alterations to the wording in several questions were made based on feedback from educators and students involved in the field-test. These changes did not alter the content or meaning of questions or responses.