

**The Arc's  
Self-Determination  
Scale-  
Adolescent Version**

**Procedural  
Guidelines**

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*For people with intellectual  
and developmental disabilities*

**The Arc of the United States**  
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*Authors' Note April 2014: This updated version of the Procedural Guidelines includes more information about the construct of self-determination, additional citations of studies using the measure, and information about the Adult Version of the SDS - guidelines and scoring information. The authors acknowledge the contributions of Margaret Lawrence and Nancy Bolding for their contributions to this work.*

# Permissions

Questions from Section 1 of *The Arc's Self-Determination Scale* were adapted, with permission from the authors, from the *Autonomous Functioning Checklist*. This instrument, developed by David Reiss, M.D. and colleagues at The George Washington University, is in the public domain. The Arc gratefully acknowledges the generosity of the authors. Information about the AFC can be found in:

Sigafoos, A.D., Feinstein, C.B., Damond, M., & Reiss, D. (1988). The measurement of behavioral autonomy in adolescence: The Autonomous Functioning Checklist. In C.B. Feinstein, A. Esman, J. Looney, G. Orvin, J. Schimel, A. Schwartzberg, A. Sorsky & M. Sugar (Eds.), *Adolescent Psychiatry, Volume 15* (pp. 432 - 462). Chicago: University of Chicago Press.

Questions from Section 4 of *The Arc's Self-Determination Scale* were adapted, with permission from the author, from the *Short Index of Self-Actualization*, which originally was published in a dissertation by Alvin P. Jones. The Arc extends its appreciation to Dr. Jones for his generosity. Information on the *Short Index of Self-Actualization* can be found in:

Jones, A. & Crandall, R. (1986). Validation of a short index of self-actualization. *Personality and Social Psychology Bulletin, 12*, 63 - 73.

# Chapter 1

## Introduction

***The Arc's Self-Determination Scale-Adolescent Version***, developed in 1995, is a self-report measure of self-determination designed for use by adolescents with disabilities. The scale's development was based upon a theoretical framework in which self-determined behavior is defined as "*volitional actions that enable one to act as the primary causal agent in one's life and to maintain or improve one's quality of life*" (Wehmeyer, 2005, p. 117). Within this model, an act or event is self-determined if the individual's actions reflect four *essential characteristics*: (1) the individual acts autonomously; (2) the behaviors are self-regulated; (3) the person initiates and responds to event(s) in a "psychologically empowered" manner; and (4) the person acts in a self-realizing manner (Wehmeyer, Kelchner & Richards, 1994). These *essential characteristics* emerge as people develop and acquire a set of component elements of self-determined behavior (e.g., choice-making, decision-making, problem-solving, goal-setting and task performance, self-observation, evaluation and reinforcement, internal locus of control, positive attributions of efficacy and outcome expectancy, self-awareness, self-knowledge). ***The Arc's Self-Determination Scale-Adolescent Version*** operationalizes this framework to provide a tool for adolescents with disabilities, educators, and researchers. The remainder of this chapter discusses the potential use and misuse of the Scale, ways to improve the reliability and validity of self-report measures, and identifies user qualifications. For more information about the theoretical framework upon which the scale is based, see:

Wehmeyer, M. L. (1999). A functional model of self-determination: Describing development and implementing instruction. *Focus on Autism and Other Developmental Disabilities, 14*, 53 – 61.

Wehmeyer, M.L. (2005). Self-determination and individuals with severe disabilities: Reexamining meanings and misinterpretations. *Research and Practice for Persons with Severe Disabilities, 30*, 113-120.

Wehmeyer, M.L., Abery, B., Mithaug, D.E., & Stancliffe, R.J. (2003). *Theory in self-determination: Foundations for*

*educational practice*. Springfield, IL: Charles C Thomas Publisher, LTD.

Wehmeyer, M.L., Agran, M., Hughes, C., Martin, J., Mithaug, D.E., & Palmer, S. (2007). *Promoting self-determination in students with intellectual and developmental disabilities*. New York: Guilford Press.

## Use of *The Arc's Self-Determination Scale-Adolescent Version*

Assessment has multiple uses in education, including providing data for diagnostic and placement decisions, evaluating individual strengths and limitations, planning educational and treatment strategies, and evaluating intervention effectiveness. As with any such process, assessment can be used inappropriately—for example, to exclude individuals from given services or to maintain outdated or overly intrusive interventions or placements. When considering the assessment of self-determination, there is a need to be cognizant not only of the possible contributions of such an effort, but the potential limitations of the exercise as well. These issues are compounded when the assessment in question is a self-report measure. *The Arc's Self-Determination Scale-Adolescent Version* was designed to be a tool to enable and empower young people to become more self-determined by providing a vehicle by which they can, with appropriate supports and accommodations: (1) evaluate their own beliefs about themselves and their self-determination; (2) work collaboratively with educators and others to identify individual areas of strength and limitations related to self-determination goals and objectives; and, (3) self-assess progress in self-determination over time. In addition, *The Arc's Self-Determination Scale-Adolescent Version* can benefit adolescents with disabilities by providing researchers a tool to evaluate which environments, instructional strategies, and curricular materials enhance or impede self-determination.

*The Arc's Self-Determination Scale-Adolescent Version* was developed, first and foremost, to provide a voice for youth with disabilities in this important area. There is, however, concern regarding the use of self-report measures, particularly with people with intellectual disability. The **Scale Construction and Development** chapter provides a detailed discussion of the procedures used to determine the most reliable and valid formats to measure self-determination. An overview of the use of self-report measures and methods to improve their validity, however, may be useful for individuals wanting to utilize the Scale.



## Improving the Validity of Self-Report Measures

There are, as mentioned, concerns with the reliability of self-report measures for use with people with intellectual disability. *The Arc's Self-Determination Scale-Adolescent Version* has been constructed in such a manner to limit problems with reliability and validity. Assor and Connell (1992) provided a number of suggestions for improving the validity of self-report measures:

- Remember and communicate that what you want is for respondents to report what they truly believe about themselves. Accurate reports do not necessarily reflect real or actual performance.
- Ask respondents in a way that helps them understand what you are after in the assessment process. There is nothing hidden or secret about the process. We are not seeking some psychologically defined variable but simply what the person feels or believes.
- Emphasize that, no matter what participants answer, as long as it is truly what they believe or feel it is the right answer. Ensure confidentiality and put students at ease.
- Communicate to participants what the information will be used for and why they are being asked these questions. Get the person involved in the interpretation process as well as the assessment process.
- Groups with too many participants are a problem because respondents feel that others might see their answers. Keep groups as small as possible.

The key to ensuring valid self-reports is to convince participants that what they believe is very important. To do so, one must genuinely believe this. This means acting on people's perceptions in a manner that is respectful, nonjudgmental, and promotes active involvement in one's surroundings and activities.

## Inappropriate Uses of The Arc's Self-Determination Scale-Adolescent Version

*The Arc's Self-Determination Scale* was designed for two principal purposes; (1) to assess individual strengths and areas of support need in self-determination and facilitate involvement in planning and intervention strategies; and, (2) as a tool to conduct research on self-determination with youth and young adults with disabilities. *The Arc's Self-Determination Scale-Adolescent Version* has been constructed and normed with these uses in mind

and other uses are inappropriate. It is important to stress that the Scale is not a diagnostic or prescriptive tool. At the very least, the difficulties with reliability and validity from self-report measures make diagnostic, prescriptive, or placement decisions based on this data inappropriate and unprofessional. Although scoring provides opportunities for comparisons between the respondent and the sample used to provide normative data, we make no assumption about a “normal” or “expected” amount of self-determination. Instead, when used to identify student strengths and limitations, users should look at repeated measures across time and examine individual improvements.

One reason it is unfair or inappropriate to make decisions about people based on scores from either version of the Scale is that the assessments makes no attempt to identify the reasons for the person’s level of self-determination, whether high or low. Becoming self-determined requires both the capacity and the opportunity to do so. Thus, limited or low levels of self-determination may be a result of limited capacities to perform skills related to self-determination; inadequate opportunities to develop, acquire or employ these skills; or both. The end result is the same, but intervention to address the issue is different. ***The Arc’s Self-Determination Scale-Adolescent Version*** is a vehicle for eliciting discussion about the cause of a low level of self-determination, if appropriate, and potential interventions to remedy this situation, but not to identify such causal relationships. It is therefore inappropriate to assume that low scores on ***The Arc’s Self-Determination Scale-Adolescent Version*** reflects problems that are only person-based. For a more detailed discussion of these issues, see the resources provided in the Introduction, previously.

A final consideration when using ***The Arc’s Self-Determination Scale-Adolescent Version*** is the difference between group scores and individual performance. Scores that fall in the extremes are generally minimized when one has a large group to consider. The sheer number of scores in a study will minimize the effect of a few outlier scores on the mean score. Although the Scale’s administration procedures attempt to control for these circumstances, it is not possible to keep these factors completely out of the assessment process. It is critical that the person working with the person completing the Scale be alert to factors that might impact that person’s ability or willingness to answer in a valid manner. In addition, however, it is the responsibility of this person to explore the validity of scores that are considerably higher or lower than the norm to ensure that an outside agent was not in action. This can only be accomplished working with the respondent as an equal partner.

## Appropriate Uses of The Arc's Self-Determination Scale-Adolescent Version

*The Arc's Self-Determination Scale-Adolescent Version* has potential to assist students and educators or adults and support persons in their efforts to promote self-determination. The Scale has utility as one component in an overall effort to promote self-determination by involving the young person in his or her planning and decision-making process. In addition, the Scale can provide information needed to develop goals and objectives related to self-determined behavior. Items on the Scale were written to be accessible to the greatest extent appropriate. The Scale has been field-tested and validated with students with intellectual disability, learning disabilities, emotional and behavioral disorders, and autism spectrum disorders receiving special education services around the country. The administration process includes the latitude for examiners to provide a series of accommodations, from reading the test items and explaining various words and concepts for the person to transcribing responses if necessary (see **Administration** chapter).

The first potential use of *The Arc's Self-Determination Scale-Adolescent Version* is to generate discussion about items the young person completing the Scale finds interesting, problematic, or wants to discuss more broadly. Ideally, a young person could use the Scale with minimal instruction from another person. Respondents will vary considerably, however, in the level of support they need to complete the assessment. Many people with limited support needs should be able to work through the Scale independently or semi-independently. This process, in and of itself, has merit. The authors' experiences with the Scale indicate that people with disabilities are motivated to engage in the activity because it focuses on their interests, abilities, and feelings. On numerous occasions, respondents have indicated that no one had ever asked them about their feelings about choices in their lives or their thoughts about decisions. If a person seems to be particularly sensitive about or focused on "scores" and "comparisons" between themselves and others, the Scale could be completed, not scored, and each topic area could form the basis for discussion about the person's beliefs, desires, abilities, areas of support needs, and future plans.

The second use of the Scale involves comparing Total, domain and subdomain scores with Scale norms and, more importantly, examining individual strengths and limitations across the domains. The normed data is provided only as a point of comparison, not so that adolescents who perform below the mean should feel a sense

of failure or otherwise use the information in a pejorative manner. Normed data can provide teachers and adolescents completing the Scale with honest feedback upon which to base future efforts to promote self-determination.

In this light, respondents could work collaboratively with the examiner to score the assessment (because of the need to make the assessment usable as a research tool, its scoring is most likely too complex for self-scoring) and discuss the outcomes, both in comparison with data from the Scale norms and looking at individual strengths and areas of need. During this process, examiners should refer back to the questions used in each domain and subdomain to find examples for the person answering the Scale to understand what they do well and where they might need additional focus. Such discussions should be supportive, positive, and empowering, not negative and critical.

Any use of *The Arc's Self-Determination Scale-Adolescent Version* should focus on potential goals and objectives for enhancing self-determination. The **Scoring and Interpretation** chapter of this guide provides a detailed description of each domain and subdomain and how scores should be interpreted. It is not realistic to turn directly to Scale questions to generate goals and objectives because the items were selected to be representative of a broader area. For example, the first six questions form a subdomain under the *Autonomy* domain called *Independence: Personal Care and Family-Oriented Functioning*. As is described in the **Scoring and Interpretation** chapter, the six questions reflect performance in self-care and general family focused activities, like shopping, cleaning and cooking. If a person scores low based on these six questions, it is likely that he or she is not performing other similar activities. Thus, instructional emphasis would focus broadly on the person learning and the opportunity to engage in the types of activities that the Scale items represent.

Beyond evaluation and planning purposes, *The Arc's Self-Determination Scale-Adolescent Version* has been used extensively as research instruments. Efforts to promote self-determination benefits from the means to evaluate the efficacy of interventions and the impact of environments and experiences on student self-determination. *The Arc's Self-Determination Scale-Adolescent Version* has been standardized to allow such use by educational and psychological researchers with both youth and young adult populations. It is important that researchers recognize that the Scale is a measure of a person's perceptions of self-determination. The **Reliability and Validity** chapter of this guide provides information on internal stability, construct and content validity and other information useful to researchers.

## User Qualifications

The end-users of the Scale are intended to be people with disabilities or educational and psychological researchers. However, we recognize that if *The Arc's Self-Determination Scale* is to be used to enable and empower people with disabilities to become more self-determined, there will need to be an intermediary agent, in most cases a teacher or support person. For all practical purposes, it will be that person who identifies the Scale as educationally useful, obtains copies of this guide and Scale protocol, provides the support and accommodations necessary for the student to complete the Scale in a reliable and valid manner, and facilitates the discussion with the student regarding how to use the information the Scale provides. The examiner's role in this process is as critically important as it is in more traditional models of instruction for youth and adults.

As such, we have identified teachers, adult support staff, psychologists, and researchers as the primary "users" of *The Arc's Self-Determination Scale-Adolescent Version* and direct comments regarding user qualifications to these parties. Use of the Scale does not require specific credentials or training in psychometric evaluation. Because the Scale is a self-report measure and the process has been designed to elicit individual involvement and discussion, it is inadvisable to be too prescriptive about its implementation. The Scale has been field-tested with both group and individual administration and can be equally suited for either circumstance. The most important "qualifications" for users are difficult, if not impossible, to teach or train: (1) acceptance of the importance of the involvement of individuals with disabilities in planning and decision-making; (2) commitment to involving the person with a disability as an equal partner in the process of goal setting and decision making; and, (3) respect for people with disabilities as equal and contributing members of our society. In addition to these characteristics, it is essential that the user be familiar with the Scale and its implementation. Scale users are encouraged to read this procedural guide to gain an understanding of the construct the assessment attempts to operationalize and to gain a full understanding of Scale administration, scoring and interpretation.

# Chapter 2

## Scale Construction and Development

The construction and development of the Adolescent version of *The Arc's Self-Determination Scale-Adolescent Version* followed the process described in this chapter.

### Identification of Scale Domains and Subdomains

#### Procedures

To identify domains and subdomains for the Scale, a series of structured interviews with (primarily) adults with intellectual disability 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 intellectual disability 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 people with intellectual disability with limited support needs. 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 difficulty for people with extensive support needs and, practically, precluded their involvement in research activities.

### **Measuring Self-Determined Behavior**

Because there were no measures of self-determination available in 1995 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 3,000 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).

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 (1995) 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 (Sigafos, 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 intellectual disability. 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 intellectual disability 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 intellectual disability may 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 intellectual disability, 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 agreements/agreements + 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 people with intellectual disability, was comparable to that for youth and adults without disabilities and that the scale was reliable for use with individuals with intellectual disability, 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 et al., 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 person 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 youth 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 a person'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 youth 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 intellectual disability 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 functional model of self-determination. 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: *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 people with disabilities. These items were adapted directly from the *Autonomous Functioning Checklist* (Sigafoos et al, 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 to does 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-type 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.

Autonomy has been conceptualized in *The Arc's Self-Determination Scale-Adolescent Version* 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 on the Scale's Adolescent version 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 self-report indicators like *The Arc's Self-Determination Scale-Adolescent Version* is 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-Adolescent Version* uses a similar method to measure interpersonal cognitive problem-solving. However, each of the six stories included on *The Arc's Self-Determination Scale-Adolescent Version* 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 respondents 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 on the Adolescent Version 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 stories from this section on the Adolescent Version are:

33. **Beginning** --You are sitting in a planning meeting with your boss. You want to learn to work the computer. Your boss wants you to learn to

work a cash register. You can only learn one of them.

**Ending** -- The story ends with you learning to work a computer.

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 job one morning and discover you do not have some of the papers you need. You are upset because you need those papers to do your job.

**Ending** -- The story ends with you using the papers to do your job.

37. **Beginning** -- You are in a committee at work. The committee chair announces that the members will need to elect new officers at the next meeting. You want to be the chair person of the committee.

**Ending** -- The story ends with you being elected as the committee chair person.

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

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

The second subdomain in the *Self-Regulation* domain is Goal-Setting and Task Performance. *The Arc's Self-Determination Scale-Adolescent Version* measures this by asking respondents to identify a goal in each of three major transition/life areas (living, working and transportation), and list the steps they will need to take to meet each goal. Respondents 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 the person generates.

## **Psychological Empowerment**

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-Adolescent Version**

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-Adolescent Version*.) 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 Adolescent version of ***The Arc's Self-Determination Scale-Adolescent Version*** 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 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-Adolescent Version**

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 a subsequent chapter. The majority of the students in the sample were adolescents with intellectual disability with limited support needs or students with learning disabilities. A revised draft of the Adolescent version of *The Arc's Self-Determination Scale-Adolescent Version* 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 2.1** 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 a person'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 2.1: Factors by Question # for Factor Analysis within Autonomy Domain**

<b>Factor I</b>	<b>Factor II</b>	<b>Factor III</b>	<b>Factor IV</b>	<b>Factor V</b>
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 2.2** 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 people had choices that they could exercise or not. Factor III contained four items, all reflecting locus of control.



**Table 2.2: Factors by Question for Psychological Empowerment Domain**

<b>Factor I</b>	<b>Factor II</b>	<b>Factor III</b>
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 2.3**. 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 2.3: Factors Question Number for Self-Realization Domain**

<b>Factor I</b>	<b>Factor II</b>
68	63
72	61
64	59
71	
70	
65	

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-Adolescent Version*** 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-Adolescent Version* 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 one of the field tests. These changes did not alter the content or meaning of questions or responses.

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# Chapter 3

## Administration

The administration and scoring of *The Arc's Self-Determination Scale-Adolescent Version* requires minimal special preparation: familiarity with the questions on the Scale, their appropriate use, and knowledge about the person with whom the Scale is being used. It is important that the teacher or person working with the respondent with a disability be familiar with the items, the directions that precede each section and the scoring procedures. Users are strongly encouraged to read Chapter 1: **Introduction** to identify procedures that enhance the reliability and validity of self-report measures like *The Arc's Self-Determination Scale*. The Scale was designed, field-tested, and validated for use with people with intellectual disability, primarily. Subsequent research has, however, established the validity and utility of the Adolescent Version of the scale with adolescents with learning disabilities, autism and autism spectrum disorders, and emotional or behavioral disabilities through factor analytic studies, though no separate norms exist for these groups. The Scale was designed and field-tested for individual or group administration. Several factors will influence how the Scale is completed, but two important factors are the person's reading and writing skills. The Scale can be administered orally, and in group situations it is often preferable to do so. Reading each item aloud may ensure that respondents understand what is being requested. If a person has difficulty writing responses, particularly to items in Section 2 requiring written responses, others can transcribe the person's response.

### Tips for Administration of the Scale

To ensure adequate reliability and validity, it is important that the following procedures for administering the Scale be adhered to as closely as possible. The following guidelines are recommended:

1. Individuals administering *The Arc's Self-Determination Scale-Adolescent Version* should become thoroughly familiar with each domain and administration instructions for each. An assessment schedule at school should be arranged that minimizes disruption to students' school routines. It is permissible to involve as many as 15 respondents at a time in the assessment process if the reading abilities of the group warrant this and there are

enough people available to provide the needed support. Even in group settings, some people can proceed at a self-paced speed and the Scale administrator or examiner can provide individual support. However, for some respondents, it may not be appropriate to complete the assessment in a group setting. In such cases, the administrator of the Scale should work one-on-one with respondents to complete the items.

2. Individual assessment should be scheduled to be completed within one session. If that is not feasible, a second session can be held to complete the remaining questions. Scale administrators should set aside between thirty minutes and one hour for respondents to complete the items on the Scale.
3. For people with more extensive support needs, it may be necessary to read questions and provide accommodations for answering the questions. This will take additional time to ensure that the person finishes the Scale in one session.
4. The standardized method of examination included BOTH oral and written presentation of all questions. This was done to account for the considerable differences in reading comprehension and vocabulary of respondents involved in the process. If people with more advanced reading abilities are frustrated by oral presentation, the examiner might tactfully explain the reasons for using this method of presentation or encourage people to complete the Scale by themselves after the directions are read in full to them.
5. During oral administration respondents may need to be reminded of the instructions (on each protocol) for the specific domain being assessed at that time.
6. People taking the Scale should be seated so that they can do their own work. It is important for the examiner to be sure people do not look at and duplicate the responses of others. Otherwise, invalid response data will be collected.
7. Before respondents begin, they should be informed why they are completing the Scale, what will be done with the results, and the importance of answering honestly. It is essential to convey this information without making the respondent feel anxious and without overstating the Scale's importance. Students should be assured that they are completing the Scale to help them and people who support them to better understand how they can become more self-determined. Teachers should emphasize a team approach to the process, restating the student's opportunity to take more control over his or her educational planning process. Directions should be read aloud. Each Scale item, its

answer choices, and any other accompanying information should be read once unless the examiner has observed some respondents have not comprehended an item and chooses to repeat that item. If you elect to allow respondents to take the Scale by themselves, be certain they understand the instructions for each domain section.

8. It is acceptable for the examiner to restate the directions, expanding or defining them if necessary, to define words within the questions that respondents find problematic or to explain what the various answering options mean. It is important that the examiner not be directive when describing options for the individual taking the Scale to answer, but simply provide information to the person.
9. If respondents do not understand vocabulary used in the test items, the examiner should give a brief definition of the word(s) in question. In so doing, it is imperative that the examiner not place undue emphasis on any outcome or answer or influence the individual's answer in any way.
10. In sections 3 and 4, respondents are asked to choose one of two categories (yes/no or agree/don't agree) that describe how they feel about themselves. A person may feel that both or neither answer describes them. Teachers should assure the person that this is not uncommon, but they should choose the one that BEST indicates what they think or believe.
11. It is important that the person respond in a manner that accurately and honestly reflects his or her beliefs and not in a manner which is perceived as socially appropriate. Stress that there are no right answers, that people answering the Scale should respond with what they believe to be true and that all responses are strictly confidential.

# Chapter 4

## Scoring and Interpretation

### Scoring *The Arc's Self-Determination Scale-Adolescent Version*

Scoring *The Arc's Self-Determination Scale-Adolescent Version* involves the determination of raw scores for all domain and subdomain areas, calculation of a total score and interpretation of these raw scores based on conversion tables. The back page of each protocol contains a scoring sheet onto which raw and converted scores can be copied. Converted percentile scores can also be graphed to track individual progress and for comparison with data from the sample norms.

#### Autonomy

The questions in the *Autonomy* domain use a response method where respondents reply to each statement with one of four choices:

- I do not even if I have the chance.
- I do sometimes when I have the chance.
- I do most of the time I have the chance.
- I do every time I have the chance.

Respondents should reply to only one of these choices on each question. The item is assigned a score based on the response category, as follows:

- I do not even if I have the chance..... 0 points
- I do sometimes when I have the chance..... 1 point
- I do most of the time I have the chance..... 2 points
- I do every time I have the chance..... 3 points

Spaces are provided on the protocol into which a scorer can record the subtotal scores. Once all subtotal scores are determined, a total *Autonomy* score can be calculated by adding each of these subtotals. There are 96 points possible in the *Autonomy* section. Low scores represent low levels of autonomy, higher scores indicate higher levels of autonomy.



## Self-Regulation

The *Self-Regulation* section consists of two subdomains, with questions which require students to write (or dictate) answers. In the Adolescent Version - Section I involves story-based items where the student identifies what he or she considers the best solution to a problem. Responses are scored on a scale of 0 to 2 points, depending on the effectiveness of the solution to resolve the problem. A “0” score means that the person either gave *no answer* or the solution the person gave would fail to achieve the indicated ending to the story. A “1” score indicates that the answer the person provided was okay, but might have limited utility to achieve the ending identified. A “2” score indicated that the answer provided was an acceptable, adequate way to achieve the indicated ending. Due to the nature of this process, scorers must use some judgment on the appropriateness of a respondent’s answers, including how they relate to geographic, cultural, and socioeconomic differences among respondents. A score of “2” does not represent an “optimal” answer, but simply an answer that would achieve the ending.

To facilitate the scoring process for this section, each question from the Interpersonal Cognitive Problem-Solving subdomain (questions 33 - 38) will be addressed individually, with suggestions as to what to look for in scoring items and examples of answers from the normative sample. These examples are not intended as guidelines, simply examples of the types of answers in each category.

### Interpersonal Cognitive Problem-Solving Subdomain Items Examples

#### ***Question 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.

#### ***Components to look for when scoring:***

**0 points** - Student does not address problem, offers no means to resolve differences or simply restates given information without resolving situation.

**1 point** - Response indicates an action on the part of a student or another, but does not suggest how to

resolve differences, such as simply stating that “I will take the class I want”.

**2 points** - Answer addresses conflict resolution, possibly through compromise and negotiation, identifies actions on both sides.

**Examples of responses:**

**0 points:**

“I would do what I need to learn more.”

“You want to take a class where you can learn to work as cashier.”

“Get mad.”

“I like my teacher and book and math.”

“I want to take family and child care class.”

“I want to take art.”

“I will like to work as a cashier at a store because my grades are good.”

“My parents want me to take the child care class. I want to be a cashier in a store.”

“We want to take a class test.”

“Cause you want the best out of life so you can get a good job and make something of yourself.”

**1 point:**

“Well, you tell your parents that you want to take that class really bad.”

“Compromise with them saying there will always be next year.”

“My Mom and Dad are cool, I ask for the job and they said OK.”

“Make my own choices.”

“My parents let me make my own decisions.”

“I told my parents I wanted to take the class.”

“I do what I want to.”

“I don’t like children - tell teacher I’d quit school.”

“Talk to parents/teacher/parents and teacher.”

“I ask the teachers to put me in next year.”

**2 points:**

“I told my parents that I would rather do something I enjoy. And ask them please can I take the cashier class.”

“Tell my parents I want to take that class better because I’m interested in it.”

“Talk to them. Try to convince them.”

“I’d say I need this class. I’d convince them.”

“So I take the class that I want to take first and learn how to cashier and after I am finished with that class I will take the other.”

“You express your desire to take the cashier class and explain what you want to your parents, who respect your decision because they feel you are mature enough.”

“My teacher and I got together and we talked about what should take and adjusted for me to take the cashier’s class.”

“I will tell my parents that I want to take the cashier class first cause I always wanted to take cashier class. I might take other classes later.”

***Question 34:***

**Beginning** -- You hear a friend talking about a new job opening at the local bookstore. 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.

***Components to look for when scoring:***

**0 points** - Student does not offer means to get a job, restates given information.

**1 point** - Response indicates action only on the part of one party (e.g., student, friend, boss) in pursuing job.

**2 points** - Answer provides actions to pursue job and action by employer in hiring.

***Examples of responses:***

**0 points:**

“I would let my friend try first.”

“I will like to work at a bookstore just to have a very nice job.”

“In a couple of days you worked at the bookstore.”

“I love to read books and write stories. I would like to be an author.”

“I went in with him.”

“I want an application, I won’t fill it out and take it but I won’t want them to call me.”

“I got the job.”

“I like to work in the bookstore. My friend opening the bookstore.”

“I will take them to a library.”

“I want to stack books and work as a cashier.”

“I learn how to give correct change and give back and take marketing class.”

**1 point:**

“I will get information about the job and work very hard on trying to get it.”

“I’d go see how much they would pay. Wages, and see what the hours are and how many days a week I would work.”

“You go in and ask for the job.”

“I go to the bookstore and fill out an application.”

“Put in an application.”

“I get info from my friend and apply for the job.”

“I decided to look for the job and get the job.”

“Check if you know how to do books and stuff.”

“You would go to the bookstore. Then you would ask them for a job to work there.”

“Ask friend where it is and apply for the job.”

**2 points:**

“You submitted an application, they accepted you and now you are working and enjoying what you are doing.”

“One of my friends, he is working there. I ask him to get me a job there. He asks the boss if one of my friends can work with us. The boss said yes, tell your friend come down tomorrow we will give him the job for a week to see if he can hold it. My friend calls and said yes, yes you got the job.”

“I went with my friend to the bookstore for an interview. A week later I got a call to go to the new job opening.”

“You go to the store, fill out application, talk to manager, go for the interview, make a good impression by being groomed and the manager hires you.”

“I had to sign some paper and take some kind of test and then I asked the boss. That is how I got the job.”

“I called and went in for an interview for the job and the Librarian hires me for the job and then I start working.”

“I go and fill out application to work and talk to boss. Boss hires me!”

“Learn how to do the job. Tell manager you want the job. He says OK.”

“I went to the bookstore and got an application and fill it out and talk to the bookstore owner and I got hired.”

“I put in application and manager hires me.”

**Question 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.

**Components to look for when scoring:**

**0 points** - Restating given information, no effort to address conflict.

**1 point** - Limited attempt to initiate contact with friends or counselor.

**2 points** - Initiation of discussion/dialogue with some aspect of working out a resolution and getting along afterward.

**Examples of responses:**

**0 points:**

“My friends are mad at me because I ate all the caramel corn pop up and I said it was good popcorn.”

“I would not talk to them until they talk to me.”

“Do nothing.”

“Maybe your friends were just in a bad mood.”

“Well, I would like to take them to the movies.”

“Because they are mad at me.”

“I will not call them my friends anymore.”

“Because I don’t know what I did wrong.”

“Friends like mine don’t get mad.”

“I’d be happy.”

**1 point:**

“We shook hands and made up.”

“I ask them for what reason or why they aren’t talking to me.”

“I would talk to them about it.”

“I say sorry.”

“Try to talk to them.”

“I just ignore it and it blows over.”

“Go to them and ask why they got mad at you in the first place.”

“Talk to my teacher.”

“Well, I ignored them and act like I don’t know anything and wait for one of my friends to come up to me.”

**2 points:**

“Why are you acting like you are mad at me? We’re not mad at you. We thought you were mad at us. No, I’m not mad so let’s settle it, ok?”

“I’d talk to them and see if there was a problem and then talk to them about it and see if we resolve whatever it is that happened.”

“I’d ask what was going on. After I find out I would try and work with them on the problem.”

“I would talk to them and work it out together.”

“Me and my friends went to the counselor.”

“You and your friends sit down and talk it out.”

“I will say it is OK and they will say I am your friend.”

“I just want to talk to them and they realized that and they said sorry.”

“You ask your friends what they are upset about, you listen to them and respect what they are saying. Then you explain your side of the story reasonably.”

**Question 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.

**Components to look for when scoring.**

**0 points** - Restating given information, no effort to address finding or borrowing a book.

**1 point** - Stating possible locations, with no follow-up, stating possible consequences.

**2 points** - Finding, borrowing or other means of obtaining a book to use in completing assignment.

**Examples of responses:**

**0 points:**

“You were upset because you need that book to do your homework.”

“I got F.”

“Get mad.”

“I don’t like to do homework.”

“The teacher will get mad at me and talk to my parents I think.”

“You should had did your homework at home and not at school.”

“I got one.”

“Listen carefully in class, take notes.”

“I don’t have my English book one morning. I was upset. I look in my backpack.”

“I tell one of them where I’m going.”

**1 point:**

“I will talk to my teacher.”

“I get a pass to look for it.”

“I go to lost and found to see if it’s there.”

“Go back to the last place you were then you might find it.”

“Go look for it.”

“Tell the teacher and ask what I can do.”

“I will try to look much harder for my English book and think harder where I left it.”

“Go to the locker to look. Go to lost and found to look for it.”

“I go to my locker to see if it’s there but it’s not so I go to my boyfriends locker because I’m so upset and I look in his locker.”

“I seem to misplace books, I can’t find it. I think it’s in my locker so I go look.”

**2 points:**

“I would ask the teacher if she/he could give me another book to borrow so I could do my homework.”

“I will tell my teacher and ask what I could do. Hopefully, my teacher would let me borrow another book for homework.”

“I find it in a hidden part of my bag where I forgot it. I had put it there so I wouldn’t forget it.”

“You ask your teacher to go to your locker. In your locker you find your book and take it back to class.”

“So you look on with someone else and look at home later.”

“You go to lost and found and see if someone turned it in. If not go to teacher and ask cost of book. Reimburse her and get another book.”

“I went to lost and found and it was not there so I went to my locker and I find it.”

“Somebody took the book. Somebody else let me borrow their books.”

“You probably left it at home - you can’t find it. Tell your teacher and she loans you one of hers.”

“I ask to use my sister’s. She says OK.”

**Question 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.

***Components to look for when scoring:***

**0 points** - Restating given information, no actions to indicate running for office, nomination or election by others.

**1 point** - Response indicates action by student indicating a desire for office or action by others to choose him or her for office.

**2 points** - Answer indicates desire for office and action by other in electing or choosing the student.

***Examples of responses:***

**0 points:**

“I’ll be rich, famous.”

“Talk to the President of the United States.”

“I am ashamed to be in a club because I don’t like to speak in front of a crowd.”

“Most of the club are my friends.”

“Work to meet your goals and you will have a high standard in life.”

“To show everyone that you can be a good president.”

“I was hoping I would be the next president.”

“What I would do is to get what I get. I will not go up to him or her.”

“I got everybody in if I could.”

“I don’t know that.”

**1 point:**

“I will run for president.”

“Tell them you want to be president.”

“They vote 9 - 5 and I won.”

“Bribe them.”

“I won the nomination and I became the president.”

“I will vote on who I want to be the next president.”

“Work really hard for it.”

“I told them I’d be a good president.”

“Run for the president.”

“I will go up to him or her and say I want to be president of the club right now.”

“I will sign up and start by having a campaign party.”

**2 points:**

“You announce your intention of running for president to everyone. You put up posters and campaign by asking members to vote for you and by saying what



you plan to do as president. They vote and you win.”

“I entered my name in the box and two boys and girl entered so the kids voted for me.”

“Persuade the members of the club that you’re the best man for the job and that you have the leadership qualities.”

“You think you should run for president of the club. They vote for you.”

“You ask your friends to nominate you and ask them to support you and they do.”

“I will do a lot of speeches and paint posters. I beat everyone in the club.”

“You ask people to vote for you and they do.”

“Work really hard for it. They the kids at school will have to vote who they want.”

“Work to meet your goal and vote. If they vote, you win.”

***Question 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.

***Components to look for when scoring:***

**0 points** - Restating given information, stating why they want friends with no means to achieve this, stating activities with no interactions indicated.

**1 point** - Response indicates action by the student to initiate interactions or responses of others to the student.

**2 points** - Response indicates action by the student to initiate interactions and responses of others to the student.

***Examples of responses:***

**0 points:**

“It is fun to have good friends not the ones who steal or break into the house.”

“I was at a new school and didn’t know anyone.”

“I had a thousand friends.”

“I don’t know anyone. I want to have friends.”

“You have to make new friends at the new school.”

“Take one day at a time.”

“Don’t act stuck on yourself.”

“I looked around.”

“I don’t know about that.”

**1 point:**

“I will ask if anyone will show me around the new school.”

“Talk to people at lunch, recess, and during class.”

“I will go around and tell everyone my name.”

“Go to my classes and be myself.”

“I go up and talk to them and I go flirt with them, I’m a flirter.”

“You could go to the teachers and ask them to be your friend.”

“Counselor introduces you to others.”

“They ask if you are new and what your name is.”

“I went to talk to people and invite them over to my house.”

“Just be yourself at all times and make friends.”

**2 points:**

“Go to the office first day, get a counselor, counselor introduces you to student who introduces you to others.”

“I went up to them and introduced myself to them and then they became my friends.”

“I go talk to some girls and they introduce me to their friends and on and on until I had many friends.”

“You join clubs, get involved in sports, and other extracurricular activities. You invite people to go to your house or to do something else with you and they do.”

“Try to find someone with the same interest as you and do it together.”

“I looked around for people I fit in with and they talked to me.”

“I talked to them at recess and they asked me to sit with them at lunch.”

“I asked him where my class was and he showed me around.”

“So at lunch you sit next to a girl with no other students around and you become friends. Later you meet her usual lunch buddies and you live happily ever after.”

“You join the team and you are the best player and every girl wants to go out with you.”

**Section II** of the *Self-Regulation* domain asks respondents to identify goals in several life areas and identify steps they need to take to achieve these goals. Points are accumulated based on the presence of a goal and the number of steps identified to reach that goal. If a person responds to the

initial inquiry about the presence of a goal with the “I have not planned for that yet” response, he or she is awarded 0 points. If the person identifies a goal, but no steps to reach that goal, he or she is awarded 1 point. For a goal with 1 or 2 steps the person receives 2 points and respondents who identify a goal and 3 or 4 steps receive 3 points. Goals are not judged on the probability that the person can achieve them, but simply on their presence or absence. Steps to achieve the goal are, however, judged based on whether they are viable steps in the process or unrelated to achieving the goal. This portion of the *Self-Regulation* has 9 points possible, with higher scores representing more effective goal-setting and task attainment skills. As in the previous section, the following section lists some components to look for when scoring these items and examples from the norming sample.

### **Goals Subdomain Items Examples**

#### ***Question 39:***

Where do you want to live when you graduate?

#### ***Components to look for when scoring:***

**0 points** - No plan or goal is unrelated to where student would live after graduation.

**1 point** - Some living goal with no steps to indicate how to achieve that goal.

**2 points** - Goal stated, plus one or two steps that would lead to achieving the goal.

**3 points** - Goal stated, plus three or four steps that would lead to achieving the goal.

#### ***Examples of responses:***

##### **0 points:**

“I have not planned for that yet.”

“Not Sure.”

“Happily ever after.”

##### **1 point:**

“In my own house.”

“In (name of town or state).”

“With parents/friends/other family.”

“House, apartment, on campus, hospital, mansion.”

##### **2 (Goal plus 1-2 steps) or 3 (Goal plus 3 - 4 steps) points**

“Work” or “Get a job.”

“Find an apartment.”

“Become a manager.”

“Finish school” or “Do homework.”

“Get good qualifications.”

“Keep out of trouble.”  
“Get furniture.”  
“Get a house.”  
“Help out with chores.”  
“Pay rent.”  
“Pack clothes.”  
“Graduate.”  
“Buy a car.”  
“Keep my bills up.”  
“Meet new friends” or “Get roommate.”  
“Save money.”  
“Learn to cook.”

**Question 40:**

Where do you want to work after you graduate?

**Components to look for when scoring:**

**0 points** - No plan or goal is unrelated to where student would work after graduation.

**1 point** - Some work or continuing education goal with no steps to indicate how to achieve that goal.

**2 points** - Goal stated, plus one or two steps that would lead to achieving the goal.

**3 points** - Goal stated, plus three or four steps that would lead to achieving the goal.

**Examples of responses:**

**0 points:**

“I have not planned for that yet.”

“Just live on my check.”

“Not sure.”

**1 point:**

“In a store.”

“My own place/office/business.”

“As a (list profession or job title).”

“Record Store” or “Captain D’s” or the name of another business.

“On small motors” or “teaching children” or other job description.

**2 (Goal plus 1-2 steps) or 3 (Goal plus 3 - 4 steps) points**

“Want ads.”

“Get job application.”

“Finish school.”

“Ride the bus.”

“Know social security number.”

“Trade school in cooking.”

“Talk to a manager.”

“Learn to read and write.”

“Go to classes at college.”  
“Train.”  
“Get an office.”

**Question 41:**

What type of transportation do you plan to use after graduation?

**Components to look for when scoring:**

**0 points** - No plan or goal is unrelated to what type of transportation student plans to use after graduation.

**1 point** - Some transportation goal with no steps to indicate how to achieve that goal.

**2 points** - Goal stated, plus one or two steps that would lead to achieving the goal.

**3 points** - Goal stated, plus three or four steps that would lead to achieving the goal.

**Examples of responses:**

**0 points:**

“I have not planned for that yet.”

“Go out of town.”

**1 point:**

“Car/Truck/Motorcycle/Limo or other type of vehicle.”

“Use family/friend’s/parent’s car, etc.”

“BMW/Toyota/Ford or make of vehicle.”

“Take a bus/subway, etc.”

“Ask other people to take me.”

**2 (Goal plus 1-2 steps) or 3 (Goal plus 3 - 4 steps) points**

“Work” or “Get a job.”

“Get a driver’s license” or “Learn driving book.”

“Buy gas/insurance, etc.”

“Save money.”

“Pay for car/truck, etc.”

“Bus pass.”

“Learn route.”

“Buy car.”

These examples are not meant to be standards for scoring, but are simply exemplary responses to use when reaching decisions. Scorers should take into consideration the individual characteristics of the person and decide if the answer achieves the ending. After each question there is a line to record the score assigned by the evaluator. At the end of the section these subtotals can be summed for a subdomain score. This portion of the *Self-Regulation* domain has 12 points possible, with higher scores

representing more effective interpersonal cognitive problem-solving.

### Psychological Empowerment

This domain consists of 16 questions asking respondents to choose which best describes them. Answers that reflect psychological empowerment (e.g., beliefs in ability, perceptions of control, and expectations of success) are scored with a 1. Answers that do not reflect a psychologically empowered belief or attitude are scored with a 0. The total points available are 16 and higher scores indicate that respondents are more psychologically empowered. The following provides a scoring key for this section:

- |                     |  |
|---------------------|--|
| <b>42. 0 points</b> | I usually do what my friends want.                                       |
| <b>1 point</b>      | I tell my friends if they are doing something I don't want to do.        |
| <br>                |  |
| <b>43. 1 point</b>  | I tell others when I have new or different ideas or opinions.            |
| <b>0 points</b>     | I usually agree with other peoples' opinions or ideas.                   |
| <br>                |  |
| <b>44. 0 points</b> | I usually agree with people when they tell me I can't do something.      |
| <b>1 point</b>      | I tell people when I think I can do something that they tell me I can't. |
| <br>                |  |
| <b>45. 1 point</b>  | I tell people when they have hurt my feelings.                           |
| <b>0 points</b>     | I am afraid to tell people when they have hurt my feelings.              |
| <br>                |  |
| <b>46. 1 point</b>  | I can make my own decisions.   |
| <b>0 points</b>     | Other people make decisions for me.                                      |
| <br>                |  |
| <b>47. 0 points</b> | Trying hard at school/work doesn't do me much good.                      |
| <b>1 point</b>      | Trying hard at school/work will help me get a good job.                  |
| <br>                |  |
| <b>48. 1 point</b>  | I can get what I want by working hard.                                   |
| <b>0 points</b>     | I need good luck to get what I want.                                     |

49. <b>0 points</b>	It is no use to keep trying because that won't change things.
<b>1 point</b>	I keep trying even after I get something wrong.
50. <b>1 point</b>	I have the ability to do the job I want.
<b>0 points</b>	I cannot do what it takes to do the job I want.
51. <b>0 points</b>	I don't know how to make friends.
<b>1 point</b>	I know how to make friends.
52. <b>1 point</b>	I am able to work with others.
<b>0 points</b>	I cannot work well with others.
53. <b>0 points</b>	I do not make good choices.
<b>1 point</b>	I can make good choices.
54. <b>1 point</b>	If I have the ability, I will be able to get the job I want.
<b>0 points</b>	I probably will not get the job I want even if I have the ability.
55. <b>0 points</b>	I will have a hard time making new friends.
<b>1 point</b>	I will be able to make friends in new situations.
56. <b>1 point</b>	I will be able to work with others if I need to.
<b>0 points</b>	I will not be able to work with others If I need to.
57. <b>0 points</b>	My choices will not be honored.
<b>1 point</b>	I will be able to make choices that are important to me.

### Self-Realization

The final section of *The Arc's Self-Determination Scale-Adolescent Version* measures individual self-knowledge and self-awareness. Like the previous section, answers are scored with either 0 or 1 points based on the direction of the answer. That is, answers reflecting a positive self-awareness and self-knowledge are scored with a 1 and answers that do not are scored with a 0. There are 15 items (questions 58 - 72) and the total possible for this domain is 15. Higher scores reflect greater self-realization. Table 4.1 provides the key to scoring for this section:

**Table 4.1: Scoring for Self-Realization section**

<b>Question</b>	<b>Agree</b>	<b>Disagree</b>
58. I do not feel ashamed of any of my emotions	1	0
59. I feel free to be angry at people I care for.	1	0
60. I can show my feelings even when people might see me.	1	0
61. I can like people even if I don't agree with them.	1	0
62. I am afraid of doing things wrong.	0	1
63. It is better to be yourself than to be popular.	1	0
64. I am loved because I give love.	1	0
65. I know what I do best.	1	0
66. I don't accept my own limitations.	0	1
67. I feel I cannot do many things.	0	1
68. I like myself.	1	0
69. I am not an important person.	0	1
70. I know how to make up for my limitations.	1	0
71. Other people like me.	1	0
72. I am confident in my abilities.	1	0

## **Entering Raw Scores on Protocol: Scoring Steps 1 and 2**

The scoring sheet (last page of each protocol) includes sections to enter raw and converted scores. Once scoring is completed, scores from each domain and subdomain should be entered into the section labeled **Scoring Step 1**. The domain scores should be summed to determine a total raw score, which should be entered into the appropriate box in **Scoring Step 2**.

## **Converting Raw Scores: Scoring Step 3**

Once raw scores are entered onto the protocol, the next step in the scoring process is to convert these raw scores into percentile scores for comparison with the sample norms and to determine the percentage of positive responses. This is accomplished using the tables that appear in the **Conversion Tables** section at the end of the Procedural Guide. Each table provides conversion information for one subdomain/domain area or the total score and provides



percentile scores for the sample norms and the positive scores. Identify the raw score appropriate for each domain/subdomain or total and record the appropriate percentage scores on the protocol at **Scoring Step 3**.

## **Interpreting Scores: Scoring Steps 4 and 5**

It is rarely justifiable to interpret findings based on raw scores alone. There are a number of reasons for this, among them the fact that there are usually different “points” possible for any given subscale and comparing between two subscales, one with a total of 12 points and another with a total of 18 points, is like comparing apples and oranges. Additionally, some topics are much more difficult than others and a low raw score might be more the norm than high scores. *The Arc's Self-Determination Scale* should be interpreted using the converted percentile scores described above. These include: (1) a percentage score for the sample norms, and (2) individual percentage positive scores.

To ease the interpretation process, **Scoring Step 4** and **Scoring Step 5** provide graphs in which converted scores can be entered. The graphs provide an easy way to view a student’s overall progress overall. Once raw scores are converted and **Scoring Step 3** is filled in, the examiner and the respondent should fill in the graphs. For example, if the converted norm sample score for 1A (*Autonomy, Independence: Self and Family Care*) was 70, this point should be identified in **Scoring Step 4** under graph column “One A” and the boxes below the 70% mark filled.

Percentage scores for comparison with the sample norms indicate the percent of scores from the norm sample which were equal to or less than the student’s score. Thus, a 70 indicates that 70% of the scores from the sample norms were the same or lower than this score. The individual percent positive scores indicate the percentage positive for each domain. The total points available for the *Autonomy* domain are 96. A person who scored a 72 will have a 75% positive score conversion where a score of 96 reflects 100% positive and 0 indicates 0% positive.

## **How to Use Scores from *The Arc's Self-Determination Scale-Adolescent Version***

The **Introduction** chapter described the appropriate and inappropriate uses of the Scale. Once converted scores are

graphed, teachers and students can examine the trends in the data to describe areas of individual strengths and weaknesses, compare scores with previous assessments to determine areas of growth and use the information provided by examining Scale items to generate potential goals and objectives.

It is presumed that the Scale's utility for research will be to measure student's self-determination to examine program or intervention efficacy, to examine environmental and individual contributors to self-determination, and to evaluate the importance of self-determination on related outcomes and issues. These comparisons will be conducted by using raw scores, although intervention-based research may track percentage positive scores graphed, examiners and respondents can examine the trends in the data to describe areas of individual strengths and weaknesses, compare scores with previous assessments to determine areas of growth and use the information provided by examining Scale items to generate potential goals and objectives.

# Chapter 5

## *The Arc's Self-Determination Scale-Adolescent Version Norms*

### Sample Description

The norms in this guide are based on responses to *The Arc's Self-Determination Scale-Adolescent Version* by 500 students (223 males, 210 females, 67 gender not known) from schools in urban, suburban and rural districts in five States (Texas, Virginia, Alabama, Connecticut, Colorado). All students were identified by their school district as currently receiving special education services and had completed protocols from *The Arc's Self-Determination Scale-Adolescent Version*. However, because of difficulties obtaining adequate consent to release information from schools in Texas and Alabama, information regarding student age, racial status or specific disability category were not available for all students. Demographic data from students for whom this information was available were provided in this section.

The age distribution for the group as a whole is presented in **Table 5.1**. Age distributions by gender are presented in **Tables 5.2** and **5.3**, and descriptive statistics for the group as a whole and by gender are provided in **Table 5.4**.

**Table 5.1: Age distribution for group as a whole.**

Age	Frequency	Percent	Cumulative Percent
14	2	1.1	1.1
15	23	13	14.3
16	40	23	37.1
17	53	29.7	67.4
18	35	20	87.4
19	8	4.6	92
20	4	2.3	94
21	7	4	98.3
22	3	1.7	100

**Table 5.2: Age distribution for males.**

Age	Frequency	Percent	Cumulative Percent
14	1	1.2	1.2
15	17	20.2	21.4
16	18	21.4	42.9
17	21	25	67.9
18	19	22.6	90.5
19	4	4.8	95.2
20	1	1.2	96.4
21	2	2.4	98.8
22	1	1.2	100

**Table 5.3: Age distribution for females.**

Age	Frequency	Percent	Cumulative Percent
14	1	1.1	1.1
15	5	5.6	6.7
16	22	24.4	31.1
17	32	35.6	66.7
18	16	17.8	84.4
19	4	4.4	88.9
20	3	3.3	92.2
21	5	5.6	97.8
22	2	2.2	100

**Table 5.4: Age descriptive statistics.**

Group	Mean	Standard Deviation	Variance
All	17.08	1.99	2.52
Males	16.86	1.53	2.34
Females	17.31	1.61	2.60

The sample consisted of students with and without disabilities, including intellectual disability, learning disabilities, and emotional disorders. **Table 5.5** presents the distribution for the group as a whole by disability category and **Tables 5.6** and **5.7** provide this information by gender.

**Table 5.5: Disability status for group as a whole.**

<b>Type of Disability</b>	<b>Frequency</b>	<b>Percent</b>	<b>Cumulative Percent</b>
No Disability	50	13.7	13.7
Learning Disability	160	44	57.7
Emotional Disorder	15	4.1	61.8
Intellectual Disability	128	35.2	97
Orthopedic Impairment	1	.3	97.3
Other Health Impairment	6	1.6	99
Autism	2	.5	99.5
Speech	2	.5	100

**Table 5.6: Disability status for males**

<b>Type of Disability</b>	<b>Frequency</b>	<b>Percent</b>	<b>Cumulative Percent</b>
No Disability	17	10.4	10.4
Learning Disability	76	46.3	56.7
Emotional Disorder	9	5.5	62.2
Intellectual Disability	59	36	98.2
Orthopedic Impairment	0	0	98.2
Other Health Impairment	2	1.2	99.4
Autism	1	.6	100

**Table 5.7: Disability status for females**

<b>Type of Disability</b>	<b>Frequency</b>	<b>Percent</b>	<b>Cumulative Percent</b>
No Disability	33	20.5	20.5
Learning Disability	52	32.3	52.8
Emotional Disorder	5	3.1	55.9
Intellectual Disability	63	39.1	95
Orthopedic Impairment	1	.6	95.7
Other Health Impairment	4	2.5	98.1
Autism	1	.6	98.8
Speech	2	1.2	100

Students from culturally and ethnically diverse backgrounds were recruited as participants. Once again, data on racial characteristics were not available for all students, but **Table 5.8** presents the racial breakdown for those students for whom this data was available.

**Table 5.8: Racial category for group as a whole**

<b>Racial or Ethnic Status</b>	<b>Frequency</b>	<b>Percent</b>	<b>Cumulative Percent</b>
Native American	2	.6	.6
Asian-American	6	1.7	2.3
African-American	78	22.5	24.8
Hispanic	61	17.6	42.4
Caucasian	197	56.8	99.2
Middle Eastern	3	.8	100

## Scale Descriptive Statistics

The descriptive statistics for each domain, subdomain and total scores from the sample norms are provided in **Table 5.9**. Tables **5.10** and **5.11** provide these same statistics by gender.

**Table 6.9: Descriptive statistics for group as whole**

<b>Variable</b>	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>Variance</b>
Autonomy	63.35	15.50	0	92	240.23
Self-Regulation	9.78	4.95	0	21	24.54
Psych. Empower.	13.28	2.64	4	16	6.97
Self-Realiz.	11.11	2.25	3	15	5.08
Total Score	97.52	19.43	14	138	377.52

**Table 5.10: Descriptive statistics for males**

Variable	Mean	SD	Min	Max	Variance
Autonomy	63.41	15.59	0	96	242.96
Self-Regulation	9.44	5.01	0	21	25.08
Psych. Empower.	12.90	2.84	4	16	8.06
Self-Realiz.	11.00	2.25	3	15	5.05
Total Score	96.75	19.30	28	138	372.61

**Table 5.11: Descriptive statistics for females**

Variable	Mean	SD	Min	Max	Variance
Autonomy	63.54	16.09	0	96	259.04
Self-Regulation	10.28	5.12	0	21	26.24
Psych. Empower.	13.42	2.30	5	16	6.43
Self-Realiz.	11.10	2.30	3	15	5.31
Total Score	98.35	20.43	14	134	417.31

## Gender, Age and Type of Disability Effects

To examine the impact of gender, age and type of disability on total and domain scores, multiple analyses of variance were performed. These are reported below.

### Statistical Analysis of Gender Differences

There were no significant differences between males and females on the overall self-determination scores, despite the fact that females scored slightly higher than did their male counterparts. Likewise, there were no significant differences by gender on the *Autonomy* subdomain scores. Females scored higher on this subscale, and individual analyses of the subdomain areas indicated significant differences between genders in the *Independence: Self- and Family Oriented Functions* subdomain [ $F(1, 431) = 5.92, p = .01$ ] and the *Acting on the Basis of Preferences, Beliefs, Interests and Abilities* subdomain [ $F(1, 431) = 6.08, p = .01$ ].

There were no significant differences for the *Self-Regulation* domain scores based on gender. There were significant differences on the *Psychological Empowerment* domain with females scoring in a more positive direction [ $F(1, 431) = 4.06, p = .04$ ]. There

were no significant differences by gender on the *Self-Realization* domain.

### Summary of Gender Differences

There were no differences by gender for scale scores overall. Domain and subdomain differences existed in three areas. First, females were more likely to assume responsibility for self and family-care activities, a finding not surprising given the sex-role stereotyping of females as caregivers. There were also differences in the Personal Expression subdomain indicating that females were more self-determined regarding their personal appearance and expression. Once again, this is not surprising given the pressure on girls and young women to conform to societal standards of self-care. However, since there were no overall effects for *Autonomy* scores by gender, findings from subdomain areas need to be interpreted with caution.

A somewhat surprising finding was that females were more psychologically empowered than males. Research has suggested that young women with disabilities are at greater risk to experience learned helplessness, a finding not necessarily supported by this sample.

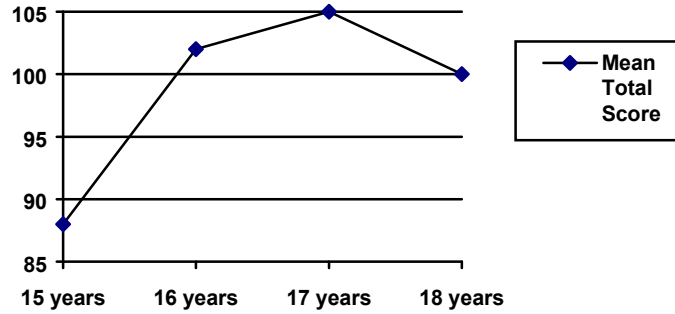
### Statistical Analysis of Age-related Differences

Age-related differences are more difficult to predict on *The Arc's Self-Determination Scale* primarily because essential elements of self-determination show differential developmental patterns. These will be discussed after the statistical analyses. These analyses were conducted for the group as a whole only for students between the ages of 15 and 18. Too few students were 19 or over, and since they were all students with intellectual disability, age related differences were confounded with disability status.

There were significant differences between groups based on age for total scores [ $F(3, 147) = 5.447, p = .001$ ]. As shown in **Figure 5.1**, scores progressed generally from lower to higher based on chronological age. Posthoc analysis using Scheffe' indicated differences at the .05 level between age 15 and ages 16 and 17.

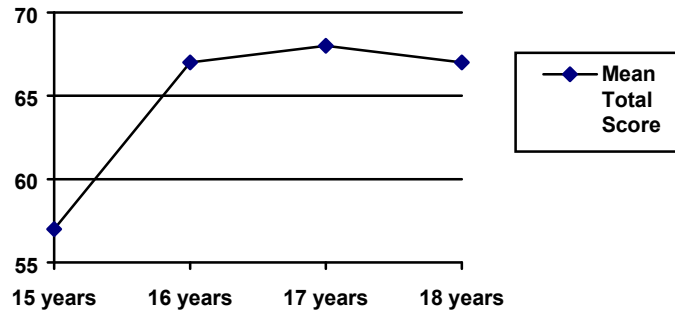


Figure 5.1 Mean scores by age for total



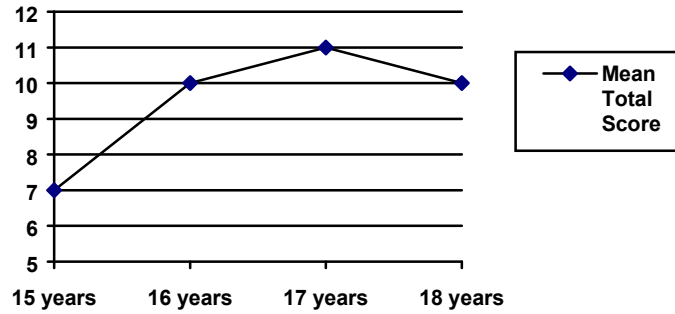
There were significant differences by age on scores from the *Autonomy* domain [ $F(3, 147) = 3.72, p = .01$ ]. As seen in **Figure 5.2**, the positive correlation between age and higher scores continued. Scheffe' tests found that differences were between 15 year olds and 16 and 17 year olds.

Figure 5.2 Mean scores by age for autonomy



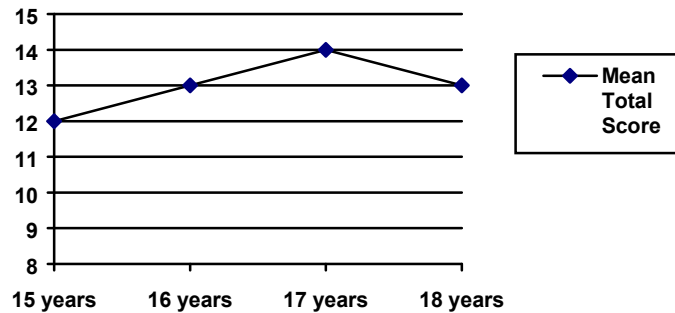
Differences between groups by age on the *Self-Regulation* domain approached significance ( $p = .058$ ) and as shown by **Figure 5.3**, these scores indicated a similar trend of increased competence by age.

Figure 5.3 Mean scores by age for self-regulation



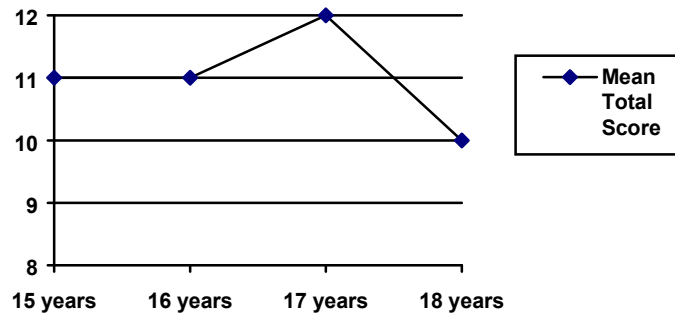
There were significant differences by age on *Psychological Empowerment* scores [ $F(3, 147) = 3.58, p = .01$ ] although the trend for these scores was less noticeable than in the previous domains. **Figure 5.4** provides these scores. Scheffe' tests indicated differences between age 15 and 17 only.

Figure 5.4 Mean scores by age for psychological empowerment



There were also significant differences by age in the *Self-Realization* domain [ $F(3, 147) = 3.51, p = .01$ ] and, like the *Psychological Empowerment* domain these scores did not show a strong age related trend (**Figure 5.5**). Significant differences occurred between age groups 17 and 18.

Figure 5.5 Mean scores by age for self-realization



## Summary of Age-related Differences

Generally, age related changes occurred as might be predicted for each domain. Skill related domains (*Autonomy* and *Self-Regulation*) showed increased skills by age, providing one indicator of construct validity for the Scale. Domains measuring perceptual elements of self-determination did not show such trends, but this too can be expected. The development of perceptions of control and efficacy often go from unrealistically high to more realistically lower. The fact that there was no strong age-trend in the *Psychological Empowerment* and *Self-Realization* domains probably reflects changes on the part of some students who develop more realistic perceptions of control and efficacy with increased age.

## Statistical Analysis of Disability-related Differences

Disability-related differences were examined for three groups: Students without disabilities, students with learning disabilities, and students with intellectual disability. There were highly significant differences between these groups on total scores [ $F(2, 335) = 24.02, p > .0001$ ]. **Table 5.12** shows mean and standard deviation scores by disability status. Post hoc analyses indicated significant differences between students without disabilities and students with intellectual disability and students with learning disabilities and students with intellectual disability.

**Table 5.12** Disability related differences for total scores

Disability	Mean	Standard Deviation
None	106.58	15.67
Learning Disability	101.87	16.04
Intellectual Disability	89.02	21.92

There were significant differences on the *Autonomy* domain scores [ $F(3, 352) = 6.65, p = .0002$ ]. As **Table 5.13** indicates, differences in these scores were also between students without disabilities and students with intellectual disability, and students with learning disabilities and students with intellectual disability.

**Table 5.13 Disability related differences for autonomy scores**

<b>Disability</b>	<b>Mean</b>	<b>Standard Deviation</b>
None	67.44	12.19
Learning Disability	65.31	13.28
Intellectual Disability	60.10	18.32

There were significant differences on the *Self-Regulation* domain scores [ $F(2, 335) = 27.45, p > .0001$ ] with significant differences between all three groups. **Table 5.14** provides the mean and standard deviation scores for this domain.

**Table 5.14 Disability related differences for self-regulation scores**

<b>Disability</b>	<b>Mean</b>	<b>Standard Deviation</b>
None	13.24	4.08
Learning Disability	11.18	4.45
Intellectual Disability	6.95	4.71

There were significant differences in the *Psychological Empowerment* domain scores [ $F(2, 335) = 27.45, p > .0001$ ] with differences between students without a disability and students with intellectual disability and students with learning disabilities and students with intellectual disability.

**Table 5.15 Disability related differences for psychological empowerment scores**

<b>Disability</b>	<b>Mean</b>	<b>Standard Deviation</b>
None	14.30	2.30
Learning Disability	13.84	2.25
Intellectual Disability	11.81	3.06

There were also significant differences in *Self-Realization* scores [ $F(2, 335) = 15.52, p > .0001$ ] with differences between students without a disability and students with intellectual disability and students with learning disabilities and students with intellectual disability.

**Table 5.16 Disability related differences for self-realization scores**

<b>Disability</b>	<b>Mean</b>	<b>Standard Deviation</b>
None	11.60	2.30
Learning Disability	11.54	1.95
Intellectual Disability	10.15	2.48

### **Summary of Disability-related Differences**

The trend for all scores, total and domain, was that students without disabilities scored highest, followed by students with learning disabilities and intellectual disability, respectively. In all cases the scores from students with intellectual disability were significantly different from students without disabilities, as would be predicted. However, scores from students with learning disabilities did not statistically differ from students without disabilities in a number of areas. The sample size for students without disabilities was too small ( $n = 58$ ) to warrant conclusions based on these results. It is probably true that for students with learning disabilities multiple factors, including a learning disability, account for problems with self-determination. These factors include the total number of failure experiences, type of classroom setting, how much autonomy they are allowed at home, and other factors.

# Chapter 6

## Reliability and Validity

### Validity of *The Arc's Self-Determination Scale-Adolescent Version*

#### Concurrent Criterion-related Validity

Criterion-related validity “refers to the extent to which a person’s score on a criterion measure can be estimated from that person’s test score. Concurrent criterion-related validity refers to how accurately a person’s current test score can be used to estimate the current criterion score” (Salvia & Ysseldyke, 1981, p. 105). This is accomplished by examining the relationship between the scale in question and conceptually related measures, the criterion, that are administered at the same time.

Students involved in the field-test of *The Arc's Self-Determination Scale-Adolescent Version* completed three conceptually-related measures at the same time; a global locus of control scale, a measure of academic achievement attributions, and a self-efficacy scale. Locus of control was measured using the Adult version of the Nowicki-Strickland Internal-External Scale (ANS-IE) (Nowicki & Duke, 1974). This scale is a global measure of the degree to which students ascribe reinforcement in their lives to internal or external control. Higher scores reflect more external, thus maladaptive, control orientations. Attributions of academic achievement were measured by the Intellectual Achievement Responsibility Questionnaire (IARQ) (Crandall, Katkovsky & Crandall, 1965). The IARQ is a 34 question, forced-choice scale which was constructed for use in educational settings. The scale yields a total internality score, as well as scores reflecting responsibility for success and responsibility for failure. The IARQ measures student beliefs in internal versus external reinforcement responsibility and yields not only a total score (Itot or self-responsibility), but separate subscale scores for beliefs in internal responsibility for successes (I+ score) and failures (I- score) (Crandall, Katkovsky & Crandall, 1965). Like the ANS-IE, the IARQ has been used to measure perceptions of control for youth with cognitive disabilities (Lewis & Lawrence-Patterson, 1989). Higher scores reflect greater degrees of internality.

Self-Efficacy was measured using the Self-Efficacy Scale (SES) (Sherer, Maddux, Mercadante, Prentice-Dunn, Jacobs & Rogers,

1982). The SES is a 23-item self-report scale measuring a general level of belief in one's own competence. Unlike many self-efficacy measures, the SES measures expectations that are not linked to specific situations. Respondents answer a series of statements about themselves using a likert-type response system ranging from disagree strongly to agree strongly. The SES has been shown to have good criterion-related validity, predicting differences in vocational and educational goal achievement, and adequate construct validity as shown by correlations with related scales. The instruments internal stability has been measured at .86. Higher scores reflect more positive self-efficacy.

Total and domain scores from *The Arc's Self-Determination Scale-Adolescent Version* were correlated with students' scores from these measures. **Table 6.1** provides the correlation coefficients and levels of significance for these findings.

**Table 6.1: Correlation analysis for conceptually related scales**

	ANS-IE	IARQ I+	IARQ I-	IARQ Total	SES
<b>Autonomy</b>	r = -.16 p = .0001	r = .21 p = .0001	r = .17 p = .0001	r = .20 p = .0001	r = .26 p = .0001
<b>Self-Regulation</b>	r = -.32 p = .0001	r = .28 p = .0001	r = .29 p = .0001	r = .29 p = .0001	r = .28 p = .0001
<b>Psych. Empower.</b>	r = -.35 p = .0001	r = .45 p = .0001	r = .25 p = .0001	r = .36 p = .0001	r = .47 p = .0001
<b>Self-Real.</b>	r = -.27 p = .0001	r = .27 p = .0001	r = .30 p = .0001	r = .27 p = .0001	r = .37 p = .0001
<b>Total</b>	r = -.26 p = .0001	r = .32 p = .0001	r = .27 p = .0001	r = .29 p = .0001	r = .39 p = .0001

In and of themselves, significant relationships are not particularly meaningful given the sample size. However, most of the relationships are moderate to strong (.25 to .5) and relationships are strongest in areas one would predict. For example, the ANS-IE and SES should correlate most strongly with the Psychological Empowerment domain scores. This was the case for both domain measures. Another indicator of the strength of the measure was the difference in relationships between the negative and positive subscales of the IARQ. The I+ subscale indicates the degree to which students attribute success internally. The I- subscale indicates the degree to which students internalize academic failure. Conceptually, higher scores on the Psychological Empowerment domain indicate more internal orientations of success. Thus, the

domain score should correlate strongly with I+ scores and less so with I- scores, as seen in **Table 6.1**.

These findings provide evidence of the concurrent criterion-related validity of *The Arc's Self-Determination Scale-Adolescent Version*.

## **Construct Validity**

### **Discriminative Validity**

A scale has discriminative validity if it adequately differentiates or does not differentiate between groups that should differ or not differ based on theoretical reasons or previous research. **Chapter 5** describes the results from analyses of the sample used to derive norms for differences according to age, gender, and type of disability. As would be predicted, the Scale differed in most skill measurement areas by chronological age, with older students doing better. Findings from the two domains examining student beliefs (e.g., *Psychological Empowerment* and *Self-Realization*) did not show the age-related trends predicted by the fact that students' perceptions of self-determination mature as they age.

The Scale also differentiated between groups based on gender in areas that make theoretical sense (autonomy, self-regulation). However, there were no total score differences by gender. Finally, *The Arc's Self-Determination Scale-Adolescent Version* adequately differentiated between students with cognitive disabilities and students without disabilities.

### **Factorial Validity**

The factorial validity of *The Arc's Self-Determination Scale-Adolescent Version* was determined by conducting a series of factor analyses, described in **Chapter 2**. These analyses show that factors resulting from the Scale reflect the constructs they are intended to measure.

### **Other forms of Construct Validity**

*The Arc's Self-Determination Scale-Adolescent Version* incorporated questions from two unique measures, the *Autonomous Functioning Checklist* and the *Personality Orientation Inventory*, both described in **Chapter 2**. By using two extant measures, both with documentation of validity, the construct validity of *The Arc's Self-Determination Scale-Adolescent Version* is enhanced.



## Reliability of *The Arc's Self-Determination Scale-Adolescent Version*

### Internal Consistency Reliability

Internal consistency reliability was calculated using Chronbach alpha for the entire Scale, with the exception of the *Self-Regulation* subscale. The open ended answer format of this section does not lend itself to such analysis. Separate analyses were conducted by subscale as well. Coefficient alpha for the Scale as a whole was .90. Alpha for the *Autonomy* domain was .90, for the *Psychological Empowerment* domain was .73 and for the *Self-Realization* domain was .62. Although alpha levels for the last two domains were lower than the first, this is not unusual or unexpected for measurements examining beliefs and perceptions.

### Item Statistics by Domain

**Table 6.2** presents item statistics, including correlations among items, for items in the *Autonomy* domain. **Table 6.3** provides item total statistics for the *Autonomy* domain. **Table 6.4** provides item statistics and **Table 6.5** item-total information for the *Psychological Empowerment* domain and **Table 6.6** and **6.7** similar information for items in the *Self-Realization* domain.

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**Table 6.2a Item statistics for Autonomy**

Item #	Avg	SD	Correlations Among Items																	
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15			
1	1.84	.952	--																	
2	2.04	1.02	.259	--																
3	1.88	1.01	.181	.169	--															
4	2.28	.930	.286	.277	.254	--														
5	1.80	1.08	.226	.139	.143	.177	--													
6	2.42	.888	.249	.238	.269	.323	.230	--												
7	2.00	.957	.167	.169	.195	.224	.133	.297	--											
8	1.16	1.07	.254	.116	.203	.121	.189	.127	.179	--										
9	1.86	1.03	.245	.127	.189	.254	.248	.310	.197	.189	--									
10	1.52	1.12	.234	.099	.125	.124	.235	.208	.098	.262	.303	--								
11	2.16	.929	.244	.119	.167	.252	.197	.332	.290	.145	.247	.212	--							
12	2.20	.967	.253	.143	.171	.244	.162	.232	.282	.182	.208	.219	.382	--						
13	1.36	1.15	.075	.060	.144	.024	.129	.093	.210	.194	.102	.147	.194	.165	--					
14	2.08	.978	.214	.066	.061	.229	.163	.267	.369	.141	.239	.198	.328	.405	.140	--				
15	2.12	1.02	.209	.174	.196	.214	.132	.279	.232	.241	.256	.121	.246	.262	.096	.274	--			
16	2.59	.803	.229	.202	.135	.375	.135	.405	.251	.075	.252	.133	.314	.344	-.01	.342	.314	--		
17	1.86	1.04	.193	.118	.199	.180	.163	.216	.278	.192	.250	.168	.299	.269	.219	.307	.270		--	
18	2.10	.924	.245	.191	.141	.298	.238	.267	.286	.185	.236	.265	.356	.358	.091	.308	.267			--
19	1.97	1.02	.202	.181	.124	.185	.143	.211	.306	.251	.195	.183	.224	.369	.158	.354	.390			
20	1.84	1.03	.209	.165	.083	.180	.060	.251	.285	.202	.181	.124	.206	.251	.168	.228	.375			
21	1.17	1.16	.186	.077	.162	.025	.118	.064	.161	.259	.169	.154	.149	.125	.314	.152	.181			
22	1.50	1.07	.194	.118	.153	.087	.145	.195	.269	.198	.242	.207	.313	.231	.385	.229	.202			
23	1.78	.997	.169	.171	.200	.175	.197	.167	.224	.199	.187	.173	.279	.239	.266	.170	.216			
24	1.58	1.06	.228	.131	.155	.175	.179	.196	.161	.264	.207	.249	.249	.282	.188	.231	.220			
25	2.14	1.02	.190	.183	.174	.254	.138	.253	.185	.152	.309	.229	.220	.218	.085	.260	.230			
26	1.46	1.19	.148	.105	.111	.131	.147	.145	.124	.137	.206	.216	.151	.131	.141	.173	.179			
27	1.54	1.13	.132	.077	.191	.127	.166	.131	.136	.217	.260	.244	.234	.166	.167	.219	.174			
28	2.50	.888	.198	.221	.164	.355	.219	.330	.203	.109	.322	.164	.258	.315	.049	.336	.250			
29	2.54	.862	.266	.180	.200	.387	.169	.393	.274	.089	.293	.229	.302	.321	.071	.395	.258			
30	2.30	.912	.250	.205	.271	.283	.209	.317	.322	.219	.306	.219	.264	.341	.107	.356	.375			
31	2.33	1.02	.161	.168	.116	.334	.171	.268	.171	.108	.214	.192	.188	.281	.003	.342	.251			
32	2.48	.870	.215	.139	.159	.363	.182	.371	.224	.081	.323	.183	.267	.324	.014	.332	.281			

**Table 6.2b Item statistics for Autonomy**

Item #	Correlations Among Items																
	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
16	--																
17	.235	--															
18	.381	.268	--														
19	.318	.330	.461	--													
20	.327	.174	.370	.413	--												
21	-.015	.283	.217	.271	.212	--											
22	.122	.349	.261	.302	.254	.345	--										
23	.226	.263	.193	.198	.270	.200	.404	--									
24	.170	.257	.243	.552	.238	.171	.315	.408	--								
25	.285	.259	.297	.248	.190	.082	.204	.242	.308	--							
26	.095	.207	.200	.219	.177	.212	.308	.216	.245	.278	--						
27	.059	.273	.202	.290	.170	.271	.351	.290	.302	.324	.422	--					
28	.428	.211	.332	.293	.169	.006	.128	.201	.141	.289	.086	.086	--				
29	.502	.216	.431	.329	.272	.015	.150	.154	.236	.356	.148	.152	.589	--			
30	.410	.340	.380	.415	.315	.149	.234	.181	.192	.327	.116	.168	.377	.481	--		
31	.358	.159	.288	.242	.201	.035	.138	.138	.199	.252	.081	.189	.374	.459	.394	--	
32	.431	.259	.377	.276	.234	-.01	.116	.121	.194	.342	.102	.070	.532	.528	.451	.431	--

**Table 6.3 Item-Total statistics for Autonomy**

<b>Item Number</b>	<b>Domain Mean if Item Deleted</b>	<b>Domain Variance if Item Deleted</b>	<b>Corrected Item-Total Correlation</b>	<b>Squared Multiple Correlation</b>	<b>Domain Alpha if Item Deleted</b>
1	60.619	237.020	.421	.244	.895
2	60.419	239.665	.303	.176	.897
3	60.576	238.823	.335	.211	.897
4	60.175	236.892	.437	.314	.895
5	60.655	237.776	.341	.183	.897
6	60.035	236.166	.487	.342	.895
7	60.457	236.260	.445	.283	.895
8	61.301	237.232	.362	.227	.896
9	60.602	234.366	.471	.288	.895
10	60.938	235.774	.386	.232	.896
11	60.290	235.326	.493	.325	.894
12	60.255	234.313	.507	.339	.894
13	61.098	238.978	.280	.246	.898
14	60.376	234.232	.503	.369	.894
15	60.337	234.310	.475	.306	.895
16	59.864	237.421	.493	.438	.895
17	60.597	233.754	.485	.299	.895
18	60.350	233.618	.559	.414	.894
19	60.485	232.314	.542	.429	.894
20	60.617	234.996	.449	.336	.895
21	61.285	237.456	.319	.283	.898
22	60.958	233.482	.478	.389	.895
23	60.679	235.652	.445	.341	.895
24	60.874	234.245	.458	.309	.895
25	60.322	234.335	.476	.304	.895
26	61.003	235.741	.355	.255	.897
27	60.920	234.409	.419	.363	.896
28	59.957	236.176	.487	.475	.895
29	59.920	234.676	.561	.553	.894
30	60.158	233.324	.578	.443	.893
31	60.130	235.676	.435	.343	.895
32	59.975	236.159	.499	.469	.895

**Table 6.4 Item statistics for Psychological Empowerment**

Item #	Avg	SD	Correlations Among Items																
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
1	.736	.441	--																
2	.667	.471	.205	--															
3	.782	.412	.193	.148	--														
4	.685	.464	.137	.194	.125	--													
5	.887	.316	.081	.138	.165	.153	--												
6	.846	.361	.067	-.01	.073	.027	.162	--											
7	.825	.380	.042	.106	.074	.125	.248	.215	--										
8	.822	.382	.117	-.01	.166	.089	.159	.297	.186	--									
9	.866	.341	.027	.182	.134	.135	.257	.097	.243	.317	--								
10	.887	.316	.179	.069	.126	.142	.077	.252	.078	.272	.194	--							
11	.866	.340	.016	.054	.037	.199	.193	.139	.191	.251	.305	.209	--						
12	.860	.347	.127	.060	.157	.086	.135	.278	.099	.249	.175	.276	.160	--					
13	.861	.346	-.01	.169	.053	.175	.295	.075	.259	.214	.366	.107	.293	.137	--				
14	.805	.397	.127	.019	.148	.112	.042	.137	.046	.233	.098	.479	.162	.211	.127	--			
15	.875	.331	.067	.096	.051	.100	.225	.082	.167	.175	.216	.077	.369	.190	.283	.036	--		
16	.895	.306	.202	.080	.172	.118	.196	.195	.094	.206	.145	.196	.162	.297	.138	.142	.328	--	

**Table 6.5 Item-Total statistics for Psychological Empowerment**

Item Number	Domain Mean if Item Deleted	Domain Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Domain Alpha if Item Deleted
1	12.431	6.523	.2352	.	.7324
2	12.500	6.490	.2228	.	.7352
3	12.385	6.511	.2685	.	.7278
4	12.482	6.373	.2803	.	.7281
5	12.280	6.555	.3648	.	.7187
6	12.321	6.582	.2886	.	.7250
7	12.342	6.506	.3078	.	.7233
8	12.345	6.302	.4157	.	.7123
9	12.301	6.413	.4168	.	.7134
10	12.280	6.497	.4025	.	.7155
11	12.301	6.461	.3875	.	.7167
12	12.308	6.464	.3750	.	.7171
13	12.306	6.453	.3842	.	.7163
14	12.363	6.485	.2995	.	.7243
15	12.292	6.557	.3428	.	.7203
16	12.272	6.551	.3844	.	.7174

**Table 6.6 Item statistics for Self-Realization**

Item #	Avg	SD	Correlations Among Items																
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
1	.487	.500	--																
2	.688	.463	-.02	--															
3	.692	.461	.093	.109	--														
4	.779	.414	.009	.136	.053	--													
5	.477	.450	.011	.028	.032	.056	--												
6	.862	.345	-.04	.171	.128	.248	.017	--											
7	.880	.324	-.02	.098	.184	.089	.011	.153	--										
8	.834	.372	-.03	.065	.069	.151	.004	.228	.128	--									
9	.536	.450	-.06	-.07	-.03	-.08	.120	-.09	.027	.049	--								
10	.637	.481	-.01	.083	.063	.106	.191	.059	.146	.033	-.07	--							
11	.884	.321	-.06	.116	.161	.129	.031	.187	.234	.237	-.02	.153	--						
12	.621	.486	-.01	.065	.053	.117	.046	.053	.081	.051	-.02	.250	.179	--					
13	.795	.404	-.02	.099	.105	.141	.090	.061	.175	.182	-.08	.153	.253	.118	--				
14	.899	.301	-.04	.179	.139	.189	.056	.190	.299	.234	-.11	.085	.353	.083	.207	--			
15	.827	.378	.025	.128	.151	.167	.056	.204	.243	.265	-.11	.194	.313	.084	.349	.246	--		

**Table 6.7 Item-Total statistics for Self-Realization**

Item Number	Domain Mean if Item Deleted	Domain Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Domain Alpha if Item Deleted
1	10.415	5.4837	-.0257	.	.6000
2	10.215	5.0515	.1954	.	.5517
3	10.211	4.9968	.2246	.	.5456
4	10.123	5.0245	.2567	.	.5397
5	10.426	5.0964	.1451	.	.5637
6	10.041	5.1453	.2618	.	.5412
7	10.022	5.1342	.2954	.	.5371
8	10.068	5.0749	.2752	.	.5378
9	10.367	5.6201	-.0826	.	.6114
10	10.266	4.9153	.2470	.	.5408
11	10.019	5.0119	.3893	.	.5235
12	10.282	4.9750	.2137	.	.5481
13	10.108	4.9423	.3164	.	.5288
14	10.004	5.1011	.3538	.	.5306
15	10.076	4.864	.3994	.	.5155

# Conversion Tables

## Table 1

<b>Autonomy: Independence: Routine Personal Care and Family Oriented Functions</b>								
<b>Raw Score</b>	<b>Percentile Scores</b>		<b>Raw Score</b>	<b>Percentile Scores</b>		<b>Raw Score</b>	<b>Percentile Scores</b>	
	<b>Norm Sample</b>	<b>Positive Scores</b>		<b>Norm Sample</b>	<b>Positive Scores</b>		<b>Norm Sample</b>	<b>Positive Scores</b>
1	0	6	7	9	39	13	61	72
2	0	11	8	14	44	14	71	78
3	1	17	9	19	50	15	80	83
4	2	22	10	29	56	16	89	89
5	3	28	11	39	61	17	95	94
6	5	33	12	50	67	18	100	100

## Table 2

<b>Autonomy: Independence: Interaction with the Environment</b>								
<b>Raw Score</b>	<b>Percentile Scores</b>		<b>Raw Score</b>	<b>Percentile Scores</b>		<b>Raw Score</b>	<b>Percentile Scores</b>	
	<b>Norm Sample</b>	<b>Positive Scores</b>		<b>Norm Sample</b>	<b>Positive Scores</b>		<b>Norm Sample</b>	<b>Positive Scores</b>
1	3	8	5	35	42	9	85	75
2	6	17	6	49	50	10	93	83
3	12	25	7	63	58	11	96	91
4	24	33	8	75	66	12	100	100

## Table 3

<b>Autonomy: Acting on the Basis of Preferences, Beliefs, Interests and Abilities: Recreation and Leisure Time</b>								
<b>Raw Score</b>	<b>Percentile Scores</b>		<b>Raw Score</b>	<b>Percentile Scores</b>		<b>Raw Score</b>	<b>Percentile Scores</b>	
	<b>Norm Sample</b>	<b>Positive Scores</b>		<b>Norm Sample</b>	<b>Positive Scores</b>		<b>Norm Sample</b>	<b>Positive Scores</b>
1	1	6	7	8	39	13	56	72
2	1	11	8	13	44	14	68	78
3	2	17	9	18	50	15	79	83
4	2	22	10	25	56	16	88	89
5	4	28	11	25	61	17	93	94
6	5	33	12	44	67	18	100	100



## Table 4

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**Autonomy: Acting on the Basis of Preferences, Beliefs, Interests and Abilities:  
Community Involvement and Interaction**

---

Raw Score	Percentile Scores		Percentile Scores			Percentile Scores		
	Norm Sample	Positive Scores	Raw Score	Norm Sample	Positive Scores	Raw Score	Norm Sample	Positive Scores
1	1	7	6	23	40	11	76	73
2	2	13	7	33	47	12	82	80
3	6	20	8	44	53	13	88	87
4	9	27	9	56	60	14	93	93
5	16	33	10	67	67	15	100	100

## Table 5

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**Autonomy: Acting on the Basis of Preferences, Beliefs, Interests and Abilities: Post-School  
Directions**

---

Raw Score	Percentile Scores		Percentile Scores			Percentile Scores		
	Norm Sample	Positive Scores	Raw Score	Norm Sample	Positive Scores	Raw Score	Norm Sample	Positive Scores
1	1	6	7	29	39	13	78	72
2	2	11	8	39	44	14	82	78
3	6	17	9	48	50	15	88	83
4	9	22	10	54	56	16	91	89
5	14	28	11	63	61	17	95	94
6	21	33	12	71	67	18	100	100

## Table 6

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**Autonomy: Acting on the Basis of Preferences, Beliefs, Interests and Abilities: Personal  
Expression**

---

Raw Score	Percentile Scores		Percentile Scores			Percentile Scores		
	Norm Sample	Positive Scores	Raw Score	Norm Sample	Positive Scores	Raw Score	Norm Sample	Positive Scores
1	1	7	6	9	40	11	32	73
2	2	13	7	13	47	12	41	80
3	2	20	8	16	53	13	51	87
4	3	27	9	20	60	14	64	93
5	6	33	10	26	67	15	100	100

# Table 7

Autonomy Domain Total Score								
Raw Score	Percentile Scores		Percentile Scores			Percentile Scores		
	Norm Sample	Positive Scores	Raw Score	Norm Sample	Positive Scores	Raw Score	Norm Sample	Positive Scores
1	1	1	33	3	34	65	55	68
2	1	2	34	4	35	66	57	69
3	1	3	35	4	36	67	60	70
4	1	4	36	5	38	68	63	71
5	1	5	37	5	39	69	65	72
6	1	6	38	5	40	70	68	73
7	1	7	39	6	41	71	71	74
8	1	8	40	7	42	72	72	75
9	1	9	41	7	43	73	75	76
10	1	10	42	8	44	74	76	77
11	1	11	43	9	45	75	79	78
12	2	12	44	11	46	76	80	79
13	2	14	45	13	47	77	82	80
14	2	15	46	14	48	78	85	81
15	2	16	47	16	49	79	87	82
16	2	17	48	18	50	80	89	83
17	2	18	49	19	51	81	90	84
18	2	19	50	21	52	82	91	85
19	2	20	51	22	53	83	92	86
20	2	21	52	24	54	84	93	87
21	2	22	53	26	55	85	94	88
22	2	23	54	28	56	86	95	90
23	3	24	55	30	57	87	95	91
24	3	25	56	32	58	88	96	92
25	3	26	57	34	59	89	96	93
26	3	27	58	36	60	90	97	94
27	3	28	59	39	61	91	97	95
28	3	29	60	40	62	92	98	96
29	3	30	61	43	63	93	98	97
30	3	31	62	46	64	94	99	98
31	3	32	63	50	66	95	99	99
32	3	33	64	53	67	96	100	100

## Table 8

Self-Regulation: Interpersonal Cognitive Problem Solving								
Raw Score	Percentile Scores		Percentile Scores			Percentile Scores		
	Norm Sample	Positive Scores	Raw Score	Norm Sample	Positive Scores	Raw Score	Norm Sample	Positive Scores
1	18	8	5	49	42	9	92	75
2	22	17	6	68	50	10	95	83
3	29	25	7	79	58	11	98	91
4	36	33	8	87	66	12	100	100

## Table 9

Self-Regulation: Goal Setting and Task Performance								
Raw Score	Percentile Scores		Percentile Scores			Percentile Scores		
	Norm Sample	Positive Scores	Raw Score	Norm Sample	Positive Scores	Raw Score	Norm Sample	Positive Scores
1	24	11	4	58	44	7	86	78
2	34	22	5	68	56	8	92	89
3	45	33	6	79	67	9	100	100

## Table 10

Self-Regulation Domain Score								
Raw Score	Percentile Scores		Percentile Scores			Percentile Scores		
	Norm Sample	Positive Scores	Raw Score	Norm Sample	Positive Scores	Raw Score	Norm Sample	Positive Scores
1	10	5	8	45	38	15	90	71
2	13	10	9	54	43	16	92	76
3	16	14	10	60	48	17	95	81
4	19	19	11	67	52	18	96	86
5	23	24	12	74	57	19	98	90
6	31	29	13	80	62	20	99	95
7	37	33	14	85	67	21	100	100

# Table 11

Psychological Empowerment Domain Score								
Raw Score	Percentile Scores		Percentile Scores			Percentile Scores		
	Norm Sample	Positive Scores	Raw Score	Norm Sample	Positive Scores	Raw Score	Norm Sample	Positive Scores
1	0	6	7	4	44	12	30	75
2	0	12	8	8	50	13	44	81
3	0	19	9	11	56	14	59	88
4	0	25	10	17	62	15	79	94
5	1	31	11	23	69	16	100	100
6	2	38						

# Table 12

Self-Realization Domain Score								
Raw Score	Percentile Scores		Percentile Scores			Percentile Scores		
	Norm Sample	Positive Scores	Raw Score	Norm Sample	Positive Scores	Raw Score	Norm Sample	Positive Scores
1	0	7	6	5	40	11	55	73
2	0	13	7	8	47	12	73	80
3	0	20	8	14	53	13	88	87
4	1	27	9	24	60	14	96	93
5	3	33	10	37	67	15	100	100

# Table 13

Total Self-Determination Score								
Raw Score	Percentile Scores		Percentile Scores			Percentile Scores		
	Norm Sample	Positive Scores	Raw Score	Norm Sample	Positive Scores	Raw Score	Norm Sample	Positive Scores
1	1	1	50	3	34	99	48	67
2	1	1	51	3	34	100	50	68
3	1	2	52	3	35	101	53	68
4	1	3	53	3	36	102	55	69
5	1	3	54	3	36	103	57	70
6	1	4	55	3	37	104	60	70
7	1	5	56	3	38	105	63	71
8	1	5	57	3	39	106	65	72
9	1	6	58	3	39	107	67	72
10	1	7	59	3	40	108	69	73
11	1	7	60	4	41	109	70	74
12	1	8	61	4	41	110	73	74
13	1	9	62	5	42	111	75	75
14	1	9	63	5	43	112	77	76
15	1	10	64	5	43	113	79	76
16	1	11	65	6	44	114	82	77
17	1	11	66	7	45	115	83	78
18	1	12	67	7	45	116	84	78
19	1	13	68	8	46	117	85	79
20	1	14	69	8	47	118	88	80
21	1	14	70	9	47	119	89	80
22	1	15	71	9	48	120	90	81
23	1	16	72	11	49	121	91	82
24	1	16	73	12	49	122	92	82
25	1	17	74	12	50	123	94	83
26	1	18	75	13	51	124	94	84
27	1	18	76	13	51	125	95	84
28	1	19	77	14	52	126	96	85
29	1	20	78	16	53	127	96	86
30	1	20	79	17	53	128	96	86
31	1	21	80	17	54	129	97	87
32	1	22	81	18	55	130	98	88
33	1	22	82	19	55	131	98	89
34	1	23	83	20	56	132	98	89
35	1	24	84	21	57	133	98	90
36	1	24	85	22	57	134	99	91
37	1	25	86	24	58	135	99	91
38	2	26	87	26	59	136	99	92
39	2	26	88	27	59	137	99	93
40	2	27	89	29	60	138	99	93
41	2	28	90	31	61	139	99	94
42	2	28	91	33	61	140	99	95
43	2	29	92	35	62	141	99	95
44	2	30	93	37	63	142	99	96
45	2	30	94	39	64	143	99	97
46	2	31	95	40	64	144	99	97
47	2	32	96	42	65	145	99	98
48	2	32	97	44	66	146	99	99
49	2	33	98	45	66	147	99	99
						148	100	100