EVALUATION OF A DEVELOPMENTALLY-BASED MUSIC THERAPY ASSESSMENT TOOL FOR CHILDREN WITH AUTISM

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MASTER OF ARTS

by
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EVALUATION OF A DEVELOPMENTALLY-BASED MUSIC THERAPY ASSESSMENT TOOL FOR CHILDREN WITH AUTISM

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ABSTRACT

The purpose of this study was to gather sufficient data to determine the statistical reliability of the scores obtained with a new music therapy assessment tool for children with autistic disorder: the Autism Developmental Skillset Assessment (ADSA). Participants included one child with autistic disorder (N = 1, male, age 3) and board certified music therapists (N = 4). Five children enrolled in this study, however, there was a participant attrition rate of 80%.

The study was composed of three steps. First, the child with autism was videotaped during one individual music therapy session. Second, video clips from the session were selected and edited. Finally, music therapists utilized these video clips to complete the ADSA and select a primary and secondary goal for the assessed child. The inter-rater reliability of primary goal selection using the ADSA was .50 (N = 4). The inter-rater reliability of secondary goal selection was .50 (N = 4). The overall reliability of the resulting ADSA scores was evaluated using generalizability theory (G-theory) statistical analysis with a fully crossed, single-facet, mixed design (r × i). The g coefficient for the ADSA tool for absolute measurement was 1.00, which surpassed the conventionally accepted reliability value of .80.
The faculty listed below, appointed by the Dean of the Conservatory of Music and Dance have examined a thesis titled “Evaluation of a Developmentally-Based Music Therapy Assessment Tool for Children with Autism,” presented by Alaine E. Reschke-Hernández, candidate for the Master of Arts degree, and certify that in their opinion it is worthy of acceptance.

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CHAPTER 1
INTRODUCTION

The incidence rate of autistic disorder continues to increase; so do the available treatment options. Professionals who work with children with this disability face increasing demands to quantifiably justify the need for and efficacy of their services to insurance companies, the community, and other professionals. Autistic disorder, more commonly known as autism, is a lifelong, complex, neurobiological and developmental disability characterized by a varied spectrum of characteristics that can be identified by age 3. It is distinguished by restricted, repetitive, stereotyped behavior, interests, and activities, as well as impairments in social interaction and communication (American Psychological Association [APA], 2000). Autism is one of the most prevalent exceptionalities of childhood in the United States, and the number of children living with this disability continues to rise. Currently, one in 110 children in the United States are identified with an autism spectrum disorder (including autistic disorder, Asperger syndrome, and pervasive developmental disorder – not otherwise specified), and statistical data suggests that more children are diagnosed with autism in one year than pediatric cancer, diabetes, and AIDS combined (Autism Speaks, Inc., 2009; National Center on Birth Defects and Developmental Disabilities, 2010). Although a definitive explanation for this increased incidence has not been identified, the incontrovertible rise in the prevalence of this disability has led to an analogous rise in demand for music therapy services (Groene, 2003).
Music therapy is a holistic healthcare approach to treatment and prevention in which a board certified music therapist uses individualized therapeutic music applications to systematically assess, treat, and reassess clients to achieve non-musical goals and objectives. The professional music therapist uses a variety of intervention techniques, including improvisation, movement, rhythmic instrument playing, singing, songwriting, and active music listening. Similar to the field of psychology, a variety of theoretical foundations are employed: cognitive-behavioral, psychoanalytical, humanistic, neurological, biomedical, and educational. Music therapy is used with a wide range of ages (birth through death), clinical populations (e.g. hospice, developmental disabilities, geriatrics, victims of abuse, psychiatric, oncology, etc.), healthy individuals (e.g. prevention, stress management, developmental support, etc.), and settings (e.g. hospitals, schools, private clinics, etc.; Reschke-Hernández, 2009b).

The music therapy profession emerged in the 1940s at the same time autism surfaced as a diagnosis. Music therapy pioneers working with children with autism challenged themselves to create effective interventions and relayed their endeavors through case study research. Many music therapists modified techniques from other fields (e.g. music education) and therapeutic approaches (e.g. psychology, speech-language pathology). In general, music therapists explored a multitude of techniques under very broad goal areas, reflecting a trial and error approach (Reschke-Hernández, in press).

In recent decades, music therapists have become more focused in their approach with children with autism in comparison to historical undertakings. As this exceptionality has become more familiar, goals have centered on the autism diagnostic domains: social skills, communication skills, and behavior. In spite of this direction, the use of historical techniques
has persisted and music therapists have continued to primarily disseminate their work through case study research. However, music therapists have challenged themselves to produce stronger research evidence, perhaps in response to strong criticisms regarding the lack of high levels of empirical justification for services (Reschke-Hernández, in press). Review articles have illustrated that this population benefits from music therapy intervention (Gold, Wigram, & Elefant, 2006; Kaplan & Steele, 2005; Whipple, 2004); nonetheless, the level of scientific evidence supporting the use of music therapy with children with autism is limited.

Healthcare professionals are expected to demonstrate quantifiable justification for their services through evidence-based practice. Assessment is an integral part of evidence-based practice as it informs clinical wisdom through routine documentation and evaluation of outcomes. Quality music therapy assessment can assist the effort to present evidence in support of a treatment intervention because it can provide a reliable and objective process to evaluate clinical outcomes. It also provides the practitioner with insight into the best treatment practices and helps ensure that appropriate individualized treatment is provided. Although quality assessment can fulfill these essential functions in evidence-based music therapy practice, limited accessible tools exist to assist a music therapist in identifying appropriate goals and objectives for children with autism. The lack of an appropriate assessment tool encourages music therapists to provide activity-based, non-goal driven treatment. This shortcoming directly impedes music therapy from being recognized as a valid evidence-based modality by other professionals (Thaut, 2000). Therefore, the purpose of this paper will be to investigate the reliability of a new music therapy assessment tool, the
*Autism Developmental Skillset Assessment* (ADSA). Accordingly, two research questions are posed:

1. What is the inter-rater reliability of primary and secondary goal selection using the ADSA?
2. What is the generalizability (reliability of the scores) of the ADSA?
CHAPTER 2

REVIEW OF LITERATURE

Assessment and documentation present challenges in the behavioral sciences due to the inherent subjective nature of behavioral assessment, the complexity of observation, privacy legislation, and time limitations. Yet professionals are expected to demonstrate quantifiable justification for their services through evidence-based practice to insurance companies, the community, and other professionals. Those who work with children with autism face increasing demands to demonstrate the efficacy of their services as incidence rates increase and available treatment options multiply. Music therapy is gaining visibility as a treatment option for individuals with autism (Accordino, Comer, & Heller, 2007; Groene, 2003). Traditionally, music therapists have utilized assessment and documentation tools with this population that are borrowed from other professions (e.g. Walworth, 2007; Walworth, Register, & Engel, 2009), not population-specific (e.g. Baxter et al., 2007; Boxill, 1985; Chase, 2002; Coleman & Brunk, 1999) or are time intensive (e.g. Bruscia, 1987; Coleman & Brunk, 1999; Nordoff & Robbins, 2007). The development of an autism-specific music therapy assessment tool will equip music therapists with a method to demonstrate accountability and efficacy to other professionals, clients, and their families and help meet the demands of evidence-based practice. Therefore, the purpose of this paper will be to investigate the reliability of a new music therapy assessment tool, the *Autism Developmental Skillset Assessment* (ADSA). Accordingly, two research questions are posed:
1. What is the inter-rater reliability of primary and secondary goal selection using the ADSA?

2. What is the generalizability (reliability of the scores) of the ADSA?

**Evidence-Based Practice**

The terms ‘evidence-based’ and ‘evidence-based medicine’ have influenced many facets of health care and education since first appearing in the early 1990s (Eddy, 1990; Evidence Based Medicine Working Group, 1992). Evidence-based medicine is considered a “powerful force in today’s health care environment and has grown . . . to prominence in the development of clinical standards and guidelines to improve quality of care” (Davidson et al., 2003, p.162). Evidence-based practice has provided a way for both practitioners and consumers to identify treatment interventions that are valid and effective. It combines practitioner wisdom with knowledge from rigorous clinical research to address the needs and desires of a client through effective treatment interventions (Detrich, 2008).

Evidence-based practice involves conducting rigorous clinical research to answer specific questions regarding client treatment. This process includes evaluating existing clinical research, conducting clinical research to investigate the efficacy of treatment approaches, and applying empirically supported treatments in practice as appropriate to the assessed needs and desires of the client. Clinical research is ranked on a continuum to help practitioners and consumers determine the current empirical support for a specific treatment intervention. This continuum ranges from systematic reviews of randomized controlled trials to expert opinion; randomized controlled trials are considered the preeminent form of evidence (Edwards, 2002; Wigram, 2002). Table 1 presents the levels of research evidence and corresponding operational definitions, and offers a way to critically assess and rank
extant research literature. In addition, the strict guidelines from the Coalition for Evidence Based Policy (2010) should be used to evaluate potential randomized controlled trials (see Table 2).

Table 1

Levels of Research Evidence

<table>
<thead>
<tr>
<th>Level</th>
<th>Type of Evidence</th>
<th>Operational Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a</td>
<td>Systematic Review (SR) of Randomized Controlled Trials (RCTs)</td>
<td>An exhaustive systematic search, objective appraisal, and summary of RCTs on a specific topic (e.g. meta-analysis).</td>
</tr>
<tr>
<td>1b</td>
<td>RCT</td>
<td>Participants are randomly assigned to two or more groups and systematically compared, based on the strict guidelines from the Coalition for Evidence Based Policy (2010).</td>
</tr>
<tr>
<td>2a</td>
<td>SR of Cohort Studies</td>
<td>Identifies two groups of individuals who received two or more different exposures or treatments and follows them to look for a specific outcome using blind and/or objective measures.</td>
</tr>
<tr>
<td>2b</td>
<td>Cohort Study</td>
<td>Participants are randomly assigned to two or more groups and systematically compared, but the strict guidelines from the Coalition for Evidence Based Policy (2010) are not followed.</td>
</tr>
<tr>
<td></td>
<td>Low-quality RCT</td>
<td>A post hoc analysis comparing a group of individuals who had the outcome of interest to a group who did not determine if they had the treatment of interest.</td>
</tr>
<tr>
<td>3a</td>
<td>SR of Case Control Studies</td>
<td>A post hoc analysis comparing a group of individuals who had the outcome of interest to a group who did not determine if they had the treatment of interest.</td>
</tr>
<tr>
<td></td>
<td>SR of Comparative Studies that are not RCTs</td>
<td>Participants in two or more groups are compared using statistical analysis. Participants are not randomly assigned to groups and the guidelines from the Coalition for Evidence Based Policy (2010) are not followed.</td>
</tr>
<tr>
<td>3b</td>
<td>Case Control Study</td>
<td>Participants in two or more groups are compared using statistical analysis. Participants are not randomly assigned to groups and the guidelines from the Coalition for Evidence Based Policy (2010) are not followed.</td>
</tr>
<tr>
<td></td>
<td>SR of Literature</td>
<td>An exhaustive systematic search, objective appraisal, and summary of literature on a specific topic (e.g. historical research).</td>
</tr>
<tr>
<td>Level</td>
<td>Type of Evidence</td>
<td>Operational Definition</td>
</tr>
<tr>
<td>-------</td>
<td>------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>4a</td>
<td>Case Series</td>
<td>A post hoc analysis of a group of individuals who had an outcome of interest; no control group is used.</td>
</tr>
<tr>
<td></td>
<td>Case Study with quantitative data analysis</td>
<td>Quantitative analysis of the outcomes of a particular treatment on an individual.</td>
</tr>
<tr>
<td></td>
<td>Low-quality Cohort Study</td>
<td>Identifies two groups of individuals who received two or more different exposures or treatments and follows them to look for a specific outcome, but did not do one or more of the following: use blind or objective measures, clearly define groups, control for known confounding variables, complete a sufficient follow-up.</td>
</tr>
<tr>
<td></td>
<td>Low-quality Case Control Study</td>
<td>A post hoc analysis comparing a group of individuals who had the outcome of interest to a group who did not to determine if they had the treatment of interest, but did not do one or more of the following: use blind or objective measures, clearly define groups, control for known confounding variables.</td>
</tr>
<tr>
<td>4b</td>
<td>Case Study with qualitative data analysis</td>
<td>Qualitative analysis of the outcomes of a particular treatment on an individual.</td>
</tr>
<tr>
<td>4c</td>
<td>Qualitative Study</td>
<td>These studies focus more on the process, including investigative research (e.g. a survey regarding current practice) and clinical wisdom (e.g. an anecdotal study, protocol description).</td>
</tr>
<tr>
<td></td>
<td>Anecdotal Study</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Survey Research</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Expert Opinion</td>
<td>A highly regarded expert in a particular field or topic provides her/his opinion (e.g. expert on cognitive music neuroscience gives his opinion about the state of music therapy research in a conference speech; Patel, 2009).</td>
</tr>
</tbody>
</table>

*Note. Based on information from Centre for Evidence Based Medicine, 2009; Coalition for Evidence Based Policy, 2010; Davidson et al., 2003; Edwards, 2002; Reschke-Hernández, in press; Wigram, 2002.*
### Table 2

*Worksheet for Evaluating a Potential Randomized Controlled Trial (RCT)*

<table>
<thead>
<tr>
<th>Study Design</th>
<th>Essential Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>Groups or individuals were randomly assigned.</td>
</tr>
<tr>
<td></td>
<td>Adequate sample size to determine meaningful effects.</td>
</tr>
</tbody>
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#### Equivalency of Experimental and Control Groups

| ✓ | Experimental and control groups are highly similar prior to intervention. |
| ✓ | Informed consent obtained before participant learned of his/her group assignment. |
| ✓ | Control was maintained throughout the study (with minimal “cross-over”). |
|   | Data collected in the same way at the same time from experimental and control groups. |
| ✓ | Outcome data obtained from at least 80% of original participants (low attrition). |
| ✓ | Participants remained assigned to same group originally randomized to. |

#### Outcome Measures

| ✓ | Valid outcome measures used, without bias towards experimental or control group. |
|   | Measured outcomes correlated with or practically important to the research questions. |
| ✓ | Data collectors remained blind to participants’ group assignment to prevent bias. |
|   | Measured if treatment effects lasted long enough to be meaningful to the participant (this criteria is preferred, but not essential). |

#### Intervention Effects

| ✓ | The effect size and its practical importance are reported (if claiming the intervention is effective). |
|   | The tests that show the effect is statistically significant are reported (if claiming the intervention is effective). |
|   | All outcomes that the study measured are reported (not just the positive ones). |

*Note:* Based on information from “Checklist For Reviewing a Randomized Controlled Trial of a Social Program or Project, To Assess Whether It Produced Valid Evidence” (Coalition for Evidence Based Policy, 2010).

Although the guidelines of evidence-based practice have been in place since the early 1990s (Eddy, 1990; Evidence Based Medicine Working Group, 1992), the plethora of non-pharmacological treatment options available to children with autism generally lack adequate
research evidence to demonstrate their effectiveness (Case-Smith & Arbesman, 2008; National Autism Center, 2009; Romanczyk & Gillis, 2005; Umbarger, 2007). Making research information regarding treatment options readily accessible to healthcare providers and families can be challenging and cause further difficulty in making informed decisions (Romanczyk & Gillis, 2005; Umbarger, 2007). By adhering to evidence-based practice guidelines, practitioners can discern treatments that demonstrate adequate support from those unsubstantiated in order to provide appropriate treatment that addresses the needs and desires of a client.

In the past decade, the level of evidence supporting music therapy practice for children with autism has been scrutinized. Meta-analyses and systematic reviews of literature both by music therapists and non-music therapists have revealed insufficient published research, faulty research methods, the presence of significant research bias, and an absence of strong empirical support (Accordino et al.; Gold et al., 2006; National Autism Center, 2009; New York State Department of Health Early Intervention Program, 1999; Reschke-Hernández, in press; Whipple, 2004; Wigram & Gold, 2006). An international survey has also suggested a possible disconnect between clinical practice and clinical research (Baker, Wigram, Stott, & McFerran, 2008, 2009). Although most of the recent research base continues to consist of evidence from clinical wisdom and case studies (e.g. Allgood, 2005; Dellatan, 2003; Holck, 2004; Kern & Aldridge, 2006; Kern, Wakeford, & Aldridge, 2007; Kern, Wolery, & Aldridge, 2007; Pasiali, 2004; Wigram, 2002; Woodward, 2004), a recent historical review indicated that improved levels of research evidence, including low-quality randomized controlled trials (Kim, Wigram, & Gold, 2008, 2009), are

Perhaps the impetus for improving the levels of research evidence began with the analysis by the New York State Department of Health Early Intervention Program in 1999. This program developed a clinical practice guidebook for parents and professionals that provided evidence-based recommendations to inform treatment intervention decisions for children with autism in early intervention programs. Treatments were labeled as demonstrating strong evidence, moderate evidence, limited evidence, or no evidence. According to the panel review, music therapy lacked sufficient evidence and could not be recommended as a treatment intervention. In particular, the panel identified a lack of sufficient intervention reporting and scientific methodology in music therapy research (New York State Department of Health Early Intervention Program, 1999).

Similar criticisms resonate in more recent reviews of music therapy research evidence. According to Accordino et al. (2007), the evidence that supports music therapy practice for children with autism is almost entirely limited to case studies, small group studies, and anecdotal information, and this available research contains considerable bias and does not consider if any negative effects exist. Although case studies provide enormous detail, research with larger sample sizes and scientific rigor can be generalized and make a stronger impact on the medical community to affirm music therapy as a viable form of treatment (Umbarger, 2007; Wigram & Gold, 2006).

In response to such criticism, a meta-analysis of quantitative music therapy research with children and adolescents with autism was conducted (Whipple, 2004). Results of this systematic review suggest that music is highly effective with this population. However,
small sample sizes of the included studies limit the generalization of findings. Only two of the 10 eligible studies were peer reviewed or available in print, limiting the accessibility of these studies to other healthcare professionals and families. The results of this meta-analysis also indicate that an examination of specific music therapy intervention techniques is needed as those in the included studies are so varied that arriving at any definitive conclusions is difficult (Whipple, 2004; Wigram & Gold, 2006).

A recent Cochrane Library review (Gold et al., 2006) strengthens the argument that more empirical evidence supporting the use of music therapy to treat individuals with autism is needed. This systematic review found three eligible studies with small sample sizes that indicated that music therapy was more effective in improving communication skills than non-music therapy conditions. However, of the included studies, only short-term effects were evaluated, studies contained some level of bias in assessor blindness, limited information was provided regarding how subjects were randomized, and standardized assessment scales were not used. All of these factors may have influenced the outcomes of the studies included in this review. Additionally, the results of this review are difficult to generalize to clinical practice due to both small sample sizes and the limited number of music therapy intervention techniques described (Gold et al., 2006).

**Intervention Reporting**

A recent historical review of music therapy treatment interventions for children with autism suggests that intervention techniques used in the past continue to be utilized despite an absence of sufficient research evidence (Reschke-Hernández, in press). A potential cause of this continued recycling of interventions without sufficient supporting evidence could be the result of general insufficient reporting of music-based treatment interventions for children...
with autism in the literature. Intervention reporting provides a detailed account of the rationale for why an intervention was chosen, how it was executed and by whom, and how others can replicate the intervention for application in practice.

Published clinical research provides a venue for explaining the details of these intervention techniques through qualitative and quantitative methods and thus informs music therapy clinical practice and future research. Without detailed intervention reporting in clinical literature, music therapy clinicians cannot adequately determine the quality of a treatment intervention or the research supporting it. It is also difficult to derive accurate and complete information to replicate the study, conduct systematic reviews, or apply the intervention in practice (Des Jarlais, Lyles, Crepaz, & the TREND Group, 2004; Robb & Carpenter, 2009). Inadequate intervention reporting leaves music therapists unable to validate music therapy as an evidence-based treatment option for children with autism to other professionals, clients and their families, and third party providers. Guidelines for reporting the wide variety of music-based intervention techniques for this population in the literature are needed.

Guidelines for transparent reporting of randomized controlled trials (RCTs) have been presented in the medical literature. The recently updated Consolidated Standards for Reporting Trials (CONSORT) Statement (CONSORT, 2010) is a free 25-item checklist to guide authors in supplying the detailed information that is necessary in a study in order for readers to adequately understand and evaluate the research. It specifies how authors should report information in all parts of published research, including the title, abstract, method, results, and discussion section. The EQUATOR network (Enhancing the QUAlity and Transparency Of health Research [sic]) is an international forum that advocates the use of the
CONSORT statement, provides education about the importance of quality and transparent research, and conducts research regarding quality and transparent intervention research reporting (EQUATOR Network, 2009).

Since its first publication in 1996, the CONSORT statement has had a significant positive impact on transparent research reporting, particularly in journals that have adopted the guidelines (Moher, Jones, & Lepage, 2001). “Adherence to reporting guidelines . . . decreases honest reporting errors, helps to uncover bad research practice, and improves the reliability and usefulness of publications” (Altman & Simera, 2010, p. 2). Poor reporting of quality research can lead to misinterpretation, misuse of techniques, oversight by readers, and, ultimately, a waste of project funding, time, and resources. It is the responsibility of authors, reviewers, and editors to ensure that quality and transparent reporting standards are followed (Altman & Simera, 2010).

Guidelines specific to transparent behavioral medicine research reporting have also been published, such as the revised CONSORT statement (Davidson et al., 2003). Item four in the CONSORT statement specifies that interventions should be clearly delineated, but this item is vague in its application to behavioral medicine. The revised CONSORT statement proposes additional guidelines for reporting transparent interventions, including specific content and format, details about the provider and the recipient, treatment setting, intensity, duration, and fidelity (Davidson et al., 2003).

The Transparent Reporting of Evaluations with Nonrandomized Designs (TREND) checklist was specifically created to improve intervention reporting in research using designs other than RCTs, including behavioral and public health interventions, and can be used to supplement CONSORT guidelines. Similar to the revised CONSORT statement, the
TREND statement requests authors to provide intervention details including content, delivery method, unit of delivery, deliverer, setting, dosage (quantity and duration of treatment), time span, and incentives to complete treatment (Des Jarlais et al., 2004). It has also been suggested that complex interventions should be graphically represented during study planning, implementation, and reporting (Perera, Heneghan, & Yudkin, 2007). This method helps the researcher ensure control and treatment measures are consistent, aids the reader in quickly viewing the differences between treatment and control conditions, and allows detailed representation in intervention reporting within journal page limits (Perera et al., 2007). Although the TREND statement, the revised CONSORT statement, and the graphical approach provide more specifications for clearly reporting behavioral medicine interventions, the complexity of music-based interventions requires comprehensive reporting guidelines more suitable to the particular characteristics of this discipline (Robb & Carpenter, 2009).

A systematic review of literature has established how music-based interventions have been reported in pediatric healthcare settings in order to help determine transparent intervention reporting guidelines (Robb & Carpenter, 2009). The results of this review revealed significant gaps in intervention reporting with this population including music qualities; materials and setting; treatment components, delivery method, dosage, and fidelity; and provider details. Based on the findings of this review, the CONSORT and TREND statement recommendations, evidence-based rationales, and behavioral intervention reporting reviews, Robb, Burns, and Carpenter (2010) developed the Music-Based Intervention Reporting Criteria checklist to guide transparent reporting of music-based interventions. The seven components of this checklist include: intervention theory, intervention content, intervention delivery schedule, interventionist, treatment fidelity, setting, and unit of
delivery. The category ‘intervention content’ is further divided into five subcategories: person selecting the music, music reference, music delivery method, intervention materials, and intervention strategies.

Considering that intervention techniques used in the past for children with autism continue to be utilized despite a lack of supporting research evidence (Reschke-Hernández, in press), future researchers should ensure they follow the criteria set forth for quality and transparent intervention reporting in the Music-Based Intervention Reporting Criteria checklist (Robb & Carpenter, 2009; Robb, et al., 2010). Music therapists ought to provide enough information in published research, be it experimental, descriptive, or qualitative, so that the investigated techniques can be applied successfully in clinical practice. The fundamental purpose of music therapy research is to benefit the client receiving treatment. By systematically approaching focused research problems to explore the efficacy of precise techniques and adequately documenting these techniques in the literature, music therapists will use effective evidence-based treatments. This will improve the ease of transferring information from the literature into practice, facilitate communication within and outside of the music therapy profession, and raise the level of evidence supporting these interventions. Transparent intervention reporting will also help prevent the recycling of intervention techniques that lack evidence of effectiveness and, ultimately, improve the quality of treatment for clients.

**Music Therapy Assessment**

One element that could be added to the Music-Based Intervention Reporting Criteria checklist is the method of client assessment that led to the implementation of the specific intervention. Assessment is an integral part of evidence-based practice as it informs clinical
wisdom through routine documentation and evaluation of outcomes. Assessment is a methodical approach to collecting and deciphering data about an individual and translating this information into effective treatment (Gearheart & Gearheart, 1990). It provides a way to demonstrate that services are necessary and appropriate; make informed treatment decisions; provide baseline comparisons to monitor treatment; and communicate treatment outcomes to the client, the client’s family, and other professionals. In the United States, assessment is a requirement of both the No Child Left Behind Act of 2001 (PL 107-110) and the Individuals with Disabilities Education Act (PL 94-142; Adamek & Darrow, 2010). Assessment is also a general standard of clinical practice of the American Music Therapy Association and is a specific requirement for those working with individuals with developmental disabilities (American Music Therapy Association, 2009).

Quality music therapy assessment can assist the effort to present evidence in support of a treatment intervention because it can provide a reliable and objective process to evaluate clinical outcomes. It also informs evidence-based practice by providing the practitioner with insight into the best treatment practices and helps to ensure appropriate individualized treatment is provided (Baxter et al., 2007; Boxill, 1985; Griggs-Drane & Wheeler, 1997). Although quality assessment can fulfill these essential functions in evidence-based music therapy practice, limited accessible tools exist to assist a music therapist in identifying appropriate goals and objectives for children with autism.

In randomized controlled trial research, the use of well-established, reliable, and valid measures is recommended (Coalition for Evidence Based Policy, 2005). At this time, there is no widely used assessment tool among music therapists working with children with autism (Walworth, 2007). Applicable published music therapy assessment tools have been found
time-consuming, difficult to administer, inaccessible, or not specific to this population (e.g. Baxter et al., 2007; Boxill, 1985; Brunk & Coleman, 2000; Bruscia, 1987; Chase, 2002; Coleman & Brunk, 1999; Nordoff & Robbins, 2007). Many have not been adequately tested for reliability or validity (Drummond & Jones, 2006, p. 110; Gabovitch & Wiseman, 2005). Without a quality assessment tool, an inexperienced music therapist can become overwhelmed by the assessment process and inadequately document client behavior (Palmer, 1983). Some practitioners administer assessments from related disciplines that exceed a music therapist’s professional expertise (Gfeller & Baumann, 1988; Thorndike, 1997; Wilson & Smith, 2000). In clinical work, it is wise to parallel the high standards of other healthcare professions and be knowledgeable about commonly used assessment tools with a particular population (Boxill, 1985; Griggs-Drane & Wheeler, 1997), particularly in collaborative approaches to treatment. It is equally important for music therapists to remain within their scope of practice and utilize assessment procedures that correlate with the treatment being provided. Improving assessment methodology will ultimately help establish the validity of music therapy as an evidence-based practice for children with autism because “... treatments... can be identified as empirically supported only on the basis of solid assessment data” (Hunsley, Crabb, and Mash, 2004, p. 25).

The Special Education Music Therapy Assessment Process (SEMTAP) is an assessment method that has been utilized by many music therapists since its introduction in the late 1990s (Brunk & Coleman, 2000; Coleman & Brunk, 1999). This handbook provides a detailed referral and assessment procedure to follow in a public school setting and is applicable to various populations. It provides numerous examples of clinical contracts, written communication, and assessment reports. The SEMTAP has not, however, been
updated to represent revisions to special education law, nor does it provide an assessment tool.

More recently, the assessment tool from the Social Communication, Emotional Regulation, and Transactional Support (SCERTS) curriculum model has been explored as a possible assessment tool in music therapy for children with autism (Walworth, 2007; Walworth et al., 2009). The SCERTS model is autism-specific and developmentally based, and the assessment corresponds with the model’s curriculum. This team-based assessment provides highly detailed information about the child, and goal formulation is very straightforward after assessment is complete (Prizant, Wetherby, Rubin, Laurent, & Rydell, 2006). The SCERTS follows many of the guidelines for validity suggested in the literature (Drummond & Jones, 2006; Gabovitch & Wiseman, 2005; Van Ornum, Dunlap, & Shore, 2008). In spite of these benefits, it has not been tested for reliability, and according to this review, it appears to be a cumbersome assessment. This onerous quality can create a challenge for its widespread application in music therapy practice because it can overwhelm novice music therapists, requires significant training outside of the typical scope of practice, and is lengthy to accurately administer. In addition, although the SCERTS method can provide enormous detail about a child with autism, it does not provide an efficient or cost effective method of assessment. The required resources and time to implement this assessment tool create a burden to the therapist, the employer, and the consumer. Therefore, it is reasonable to assume many music therapists, particularly those with a large client base or minimal clinical experience, will be unlikely to use the SCERTS assessment model.
Assessment Methods

Assessment and documentation are challenging across all therapeutic modalities (Kroeger & Cardy, 2006), including music therapy. Considering the complexity that might exist within a music therapy session, there are several methods to gather assessment information. These include interviewing the client, family, and other professionals, using supplementary materials such as pre-existing client charts (Drummond & Jones, 2006), and behavioral observation (Drummond, 2000).

Behavioral observation can be completed using video and audio recordings (Kroeger & Cardy, 2006; Suárez & Daniels, 2009). Video recording allows the music therapist to focus all attention on the client during the session and view the video at a later time. This method preserves the session in real-time and allows for careful attention to detail during the assessment without relying on memory. Video recording allows a music therapist to evaluate therapist-client interactions and improve technique. Audio recording is an alternative to video that preserves session details and allows for subsequent analysis of auditory material such as language and musical expression. (Kroeger & Cardy, 2006; Suárez & Daniels, 2009).

In the United States, the privacy constraints of the Health Insurance Portability and Accountability Act (HIPAA) of 1996 (PL 104-191) have limited video and audio recording in many facilities (Campbell, Sosa, Rabinovici, & Frankel, 2006). Video and audio recording may also create budgetary strain due to the cost for appropriate equipment and the allocation of time necessary for coding (Kroeger & Cardy, 2006). Some elements of a session cannot be recorded using video equipment, for example when a client moves out of the viewfinder. Audio recording does not register visual indicators that are part of the assessment, including facial expression, eye contact, and physical behaviors. It is also
difficult to capture intangible elements of a client-therapist relationship using video and audio recording, such as the clinical thought process and decision-making that occur when interacting with a client. Finally, expectations can bias the outcome of the assessment when the music therapist that provides the treatment performs the assessment.

An observer trained to objectively recognize and record operationally defined behaviors or elements of the music therapy session and who is familiar with music therapy treatment can perform a live assessment (Drummond, 2000). This method relieves pressure from the music therapist to collect data during the session and eliminates the time to either review a tape or complete an assessment post-session. However, this method requires extra training with its associated time and costs. Using non-music therapists, non-musicians, and those unfamiliar with the client population can be problematic because musical behaviors (e.g. changes in key, tempo, rhythm), musical representations of non-musical behaviors (e.g. musical interaction or communication), and population-specific behaviors can be overlooked or misinterpreted. The addition of an unfamiliar person can also influence the behavior of a client (Drummond & Jones, 2006), particularly a child with autism. Finally, compensating an assessment assistant can be cost prohibitive.

A more economical option than using an assistant or video recording is for the music therapist to document assessment information either after the session (based on memory) or while concurrently leading the session. The inherent characteristics of the therapist as assessor eliminate the extra training and cost of assistant or video equipment. A music therapist is trained in the techniques in use, has familiarity with the clinical population, and has defined the behaviors or attributes being assessed. As with video or audio analysis, the expectations of a music therapist serving dual roles as assessor and treatment administrator
can bias the outcome of the assessment. Due to the complexity that often exists within a music therapy session, elaborate quantitative and qualitative data cannot be recorded either during or after the session. If a music therapist records data while leading a session, something will be lost from the therapist-client interaction. A limitation of recording information after the session is the therapist’s memory capacity. The therapist might unintentionally document assessment information incorrectly or never complete the documentation.

A possible solution is to create an assessment tool that allows a music therapist the flexibility to administer the tool in a variety of ways. In this regard, the music therapist could weigh the benefits and limitations of each assessment method and determine what is most appropriate in his or her given situation. Based on the known limitations of the various assessment formats and the expectations of evidence-based practice, the primary challenge is to develop an assessment tool for children with autism that provides a practical and efficient means to determine client goals and objectives.

The ideal assessment tool should be simple for the therapist to use in the context of a music therapy session and afford the flexibility for use in the other aforementioned assessment formats. It should be valid, reliable, and objectively provide the music therapist with useful information to facilitate goal formulation (Drummond, 2000). Such a tool should dually function as both an intake and ongoing assessment tool in order to adequately document clinical outcomes across the treatment period in a consistent manner. This consistency prevents variability in the measurement outcomes because the music therapist does not have to interpret data across different tools. Finally, the tool should be usable by
other professionals to promote unambiguous communication and collaboration between members of a team.

Attributes of Assessment Tools

Attributes of quality assessment tools include validity, objective measures, and reliability (Drummond & Jones, 2006; Gabovitch & Wiseman, 2005; Van Ornum et al., 2008). Validity refers to how well a tool measures what it was intended to measure and refers to both concurrent and content validity (Pierangelo & Giuliani, 2006). A tool that has comparable quality to other available tools has high concurrent validity; a developmentally appropriate and population specific tool has high content validity. Content validity is increased when an assessment tool for a child with autism is based on both developmental milestones (to serve as a gauge) and the Diagnostic and Statistical Manual of Mental Disorders (4th ed., text rev.; DSM-IV-TR) criteria for an autism diagnosis (Gabovitch & Wiseman, 2005). The domains outlined for an autism diagnosis in the DSM-IV-TR include social skills, receptive and expressive communication, and behavior (restrictive, repetitive, stereotyped patterns of behavior, interests, and activities) (APA, 2000; Gabovitch & Wiseman, 2005).

A quality assessment tool should provide objective measures. Objectivity directly influences the reliability and validity of an assessment tool (Gabovitch & Wiseman, 2005). An assessment tool should provide both objective qualitative and quantitative data that can be translated into treatment recommendations, provide baseline data, and support claims of treatment success with detailed documentation (Boxill, 1985; Coleman & Brunk, 1999; Wigram, 2000). It is difficult to maintain objectivity during a music therapy assessment due to the subjective nature of behavior interpretation. Clearly identifying and operationally
defining the attributes that need to be measured improves observation objectivity (Thorndike, 1997). The tool should be designed to systematically evaluate and accurately record the behaviors. Improving a tool’s objectivity directly influences a tool’s level of reliability (Gitlin-Weiner, Sandgrund, & Schaefer, 2000).

Reliability is an important psychometric property of a quality assessment tool. Reliability refers to the dependability of an assessment or measurement tool to produce consistent scores or results. Various traditional forms of reliability include alternate forms, internal consistency, inter-rater, and test-retest reliability (Kline, 2005). Alternate forms reliability explores the degree of similarity between the results of two versions of the same test. Internal consistency reliability examines if multiple items within a single test will yield similar or consistent scores (Strube, 2000). Inter-rater reliability refers to how much coding agreement exists between the scores obtained by multiple users of an assessment tool (Drummond & Jones, 2006). In other words, if two or more people assess the same child using the same assessment tool, they should get similar results. Test-retest reliability refers to the similarity of results acquired if an assessor completes an initial assessment and then repeats the assessment on a different occasion (Drummond & Jones, 2006; Gabovitch & Wiseman, 2005).

**Determining the Reliability of Assessment Tool Scores**

**Classical test theory.** Classical test theory (CTT) is the model that has been traditionally used to determine reliability in psychological measurement and is comprised of three components: true scores, observed scores, and measurement error (Furr & Bacharach, 2008). An individual’s true score on an assessment is a hypothetical concept referring to the average score obtained if the assessment was performed an infinite number of occasions
(Kline, 2005). The observed score is the result obtained for a particular item on an assessment. Measurement error refers to the variables that could influence an inconsistency between the true score and observed score (Furr & Bacharach, 2008). Therefore, in CTT the resulting observed score on an assessment reflects influences from both the hypothetical true score and the sources of measurement error. Reliability is represented by a relationship between observed scores, true scores, and error (Lakes & Hoyt, 2009; Strube, 2000).

CTT can provide valuable information about an assessment’s reliability in situations in which there is only one source of measurement error (e.g. Gallagher, Franchignoni, Giordano, & MacLachlan, 2010; Güler & Gelbal, 2010; Hays, Brown, Brown, Spritzer, & Crall, 2006). In situations in which there are more sources of error, such as the use of multiple raters or observations in behavioral assessment, the resulting reliability coefficient can be misleading. True score variance tends to be overestimated, and error variance tends to be underestimated. CTT also fails to identify the specific sources of variance (Crocker & Algina, 1986; Furr & Bacharach, 2008; Lakes & Hoyt, 2009). Identifying the sources of variance and how they contribute to measurement error would be useful for making decisions about how to revise or apply an assessment tool.

**Generalizability theory.** In contrast to CTT, generalizability theory (G-theory) provides a flexible and comprehensive method to simultaneously assess multiple sources of both known and random error in order to estimate the reliability of a measurement. In G-theory, the quality of an assessment tool is evaluated by investigating various combinations of sources of error, for example raters, the number of behavioral observations used, or how raters changed their assessments of a child across different observations. In this regard, G-theory provides a more accommodating and accurate estimate of reliability than CTT. It can
also be used to predict how the quality of a tool could change if the sources of error were altered (i.e. fewer raters, more observations, etc.; Cronbach, Gleser, Nanda, & Rajaratnam, 1972; Furr & Bacharach, 2008; Lakes & Hoyt, 2009; Wasserman, Levy, & Loken, 2009).

Numerous researchers in the behavioral sciences have recognized the value of using G-theory to compute reliability in assessment tool development and inform the optimization of assessment administration. One such study examined the reliability of alternate assessment scores in special education and identified the specific assessment conditions (e.g. number of raters and observations) that would allow the tool to both yield reliable scores and maintain cost-efficiency (Taylor, 2009). G-theory has been similarly applied in reading performance analysis of children with disabilities in public schools (Tindal, Yovanoff, & Geller, 2010) and in determining the optimal numbers of raters and test items for a new version of the Test of English as a Foreign Language (TOEFL; Lee, 2006).

G-theory has also been utilized to inform the revision of new and existing assessment tools. For example, one group of researchers used G-theory analysis to revise an assisted living facility care quality assessment. They determined the appropriate number of assessment observations and identified sections of the tool for revision in order to improve the overall reliability of the assessment scores (Rantz et al., 2008). Finally, G-theory is useful in establishing the credibility of an assessment tool when comparative tools are not available to determine concurrent validity. An assessment tool developer should first assess the reliability of the scores of the tool to determine if it is a dependable form of measurement rather than attempt to determine its concurrent validity against a nonequivalent tool or one with inadequate psychometric analysis (Chafouleas, Christ, Riley-Tillman, Briesch, &...
Chanese, 2007). Based on the literature, G-theory appears to be the more appropriate method for analyzing the reliability of the scores of a new behavioral assessment tool.

**Additional Attributes of Assessment Tools**

If an assessment meets the aforementioned properties of validity, objectivity, and reliability but is lengthy or difficult to complete, it will not be widely used by music therapists. Ideally, a music therapist should be able to quickly administer and tabulate the assessment (Drummond, 2000; Drummond & Jones, 2006; Thorndike, 1997). Supplementary materials such as client files, interviews with parents, and information from other professionals treating the child can help the music therapist gain a more holistic view of a child and decrease the length of the music therapy assessment (Drummond & Jones, 2006). Parent reports can be particularly helpful if they can be returned to the therapist in advance. Any parent-component of an assessment should be easy to read and use and take less than 10 minutes to complete (Gabovitch & Wiseman, 2005).

Once a tool satisfies all suggested criteria of a high-quality assessment tool (validity, reliability, and objectivity), it ought to be standardized in practice. This means the tool must be widely distributed and used by numerous professionals to assess many individuals from the tool’s intended population. The assessors and the assessed must be from varied demographic and geographic backgrounds. Clinical experts must field-test the tool, and evidence that describes the assessors and the assessed must support the tool (Gabovitch & Wiseman, 2005). Figure 1 illustrates the characteristics of a high-quality assessment tool and can serve as a guide for music therapists.
In summary, the psychometric attributes of a high quality music therapy assessment tool include validity and reliability, acknowledging that the objectivity of a tool directly influences its level of validity and reliability. To improve the likelihood that it will be used in clinical practice, the tool should be easy to complete and take minimal time to administer. Finally, a well-designed assessment tool meeting the aforementioned criteria should be standardized (Drummond, 2000; Drummond & Jones, 2006; Gabovitch & Wiseman, 2005; Van Ornum et al., 2008).

**The Autism Developmental Skillset Assessment**

Accurate assessment is vital to the treatment process. However, limited accessible tools exist to assist a music therapist in identifying appropriate goals and objectives for children with autism. A music therapist can design an appropriate assessment tool that corresponds to the clinical population with whom she or he works. The *Autism Developmental Skillset Assessment* (ADSA, see Appendix A) provides a practical and efficient means to inform the development of appropriate treatment goals and objectives for children with autistic disorder. It dually functions as both an intake and ongoing assessment.
to consistently document initial assessment and clinical treatment outcomes. A consistent
documentation tool will improve a clinician’s ability to communicate music therapy
treatment outcomes to the client, family, other professionals, and insurance companies.

**Attributes of the Autism Developmental Skillset Assessment (ADSA)**

The primary attributes of the ADSA include content validity, objectivity, and
practicality. The content validity of an assessment is improved if it is developmentally
appropriate and specific to a population. Typical developmental milestones provide a
context of expectations for a client’s age. When a clinician understands typical development,
they can more clearly identify appropriate goals and objectives, thus providing high quality
treatment to a child with a disability. Grounding the ADSA in typical development provides
a clinician with perspective, encourages the use of age and developmentally appropriate
interventions, and improves its content validity.

Content validity of the ADSA is further substantiated because it is disability-specific,
and the major assessment domains are based on the criteria for autism diagnosis provided in
the DSM-IV-TR. These domains include social skills; receptive and expressive
communication; and restrictive, repetitive, stereotyped patterns of behavior, interests, and
activities (abbreviated ‘behavior’ in the ADSA; APA, 2000). Each domain is further divided
into subdomains for clarity and organization. Concurrent validity is increased because it is
based on an accepted and valid general diagnostic framework set forth by the American
Psychological Association (Gabovitch & Wiseman, 2005). It is difficult to further
substantiate concurrent validity because (despite an exhaustive search) the author has not yet
found a comparable tool. To improve objectivity and reliability, the ADSA includes a
glossary of response definitions for all assessment behaviors and detailed instructions for use of the tool.

The ADSA is intended for use in music therapy; however, it does not contain domains to assess quantitative information about music skills. The music therapist should formulate functional goals that can be generalized to life outside the controlled therapeutic environment rather than music-oriented goals (Thaut, 2000). Following the Transformational Design Model, goals and objectives should be determined based on client assessment and translated into appropriate “nonmusical therapeutic exercises and stimuli” (Thaut, 2000, p. 35). Clinical wisdom, evidence from research, creativity, and strong functional musicianship inform a music therapist’s logic to transform these nonmusical exercises into music therapy interventions (Thaut, 2000). When using the ADSA, the specific musical and non-musical elements of an intervention that influence client responses can be qualitatively documented in the session plan, and information such as music preference can be anecdotally recorded. Additionally, if a client displays a musical version of a behavior (e.g. communicating via instrument play), this can be noted both in the comments portion of the ADSA and through a detailed report of the intervention (Robb & Carpenter, 2009; Robb et al., 2010).

From a collaborative and interdisciplinary viewpoint, different professionals who work with a child can use the ADSA to communicate assessment and documentation outcomes in consistent and transparent language. The music therapist can compare results of the ADSA with members of other disciplines to determine the areas that will be most impacted by music therapy intervention. For instance, an area in which the child is unsuccessful in other treatment venues, but scores highly during music therapy, gives the music therapist a distinct advantage to help the child improve and generalize this skill.
The ADSA has several administration options. Ideally, the music therapist learns to administer the ADSA while leading a music therapy session. This is the most time- and cost-efficient method of assessment and avoids HIPAA constraints, but has the potential to interrupt the flow of the session and diminish therapist-client interactions. If funding, time, and legal constraints allow, the ADSA can be completed with the aid of video recording or a trained assistant. The most accurate and detailed results will likely be obtained using one of these two methods, but the ADSA is designed to function using any completion method, including post-session. Systematic evaluation and accurate recording is supported by a streamlined design and consistent frequency count scoring system used across all domains (Thorndike, 1997). The ADSA allows the assessor to quickly indicate the behavior and the type and number of prompts given. This efficient checklist system makes it possible to complete the assessment during a session or quickly after a session and provides more objectivity than a rating scale system (Thorndike, 1997). Additionally, a section for anecdotal comments within each subdomain allows for both qualitative and quantitative assessment, thus satisfying most assessment needs (Drummond & Jones, 2006; Kroeger & Cardy, 2006).

A supplementary questionnaire was developed to inform the music therapist of items not accounted for on the ADSA. Supplemental information is useful to have prior to the first encounter with a client, such as medication side effects, physical limitations, music preferences, other therapy received, and behavior challenges (see Appendix B). Parents, a classroom teacher, or another treatment team member could complete this questionnaire, or it could serve as a guide during a chart review or interview. When information is gathered from multiple sources a holistic view of a client is gained and time spent in direct observation
is reduced (Drummond & Jones, 2006). This questionnaire also supports an evidence-based practice mindset and helps build rapport by accounting for the needs and desires of the family and client at the time of assessment.

Due to the multi-sensory nature of music, a music therapist will probably address numerous skills within one music therapy application. However, it is more important for a music therapist to demonstrate quality assessment in one area and accurately document quantitative and qualitative behavioral change than to record inadequate or haphazard data across all domains at once. Therefore, the assessor is advised to code a maximum of one domain of the ADSA (e.g. social skills) for each application within a session. By focusing on specific skills in which music therapy can most impact a child’s life, the music therapist can address the precise therapeutic elements of the music and the intervention that are causing the dynamic of a skill to occur.

The attributes of the ADSA were based on a review of literature regarding the properties of a quality assessment tool and a review of formal published and informal unpublished tools in both the autism and music therapy literature. The development of the tool was informed through a holistic and systematic process involving multiple reviews and revisions with input from a panel of experts. The complexity of developing such a tool is worthy of explanation to inform music therapists working with the same and other client populations to support quality assessment development.

**The Development of the ADSA**

The ADSA was developed across two-and-a-half years of a master’s degree program. Personal frustrations with assessment and documentation in professional practice led to its inception during an advanced clinical experience. The ADSA was further developed during
a pilot study. The results of this pilot study informed changes to this tool, and the author assembled a panel of experts to provide additional input. The reliability of the final version of the ADSA will be tested as part of this master’s thesis. The entire construction, review, and editing process have been critical to developing strong reliability and validity for the ADSA.

A procedure for developing achievement and aptitude tests emphasizes the importance of documenting the steps taken to increase the reliability and validity of a test, developing a purpose statement for the test, and providing supplementary materials to promote appropriate use of the test (Drummond, 2000). This process involves eight phases and can be applied to the development of a music therapy assessment tool for children with autism. During phase one, the test creator establishes a need for tool development. This can be achieved through personal reflection, conducting surveys, and reviewing and critiquing similar or related tools. During phase two, the creator delineates the objectives and parameters of the test to clearly define the test’s purpose and how the derived information will be useful. The developer also considers the appropriate test format and identifies the attributes or behaviors that will be evaluated.

An advisory committee becomes involved in phase three to review the test and provide feedback to the developer. When creating achievement or aptitude tests, phase four involves creating questions (Drummond, 2000). In music therapy, this phase involves clearly articulating operational definitions of the attributes being assessed and making revisions suggested by the advisory committee. In phases five and six, a pilot study is conducted to identify and revise areas that were confusing, difficult to use, or contained bias. In phase seven, the developer finalizes the test, and both internal (i.e. test developers) and external
independent committees review it. Finally, technical information regarding validity, reliability, and norm referencing are determined (Drummond, 2000). The author developed the ADSA tool following a similar process, which is illustrated in Figure 2.

![Diagram of the eight-phase process for developing the Autism Developmental Skillset Assessment](image)

*Figure 2. The eight-phase process for developing the Autism Developmental Skillset Assessment.*

**The ADSA Pilot Study**

The pilot study (Reschke-Hernández, 2009a) compared the reliability of the scores of the initial version of the ADSA to that of a generic narrative assessment tool using G-theory. It also compared the inter-rater reliability of primary and secondary goal selection using information obtained from the assessment tool. Participants ($N = 17$) included music therapy undergraduate and graduate equivalency students and music therapy interns. A videotape containing four clips from a music therapy session with a nine-year-old boy diagnosed with autistic disorder was used to evaluate the two assessment tools. Participants viewed each video clip and then completed all domains of the assessment tool for that clip. Additional time was provided at the end of the assessment to select one primary and one secondary goal.
area (expressive communication, receptive communication, social, or behavior) (Reschke-Hernández, 2009a).

The inter-rater reliability of the generic narrative assessment tool was .38 ($n = 8$) for the primary goal selection and .38 ($n = 8$) for the secondary goal selection. The inter-rater reliability of the ADSA was .67 ($n = 9$) for the primary goal selection and .44 ($n = 9$) for the secondary goal selection. G-theory analysis was used to obtain reliability estimates via the $g$ coefficient. The resulting $g$ coefficient for the generic narrative assessment tool for absolute measurement was .77. The $g$ coefficient for the ADSA tool for absolute measurement was .82. Analysis of each domain of the ADSA tool revealed three of the four domains could be revised to improve the overall $g$ coefficient: 1. expressive speech and language, 2. receptive speech and language, and 3. behavior. Analysis of each subsection within these domains identified specific areas for revision (Reschke-Hernández, 2009a).

Results of this pilot study indicated that the initial version of the ADSA demonstrated a stronger level of inter-rater reliability in primary and secondary goal selection in comparison to a generic narrative assessment tool. However, both tools demonstrated a poor level of inter-rater reliability in the selection of the secondary goal. This indicates that clearer directions, definitions, and training with the ADSA tool could improve inter-rater reliability for goal selection in future studies. Additionally, the raters’ amount of clinical experience and lack of professional credentialing may also have influenced reliability results and should be considered when determining participant inclusion criteria in future studies. The ADSA demonstrated a higher level of reliability and more specificity in comparison to a generic narrative assessment tool and surpassed the recommended reliability level of .80 (Cardinet, Johnson, & Pini, 2010; Lakes & Hoyt, 2009). Although participants in the
narrative assessment group had access to the same glossary as participants in the ADSA group, they generally provided minimal information (Reschke-Hernández, 2009a).

**Statement of Problem and Conclusion**

A primary challenge for music therapists is to develop a valid and reliable assessment tool for children with autism that provides a practical and efficient means to meet assessment and documentation needs as well as the demands of evidence-based practice. Currently, limited accessible tools exist to assist a music therapist in identifying appropriate goals and objectives for children with autism in spite of the stipulations of both public law and the American Music Therapy Association. Without a common, quality assessment, it is difficult to disseminate treatment outcomes (Walworth et al., 2009) and encourages non-goal driven treatment (Thaut, 2000). The development of an autism-specific music therapy assessment tool will equip music therapists with a method to demonstrate accountability and efficacy to other professionals, clients, and their families.

The ADSA aims to fulfill this need. This assessment tool was developed using a holistic eight-phase process (Drummond, 2000) and included a pilot study and review by a panel of experts. Results of the pilot study along with input from both internal and external independent committees informed the revisions to the ADSA and provided guidance for future empirical investigation of this tool. The ADSA has now been finalized and is prepared for a reanalysis of reliability using G-theory. Therefore, the purpose of this paper will be to investigate the reliability of the ADSA. Accordingly, two research questions are posed:

1. What is the inter-rater reliability of primary and secondary goal selection using the ADSA?
2. What is the generalizability (reliability of the scores) of the ADSA?
CHAPTER 3

METHOD

The purpose of this study was to gather sufficient data to determine the statistical reliability of the scores obtained with the *Autism Developmental Skillset Assessment* (ADSA), a new developmentally based music therapy assessment tool for children with autism. Two research questions were posed:

1. What is the inter-rater reliability of primary and secondary goal selection using the ADSA?

2. What is the generalizability (reliability of the scores) of the ADSA?

To ensure results from this study could be generalized to clinical application, statistical reliability analysis required the individualized assessment of a child with autism by multiple raters who were board certified music therapists. The study was composed of three steps. First, a child with autism was videotaped during one individual music therapy session. Second, video clips from the session were selected and edited. Finally, professional music therapists utilized these video clips to complete the ADSA. The reliability of the resulting assessment scores was evaluated using generalizability theory (G-theory) statistical analysis.

**Using Generalizability Theory to Determine the Reliability of Assessment Tool Scores**

In contrast to classical test theory, G-theory provides a flexible and comprehensive method to simultaneously assess multiple sources of both known and random error in order to estimate the reliability of a measurement (Cronbach et al., 1972; Furr & Bacharach, 2008;
Lakes & Hoyt, 2009; Wasserman et al., 2009). To apply G-theory in assessment tool development and reliability analysis, it is necessary to understand the basic constructs underlying the model (see Table 3 for a list of symbols and terminology that are commonly used in G-Theory). G-theory is comprised of two primary components: a universe score and facets. A universe score is considered a hypothetical composite of the infinitely possible observations that could have been used to obtain the assessment score. The select observations used for the assessment serve as a representation for the universe score; therefore, these observations can be generalized to the universe of the population for which the assessment tool is intended (Cronbach et al., 1972; Lakes & Hoyt, 2009).

Facets are the known sources of error that could influence the assessment scores, such as the number of raters, assessment items, and measurement occasions. Facets can be classified as either random or fixed, and a study can include both types of facets (mixed design). A random facet is one in which the sample is replaceable. For example, a sample of 10 children with autism used to test the reliability of an assessment tool could be replaced by a sample of 10 different children with autism. A fixed facet is one that is irreplaceable. For example, autism diagnosis is determined by assessing social, communication, and behavior skills. These domains would be considered fixed or irreplaceable on an autism diagnostic assessment because they have been defined as necessary diagnostic criteria (APA, 2000). Another example of a fixed facet would be if a researcher was only interested in the variability of assessment scores between a select group of therapists with no plans to generalize findings to a larger population of therapists. The researcher determines if a facet is fixed or random (Wasserman et al., 2009).
Table 3

Common Symbols and Terminology Used in Generalizability Theory

<table>
<thead>
<tr>
<th>Symbol or Term</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>×</td>
<td>Crossed with</td>
</tr>
<tr>
<td>:</td>
<td>Nested with</td>
</tr>
<tr>
<td>e</td>
<td>Error, not identified with persons or facets (random or unknown)</td>
</tr>
<tr>
<td>p</td>
<td>Persons (the object of measurement)</td>
</tr>
<tr>
<td>g, h, i, j, k, l</td>
<td>A facet</td>
</tr>
<tr>
<td>o</td>
<td>Occasions, as a facet</td>
</tr>
<tr>
<td>f</td>
<td>Test forms, as a facet</td>
</tr>
<tr>
<td>r</td>
<td>Raters or recorders, as a facet</td>
</tr>
<tr>
<td>s</td>
<td>Schools, as a facet</td>
</tr>
<tr>
<td>t</td>
<td>Teachers or trials, as a facet</td>
</tr>
<tr>
<td>$\sigma^2$</td>
<td>The variance component in a G study</td>
</tr>
<tr>
<td>$E\rho^2$</td>
<td>The generalizability ($g$) coefficient, reliability coefficient for relative decisions.</td>
</tr>
<tr>
<td>$\Phi$</td>
<td>The index of dependability, reliability coefficient for absolute decisions.</td>
</tr>
<tr>
<td>$\sigma^2(\tau)$</td>
<td>Universe score variance</td>
</tr>
<tr>
<td>$\sigma^2(\delta)$</td>
<td>Relative error variance</td>
</tr>
<tr>
<td>$\sigma^2(\Delta)$</td>
<td>Absolute error variance</td>
</tr>
</tbody>
</table>

Absolute decision The results of an assessment identify an individual’s score, not in relation to others.
Crossed design All levels of all facets are tested in combination with each other.
Decision (D) study Typically used in substantive or practical research; based on the results of a G study to maximize the dependability of results.
Error ($e$) The random or unknown sources of score variability not identified in the study.
Facet The known sources of error, e.g. raters, assessment items, measurement occasions.
Fixed facet The sample is not replaceable.

$g$ coefficient ($E\rho^2$) Reliability coefficient used in relative decision studies.
Generalizability (G) study Typically used to determine the reliability of an assessment tool; conducted prior to a D study.
Index of dependability ($\Phi$) Reliability coefficient used in absolute decision studies.
Mixed design A study that includes both random and fixed facets.
Multi-facet A study that contains two or more known sources of error, aside from the individuals being assessed.
Nested design Various levels of some facets are tested with the other facets.
One-facet/single-facet A study that contains only 1 source of error, aside from the individuals being assessed.
Random facet The sample is replaceable.
Relative decision Individuals are rank ordered according to the assessment results.
Universe score A hypothetical composite of the infinitely possible observations that could have been obtained.

Note. Information based on Brennan, 2001; Cronbach, Gleser, Nanda, & Rajaratnam, 1972.

The type and number of facets identified for the study will inform whether a G-theory study is classified as a single- or multi-facet design. In a single facet design, there is only
one known source of error, excluding the population (people) being assessed. In a multi-facet design, two or more known sources of error are identified (Lakes & Hoyt, 2009). Each facet can have multiple levels (the various possible values or numbers of participants the facet can have) and can either be crossed or nested. In a crossed design, all levels of all facets are tested in combination with each other. For example, in a two-facet study involving four raters ($r$), 10 students ($s$), and two occasions ($o$), all four raters would observe all 10 students on both occasions, $r \times s \times o$. This example would be considered nested if two raters observed five students, and another two raters observed the remaining five students on the same occasions, $(r : s) \times o$, avoiding overlap in any of the facets. Crossed designs are considered stronger than nested designs because they provide more specific information and the ability to isolate all sources of variability. Nested designs are useful when conditions do not allow all facets to be crossed with one another (Wasserman et al., 2009). Figure 3 illustrates the differences between crossed and nested designs.

In G-theory, it is recommended that a generalizability (G) study be conducted prior to a decision (D) study. In measurement development, the primary focus of a G study is to determine the psychometric properties (namely reliability) of an assessment tool. The focus of a D study is substantive, as in practical clinical research. Results of a G study are used to determine the levels of each facet (i.e. the number of raters, observations, test items) and type of design (crossed or nested) used in a D study. Without a G study, the results of a D study would be difficult to interpret and generalize because the dependability of the assessment used is unknown (Lakes & Hoyt, 2009; Shavelson, Webb, & Rowley, 1989).
Two-facet crossed design, $r \times s \times o$

Two-facet nested design, $(r : s) \times o$

**Figure 3.** Illustration of the differences between crossed and nested designs (Adapted from examples in Cronbach et al., 1972).

For example, a tool could be designed to assess if children with autism perform differently on social interaction tasks in music therapy as compared to speech therapy. First, a G study would be conducted to determine the reliability and measurement precision of the tool and if the resulting scores could be generalized. An optimization analysis would then be conducted to determine the number and levels of facets (e.g. number of observations and test items) required to obtain reliable results (Cardinet et al., 2010). Based on this analysis, the number of raters might need to be increased, and the number of observation occasions might need to be decreased. A G-facets analysis would be used to determine the extent to which each facet or levels of each facet (e.g. specific raters, specific assessment items) affected the reliability of the tool (Cardinet et al., 2010). This analysis might reveal that one item on the tool had a significantly negative impact on the results and could be eliminated or revised. The information from these analyses would then inform the design of the D study (obtaining
new data) that would be conducted to determine if there was indeed a difference between social interaction in music therapy as compared to speech therapy.

**The Steps of Generalizability Theory Analysis**

The first step in analyzing the results of a G-study is to conduct a factorial analysis of variance (ANOVA). This step estimates the variance component ($\sigma^2$) of each facet (random, fixed, or mixed model). In G-theory, the variance, or error, in the obtained assessment scores can be attributed to each facet and the interaction of the facets. For example, in a two-facet random design that includes raters ($r$), students ($s$), and test items ($i$), there will be seven sources of error: each facet ($r$, $s$, $i$); the interactions between two facets ($rs$, $ri$, and $si$); and the three-way interaction between raters, students, and test items, as well as other unidentified sources of error ($e$) that were not measured in the study ($rsie$).

The second step in analyzing the results of a G-study involves using the results of the ANOVA to obtain either a generalizability ($g$) coefficient ($E \rho^2$) or an index of dependability ($\Phi$). In this step, one must determine if the decisions made with the results will be absolute or relative. If the results of an assessment will rank order individuals, the decision is relative. If the results of an assessment will merely identify a score of an individual, such as in a diagnostic assessment, the decision is absolute. The $g$ coefficient is used to make relative decisions (ranking), and the index of dependability is used to make absolute decisions (independent scoring). These coefficients are analogous to the reliability coefficient in classical test theory. The $g$ coefficient for relative decisions ($E \rho^2$) is determined by the proportion of the universe score variance, $\sigma^2(\tau)$, to the sum of the universe score variance plus relative error variance, $\sigma^2(\delta)$. In this case, error is associated only with the interaction of each facet with the object of measurement (e.g. the people being assessed). The index of
dependability for absolute decisions ($\Phi$) is determined by the proportion of the universe score variance, $\sigma^2(\tau)$, to the sum of the universe score variance plus absolute error variance, $\sigma^2(\Delta)$. In this case, error is associated both with each facet independently and all the combinations of facet interactions. The conventionally accepted reliability value for either the index of dependability or the $g$ coefficient is .80 (Cardinet et al., 2010; Lakes & Hoyt, 2009). The following formulas illustrate how these coefficients are estimated (Brennan, 2001; Lakes & Hoyt, 2009; Shavelson & Webb, 1991; Shavelson et al., 1989):

$$E\rho^2 = \frac{\sigma^2(\tau)}{\sigma^2(\tau) + \sigma^2(\delta)}$$

$$\Phi = \frac{\sigma^2(\tau)}{\sigma^2(\tau) + \sigma^2(\Delta)}$$

The use of G-theory is invaluable in behavioral research because it provides a flexible and comprehensive method to simultaneously assess multiple sources of both known and random error in order to estimate the reliability of a measurement. It has wide application and employs the use of G studies to determine psychometric properties of a measurement tool and D studies to design strong practical experiments using an assessment tool. Results from both types of studies yield detailed analyses and allow a researcher to make comprehensive interpretations about the dependability of an assessment tool (Lakes & Hoyt, 2009; Shavelson et al., 1989; Wasserman et al., 2009).

**Method**

**Participants: Children with Autism**

This study included two groups of participants: children with autistic disorder and board certified music therapists. The inclusion criteria for the child participants in this study comprised male and female children from ages 2 and 9 (inclusive) who were formally diagnosed with autistic disorder and who fluently spoke and/or understood English, regardless of primary language. The researcher verified formal diagnosis, for example from
a report from an interdisciplinary team diagnosis, a physician, or a psychologist using at least one standardized diagnostic assessment (e.g. the Autism Diagnostic Observation Schedule (A-DOS) or the Autism Diagnostic Interview-Revised (ADI-R)). Individuals with other developmental disabilities were excluded from this study, including pervasive developmental disorder (PDD), general developmental delay, Rett’s syndrome, and Asperger’s syndrome. Child participants were drawn from two sources within a large metropolitan city in the Midwestern United States: 1. music therapy practices of board certified music therapists and 2. the general community, including support groups, diagnostic clinics, and local organizations for families of children with autism. Children were recruited following a human subjects review board approval via a recruitment flier (see Appendices C and D).

Recruitment occurred across three weeks. Eleven families expressed an interest in enrolling their children in this research study. From these families, nine children were eligible, and five children (one girl and four boys) between the ages of 3 and 7 ($M = 4.9, SD = 1.95$) enrolled in this study. During the study, four children (one girl and three boys) dropped out due to illness, illustrating a participant attrition rate of 80%. The remaining participant ($N = 1$) was a 3-year-old male who spoke English as the primary language, was diagnosed with autistic disorder at 29 months, and was not diagnosed with other disabilities. At the time of the study, the child was receiving music therapy services from someone other than the researcher. Appendix G displays the child participant demographic information collected during this study.

**Participants: Raters**

The inclusion criteria for the second group of participants for this study comprised male and female board certified music therapists fluent in English and working within a 150-
mile radius of a large city within the Midwestern United States. Board certification status was confirmed through the Certification Board for Music Therapists (The Certification Board for Music Therapists, n.d.). These participants were recruited via email following an SSIRB approval (see Appendices C and I). Contact information was obtained through a locally based music therapy association and resources from a university music therapy department.

Recruitment occurred across three weeks. Ten female music therapists expressed an interest in participating in this research study. From these individuals, four enrolled in the study with no participant attrition. The other six did not enroll due to the time commitment involved to complete the study. Appendix L displays the information collected from the music therapist participants regarding their knowledge of and experience with autism. Of the participants (N = 4), three held bachelors degrees in music/music therapy, music education/music therapy, or psychology/music therapy, and one held a master of arts in music therapy. Two participants had up to five years of music therapy clinical experience, and two had six to 10 years of experience. Their total years of clinical experience with clients with autism ranged from zero to eight (M = 3, SD = 3.46). At the time of this study, two participants indicated they had no clinical contact with clients with autism, one had bi-monthly contact (less than once per week, but more than once per month), and one had daily contact (at least four days per week). One participant indicated they had no exposure at all to individuals with autism (in the community, personally, or clinically), and one indicated they had incidental exposure. The other two participants indicated they only had clinical exposure to individuals with autism.
Design

This study employed G-theory analysis to determine the reliability of the scores of the ADSA. In contrast to classical test theory (CTT), G-theory provides a comprehensive method to simultaneously assess multiple sources of error associated with various known facets (e.g. raters, test items, occasions, etc.) and random error in order to estimate the reliability of a measurement (Cronbach et al., 1972; Lakes & Hoyt, 2009; Wasserman et al., 2009). A fully crossed, two-facet, mixed design \((p \times r \times i)\) was desired in which \(p\) = the children with autism being assessed \((N = 1)\), \(r\) = the raters (music therapists, \(N = 4\)), and \(i\) = the items on the ADSA \((N = 141)\). However, because only one child completed participation in this study, a fully crossed, single-facet, mixed design \((r \times i)\) was used. The fully crossed design is considered the strongest in G-theory because it provides more specific information and the ability to isolate all sources of variability (Wasserman et al., 2009). In this design, each rater assessed the child using all items on the ADSA with only one videotaped observation (see Figure 4). According to G-theory, this is considered a mixed design because the items on the ADSA \((i)\) are a fixed or irreplaceable facet, and raters \((r)\) is a random or replaceable facet. Data was analyzed using G-theory analysis, analogous to an analysis of variance (ANOVA), to obtain a generalizability \((g)\) coefficient, which is comparable to the reliability coefficient in CTT. Analysis was conducted using EduG, a free G-theory statistical analysis software program (Cardinet et al., 2010; Swiss Society for Research in Education Working Group, 2010a).
Procedure

The procedure for this study was composed of three steps. First, one child with autism was videotaped during one individual 30-minute music therapy assessment session (see Appendix M). Second, video clips from the session were selected and edited. Finally, professional music therapists utilized video clips of this session to complete the ADSA.

Step 1: Assessment session. One child participated in this study. The researcher emailed copies of a parent consent form (see Appendix E), a videotape permission form (see Appendix F), and a child participant demographic information form (see Appendix G) to the 11 parents who expressed interest in enrolling their children in this study. All forms were provided in English. Parents were asked to review these documents, and the researcher contacted them by either email or phone (according to their preference) to answer questions regarding the study and to ensure they met the enrollment criteria. Nine children met eligibility, and five children were enrolled in the study. Once the parent enrolled their child in the study, a 30-minute individual music therapy assessment session was scheduled. Upon
arrival to the session, the parameters of the study were again reviewed, and parents were
given an opportunity to ask questions. While the parents met with the researcher, a graduate
music therapy student provided assistance to the child as needed. The graduate student was
not present during the session. Once the study parameters were reviewed, informed consent,
video consent, verification of autism diagnosis, and the demographic information form were
obtained. One child participant completed all components of the assessment process
(participant attrition rate = 80%).

The music therapy assessment session was held in a classroom on the metropolitan
campus of a university in the Midwestern United States. This 19’ by 24’ room was isolated
from other classrooms; however, some residual sound carried into the room from a brass
studio two floors below. The room contained an upright piano (closed and not used in the
session), florescent lights with mirror backing, commercial loop carpeting, and two large
windows (6.5’ by 8’ and 3.5’ by 8’) covered with closed mini-blinds at one end of the room.
Four 2’ by 4’ tables were laid on their sides to block off a 19’ by 14’ space for the session.
This prevented the child from having access to a podium, computer, VCR, projector screen,
sterio cabinet, two chalkboards, a royal blue bulletin board with yellow border, document
camera, music stand rack, extra tables and chairs, and the windows. The walls were painted
light beige, and the room did not contain decor of any kind, including on the chalkboards and
bulletin board.

The researcher, a board certified music therapist with three years of full-time and
three years of part-time experience working with children with autism and other disabilities,
implemented a music therapy assessment protocol that was tailored to be age appropriate and
according to the individual’s current level of functioning (see Appendix M). This protocol
targeted specific expressive communication skills, receptive communication skills, and social skills, as defined in the ADSA. The protocol and further intervention reporting details can be found in Appendix M. Two parents remained with the child during the session; other children (e.g. siblings) did not attend. The child and parents sat across from the music therapist in chairs (a children’s chair was available) in a small semi-circle.

The expressive and receptive language deficits of children with autism inhibit the ability of a child to both understand questions (e.g. “do you want to participate?”) and express a desire not to do an activity. Based on this knowledge, the researcher was attuned to behaviors that potentially indicated that the child no longer wanted to participate in the music therapy session (e.g. left the room, verbally or non-verbally indicated they no longer wanted to participate, screaming, physical resistance, etc.). If any of these behaviors were exhibited, the music therapist planned to adapt the current music therapy application and provide the child an opportunity to continue the session. The session would continue if the behavior stopped; if the behavior continued, the session would end. The child who participated in this study did not require any of these adaptations. To compensate for their time and effort, the family received a pair of Chiquita shakers and six dollars of reimbursement for gas and parking at the conclusion of the session. They were also mailed a DVD of the child’s music therapy assessment session and a music activity handout that provided ideas regarding how to use the shakers and music used in the session at home (see Appendix H).

Step 2: Video editing. Rather than performing a live assessment, the session was videotaped to prevent raters from influencing the child’s behavior, to provide convenience of conducting the assessment at a later date, and to allow the researcher to identify video clips that corresponded to the appropriate domains and subdomains on the ADSA. For the
duration of the study, the video was stored in a secured location (i.e. a locked cabinet in a
locked office) and accessed only by the researcher and thesis committee chairperson. Parents
had the opportunity to allow or deny the use of the video in future scholarly, professional,
and research pursuits (see Appendix F).

The researcher edited the videotaped sessions using iMovie ‘09 (version 8.0.6). Eight
one-minute segments that corresponded with the following subdomains were identified:
speech development, identification, directions, questions, social conversation, eye contact,
joint attention, and interaction. Appendix M outlines the interventions used to assess each of
these skillsets. To identify a clip, the researcher first located the intervention that
corresponded to the subdomain on the video and determined the entire length of the
intervention. Next, a random starting point within the intervention was selected using a
random number generator (Haahr, 1998-2010), ensuring that this starting point allowed a
one-minute clip of the intervention and did not continue into the next intervention. After the
clip was identified, the researcher made certain that the child was in view for at least 90% of
the clip. If the child was not, another random clip within the intervention was selected.

Two additional one-minute clips were selected from the child’s video that included a
transition (as defined in the ADSA) and were used to assess the following subdomains: self-
stimulatory behavior and other behavior. To identify these clips, the researcher first
randomly selected one of the transitions between the seven interventions from a field of six
total transitions using a random number generator. Next, a random starting point in the 30
seconds preceding the transition was selected using a random number generator (Haahr,
1998-2010). After the clip was identified, the researcher ensured that the child was in view
for at least 90% of the clip. If the child was not, another transition was randomly selected.
All video clips for each child were compiled in a sequence that corresponded to the format of the ADSA: speech development, identification, directions, questions, social conversation, eye contact, joint attention, interaction, self-stim behavior, and other behavior.

**Step 3: Assessment.** The researcher emailed copies of a consent form (see Appendix J), a confidentiality agreement (see Appendix K), and an information form regarding years of clinical experience, experience with children with autism, and clinical training and education (see Appendix L) to the 10 music therapists who expressed interest in participating in this study. All forms were provided in English. Music therapists were asked to review these documents, and the researcher contacted them by email to answer questions regarding the study and obtain availability for participation. From these individuals, four enrolled in the study with no participant attrition. The other six did not enroll due to the time commitment involved to complete the study. A block of time that matched the music therapists’ availability was scheduled to complete the assessment.

The assessment took place in the same classroom as the music therapy assessment sessions. One 2’ by 4’ table was set up for each music therapist (rater), and all tables were spaced at least 2 feet from each other to control for peer influence. Upon arrival to the classroom, the researcher reviewed the parameters of the study. Raters were given an opportunity to ask questions and were then asked to sign the consent and confidentiality forms (see Appendices J and K).

The researcher presented each rater with an assessment packet. The packet contained an ADSA tool (labeled with coversheet “1;” see Appendices A and O) and goals worksheet (labeled with coversheet “2;” see Appendices O and P) in a 9 by 12-inch envelope, and ballpoint pens were provided as needed. To protect the identity and confidentiality of the
raters, each was randomly and anonymously assigned a unique alphabetical identifier, which was used to label all pages in the assessment packet. Raters listed their name and unique identifier on a sheet of paper and sealed it in an envelope. This was done in case of a replication of this study with more participants. In this event, this same set of raters who attend the assessment of the new child enrollees will open this envelope to find their identifier and obtain assessment packets marked with this same unique identifier. In this regard, the researcher did not have the ability to trace assessment responses to the raters, and this initial assessment could be included in future analysis with the same set of raters (the permission to use data from this first analysis in future research was granted by the family).

To protect the identity and confidentiality of the child, he was assigned a unique numerical identifier, which was used to label the video and all pages in the assessment packet. A paper recording the child’s first name and the unique identifier was stored in a locked cabinet in a locked office, and a computer document file was not kept. The rationale for keeping this record was to provide a safeguard in the event that the researcher needed to determine which assessment corresponded with which videos if more children are enrolled prior to the SSIRB expiration date (e.g. the parent/legal guardian inquired about the results of his/her child’s assessment, questions arose about the assessment outcomes, video clips needed to be reviewed, etc).

Scripted instructions were visually presented on slides embedded with voiceover recording before the first clip in the child’s video (see Appendix N). These instructions guided raters to open their packets and complete a questionnaire regarding each rater’s years of clinical experience, clinical training and education, experience with individuals with autism (see Appendix L). Once all raters completed this information form, five minutes were
provided for each rater to independently review the ADSA, directions, and operational definitions (see Appendix A). Next, instructional slides in the video guided raters through the basic format of the ADSA, the scoring format, and how to score the tool. Following these general instructions, raters were given time to review the operational definitions and scoring for ‘speech development’ within the expressive communication domain of the ADSA. Raters were then presented with the corresponding one-minute video clip and instructed to simultaneously assess the child as seen in the video according to the directions in the ADSA. Upon completion of the clip, raters were given a 30-second break.

This process of review, assessment, and break was repeated for each subsequent section of the ADSA (identification, directions, questions, social conversation, eye contact, joint attention, interaction, self-stimulatory behavior, and other behavior). A 10-minute break was provided after the questions subdomain during which time complimentary refreshments were served. After the final assessment segment, raters were asked to review their completed ADSA. Based on their assessment of the child, they selected one primary goal and one secondary goal from the following options: expressive communication, receptive communication, social skills, and behavior. At the end of this final task, raters were instructed to return the completed ADSA to the envelope and return it to the researcher. Once the assessment was complete, the raters received a $40 honorarium for their time and effort. The time to complete this initial training assessment was one hour and 12 minutes. In a replication study with more child participants, subsequent assessments would be shorter (approximately 36 minutes) because after the initial training the basic directions for completing the ADSA would be eliminated and the time to review operational definitions before each clip would be cut in half.
CHAPTER 4
RESULTS

The purpose of this study was to gather sufficient data to determine the statistical reliability of the scores obtained with the *Autism Developmental Skillset Assessment* (ADSA). Two research questions were posed:

1. What is the inter-rater reliability of primary and secondary goal selection using the ADSA?

2. What is the generalizability (reliability of the scores) of the ADSA?

To ensure results from this study could be generalized to clinical application, statistical reliability analysis required the individualized assessment of a child with autism by multiple raters who were board certified music therapists. The study was composed of three steps. First, a child with autism was videotaped during one individual music therapy session. Second, video clips from the session were selected and edited. Finally, professional music therapists utilized these video clips to complete the ADSA. The reliability of the resulting assessment scores was evaluated using generalizability theory (G-theory) statistical analysis.

**Statistical Analysis of Data**

This study employed G-theory to determine the reliability of the scores of the ADSA. A fully crossed, singlefacet, mixed design \((r \times i)\) was used in which \(r = \) the raters (music therapists, \(N = 4\)), and \(i = \) the items on the ADSA (\(N = 141\)). In this design, each rater assessed the child participant using all items on the ADSA with only one videotaped observation. Data was analyzed using G-theory analysis to obtain a generalizability (\(g\))
coefficient. Analysis was conducted using EduG, a Windows-based statistical software program specifically designed for G-theory analysis (Cardinet et al., 2010; Swiss Society for Research in Education Working Group, 2010a). The assessment results were reviewed and compiled by the researcher.

**What is the Inter-Rater Reliability of Primary and Secondary Goal Selection Using the ADSA?**

After completing the assessment, raters selected a primary goal area from a field of four options (expressive communication, receptive communication, social, or behavior) according to the information gained from the video recording. The inter-rater reliability of primary and secondary goal selection was calculated by dividing the total number of agreements by the total number of agreements plus disagreements (% inter-rater reliability = \( \frac{a}{a + d} \)). Based on the results of this study, the inter-rater reliability of the primary goal selection of the ADSA tool was .50 (\( N = 4 \)). Two of the four raters agreed expressive speech and language was the primary goal area; one rater chose social skills, and one chose receptive speech and language. The inter-rater reliability of the secondary goal selection of the ADSA tool was .50 (\( N = 4 \)). Two of the four raters agreed social skills was the secondary goal area, while the other two raters agreed that receptive speech and language was the secondary goal area.

**What is the Generalizability (Reliability of the Scores) of the ADSA?**

According to G-theory analysis, this study employed a fully crossed, single-facet, mixed design (\( r \times i \)) in which \( r \) = the raters (music therapists, \( N = 4 \)), and \( i \) = the items on the ADSA (\( N = 141 \)). ‘Raters’ was considered a random facet while ‘items’ was considered a fixed facet. This analysis sought an absolute decision: the results of the assessment identified
the child’s score independently. Data was analyzed using EduG, a Windows-based statistical software program specifically designed for G-theory analysis (Swiss Society for Research in Education Working Group, 2010a). The parameters of this software require that each item on an assessment tool be based on the same type and length of scale, or that they are converted to the same length of scale (Cardinet et al., 2010). Because several different scale lengths were used in this assessment (e.g. verbal prompts could have from 0-15 checkmarks; vocalizes could have from 0-5 checkmarks), the researcher converted each item’s score into a proportional scale from 0-1. For example, a score of 2 out of 5 was converted to .40.

Table 4 displays the ANOVA variance partitioning results for the ADSA tool. The information from this initial step in G-theory analysis involves estimating each facet’s contribution to the overall score variance (Cardinet et al., 2010). Table 5 provides a description of how each of the facets for this study contributes to the score variance. According to this analysis, there was a small variance component for the main effect of raters ($\sigma_r^2 = .000, .2\%$). This indicates that raters assessed this particular child consistently in comparison to each other. The large variance component for the main effect of items ($\sigma_i^2 = .013, 71.0\%$), indicates that the child demonstrated varying skill levels across items on the ADSA. Finally, the variance component for the residual ($\sigma_{rie}^2 = .005, 28.8\%$) indicates that a moderate proportion of the score variance was due to the three-way interaction between raters, items, and other sources of error that were not measured in the study.
Table 4

ANOVA Variance Partitioning for the Autism Developmental Skillset Assessment

<table>
<thead>
<tr>
<th>Source of Error</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>Variance</th>
<th>% Variance</th>
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<tr>
<td>R</td>
<td>.017</td>
<td>3</td>
<td>.006</td>
<td>.000</td>
<td>.20</td>
</tr>
<tr>
<td>I</td>
<td>8.095</td>
<td>140</td>
<td>.058</td>
<td>.013</td>
<td>71.0</td>
</tr>
<tr>
<td>$RI_e$</td>
<td>2.224</td>
<td>420</td>
<td>.005</td>
<td>.005</td>
<td>28.80</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>10.336</td>
<td>563</td>
<td></td>
<td></td>
<td>100%</td>
</tr>
</tbody>
</table>

Note. R=rater, I=item, $e$error

Table 5

Description of Variance Components

<table>
<thead>
<tr>
<th>Source of Error</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rater Variance (R)</td>
<td>Variance in the assessment scores across raters.</td>
</tr>
<tr>
<td>Item Variance (I)</td>
<td>Variance in the assessment scores across assessment items.</td>
</tr>
<tr>
<td>Rater $\times$ Item Variance, residual ($RI_e$)</td>
<td>The extent to which the assessment scores vary across items depending on the rater as well as other unidentified sources of error ($e$) that were not measured in the study.</td>
</tr>
</tbody>
</table>

Table 6 displays the G study results for the ADSA tool. The information from this secondary step in G-theory analysis involves estimating each facet’s contribution to the measurement variance (based on the ANOVA score variance partitioning), reveals the $g$ coefficient, and informs the researcher where changes could be made to improve the precision of the measurement (Cardinet et al., 2010). The $g$ coefficient for the ADSA tool
for absolute measurement was 1.00, which indicates that about 100% of the observed variation in scores was attributable to the child’s universe score (“true score”). This $g$ coefficient value surpassed the conventionally accepted value of .80 (Cardinet et al., 2010; Lakes & Hoyt, 2009).

In this analysis, the raters facet accounted for the differentiation variance in measurement: the object of measurement or source for comparison (Cardinet et al., 2010; Swiss Society for Research in Education Working Group, 2010b). Table 7 displays the means, variances, and standard deviations for the raters. From the displayed means, it is evident that the raters strongly agreed on their assessment of the child and no one rater was significantly more or less critical in their assessment. The items facet accounted for the instrumentation variance and includes all observable sources of measurement error. The total differentiation variance (.00004) was slightly larger than the total absolute error variance (.00000), indicating why the strong $g$ coefficient value was obtained. ‘Items’ was a fixed facet and did not contribute to the measurement error variance, therefore, all variance was attributable to the raters and unidentified sources of error.
Table 6

*G Study Results for the Autism Developmental Skillset Assessment*

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>Differentiation Variance</th>
<th>Source of Variance</th>
<th>Absolute Error Variance</th>
<th>% Absolute</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>.00004</td>
<td>I</td>
<td>(.00000)</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RL_e</td>
<td>(.00000)</td>
<td>0</td>
</tr>
<tr>
<td>Sum of Variances</td>
<td>.00004</td>
<td></td>
<td>.00004</td>
<td>100%</td>
</tr>
<tr>
<td>SD</td>
<td>.00636</td>
<td>Absolute SE: 0.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\[
g_{\text{Coefficient (Absolute)}} = 1.00
\]

Grand Mean: .04693

*Note.* R=rater, I=item, e=error

Table 7

*Means, Variances, and Standard Deviations for Raters*

<table>
<thead>
<tr>
<th>Rater</th>
<th>M</th>
<th>Variance</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.056</td>
<td>.028</td>
<td>.167</td>
</tr>
<tr>
<td>2</td>
<td>.046</td>
<td>.016</td>
<td>.126</td>
</tr>
<tr>
<td>3</td>
<td>.046</td>
<td>.016</td>
<td>.128</td>
</tr>
<tr>
<td>4</td>
<td>.041</td>
<td>.013</td>
<td>.114</td>
</tr>
</tbody>
</table>
CHAPTER 5

DISCUSSION

The purpose of this study was to determine the statistical reliability of the scores obtained when assessing a child with autism using the ADSA. Two research questions were posed:

1. What is the inter-rater reliability of primary and secondary goal selection using the ADSA?

2. What is the generalizability (reliability of the scores) of the ADSA?

Results of this study revealed an inadequate level of inter-rater reliability in both the primary (.50, N = 4) and secondary goal selection (.50, N = 4) compared to the generally accepted minimum reliability value of .80 (Madsen & Madsen, 1993). Although measures were taken to try to improve the reliability of goal domain selection in comparison to the ADSA pilot study (e.g. clarified directions and operational definitions), the inter-rater reliability of primary goal selection was actually slightly lower than the pilot study (.67, N = 9). This could partly be explained by the smaller sample size of raters in the present study. The inter-rater reliability of secondary goal selection improved only slightly from the pilot (.44, N = 9).

One notable improvement in comparison to the pilot is that, although both studies included a forced-choice goal selection process, none of the participants in the current study selected goal areas that appeared to be unsupported by the information provided by the assessment tool. For example, in the pilot study one participant did not record anything in
the behavior domain but selected behavior as a secondary goal. This suggests that the revisions to the directions, operational definitions, and guidance to select broad goal domains might have had an effect on assessment-informed goal selection. Additionally, two raters in this study selected the same goal domains (social skills and receptive speech and language), but their assignments to primary and secondary goal were opposite. Finally, the raters in this study were professional music therapists and the raters in the pilot were music therapy students; however, participants in both groups had diverse levels of experience with individuals with autism. Theoretically, this varied level of experience could have impacted the selection of a goal domain. This study illustrates that goal selection remains a subjective process with ample room for interpretation by the individual, regardless of experience.

The ADSA tool demonstrated a reliability of 1.00 in this study. This is a substantial improvement from the reliability of the initial version of the ADSA (.82). Several changes to the tool could have led to this improvement. To provide knowledgeable input on the ADSA revisions, a panel of independent experts from various fields was assembled. This panel included a psychologist with expertise in treating, assessing, and diagnosing children with autism; a psychologist with expertise in child development; two speech-language pathology professors with autism expertise; a music therapist working in a public school setting; a music therapist with assessment development expertise; and a play therapist with experience collaborating with music therapists. A second panel composed of internal reviewers provided further input both at a professional and novice level. The second panel included four music therapy and music education professors, numerous professional music therapists and music therapy practicum students, and one immediate family member of an individual with autism.
Based on input from both the independent and internal panels, as well as the results from the pilot study, several revisions were made. First, in the present study only one subdomain of the ADSA (e.g. speech development scores) was coded at a time, and the assessment was completed while simultaneously viewing the video. Second, structural elements that made the initial version of the ADSA confusing were revised. For example, the format was adapted to allow raters to record the frequency of a behavior across time, and an anecdotal comments section was added to allow space to record information not accounted for on the ADSA. ‘Verbal’ prompt was renamed ‘oral’ prompt to eliminate confusion between a type of prompt and use of the word ‘verbal’ in other sections of the tool.

Next, the researcher scrutinized all domains and subdomains of the ADSA for possible improvements, particularly those in the expressive speech and language, receptive speech and language, and behavior domains. Finally, the directions and operational definitions were revised for clarity and conciseness, and they were organized by subsection according to the revised ADSA to facilitate locating the definitions.

Initially, the reliability results of the ADSA in this study are encouraging. However, due to the small number of raters ($N = 4$) and considering only one child was assessed, the generalizability of this tool should be applied with caution. Such small sample sizes are acceptable in generalizability theory analysis, however, more numerous observations (i.e. more raters and more children) yield more stable estimates of reliability (Cardinet et al., 2010). Several raters also commented that the child that was assessed in this study appeared to be very high functioning, did not exhibit behavior challenges, and was verbal. A lower functioning child with autism might be more challenging to assess while maintaining such a strong level of reliability. Future studies should include more children and perhaps a
heterogeneous sample to further explore the generalizability (reliability of the scores) of the ADSA. An increase in the number of participants would provide an opportunity to investigate if raters are consistent in how they rate children with autism with different abilities and needs.

The applications of G-theory in the present study and in the pilot study illustrate its usefulness in accounting for multiple sources of error. In the pilot study, G-theory highlighted specific areas that contributed to measurement variance. In the present study, error associated with the different raters, numerous items on the ADSA, and the interaction between these two facets were taken into account in the calculation of the generalizability coefficient. G-theory will be particularly insightful if this study is replicated with a greater number of child participants and/or raters. When exploring the psychometric properties of assessment tools, G-theory can provide a thorough picture of the variables involved in obtaining reliability. G-theory also provides a framework where concepts of reliability and validity begin to merge and suggests that the level of reliability is indicative of the validity, particularly the content validity, of the measurement tool (Cardinet, Tourneur, & Allal, 1981; Cronbach et al., 1972). The g coefficient results of the current study suggest that the ADSA is not only a potentially very reliable tool, but also a valid tool.

In addition to reliability and validity, the ADSA also attempts to provide an objective and practical means to inform the development of appropriate and functional treatment goals and objectives for children with autistic disorder. Part of its objectivity is related to the transparent reporting of the interventions used in the reliability analysis. The music therapy protocol utilized in this study provides accurate and complete information for controlled replication both within the current study and in future studies. Additionally, presenting the
readership with the interventions used in the assessment facilitates a transfer from this study to practice. By providing music therapists with all the necessary tools (the protocol, intervention reporting, and the assessment tool), they will be more likely to use the tool in clinical practice.

The flexibility of the structure of the ADSA suggests non-music therapists could use it, which has implications in interdisciplinary or co-treatment approaches. It also dually functions as both an intake and ongoing assessment to consistently document the initial assessment and communicate clinical treatment outcomes. The use of a consistent documentation tool improves a clinician’s ability to communicate music therapy treatment outcomes to the client, family, other professionals, and insurance companies, and has direct implications in evidence-based practice.

Assessment is a methodical approach to collecting and deciphering data about an individual and translating this information into effective treatment (Gearheart & Gearheart, 1990). In evidence-based practice, effective treatment interventions are defined as a combination of practitioner wisdom, knowledge from rigorous clinical research, and the needs and desires of a client (Detrich, 2008). The ADSA attempts to fill the identified gap in the music therapy literature to provide a reliable, objective, and practical assessment tool for children with autistic disorder that is within a music therapist’s scope of practice.

There are numerous possibilities for future research regarding the ADSA. First, a major limitation of the current study was the small sample of participants, particularly the child participants. In the pilot study, the researcher was able to recruit a greater number of raters (N = 17) from a convenience sample of students and conducted the study during a class they were enrolled in, but the study also included only one child. In the current study, the
high number of assessment items \((N = 141)\) accommodated somewhat for the small number of participants (children \(N = 1\); raters \(N = 4\)); however, some scholars of G-theory have recommended at least eight levels of each type of facet for more stable estimates of reliability (i.e. eight children and eight raters; Lakes & Hoyt, 2009; Shavelson & Webb, 1991; Smith, 1978). Therefore, the current study should be replicated with more children and perhaps more raters. A longer recruitment period (greater than three weeks) will potentially facilitate participant recruitment. Second, the raters in this study were relatively new to the music therapy profession, and most did not have substantial experience with children with autism. Future research could investigate a large sample of raters to analyze if there is a correlation between experience and reliability of assessment. Because the ADSA was designed to be used by other professionals, one could also investigate the reliability of assessment by raters from non-music therapy disciplines (e.g. speech-language pathology, psychology, etc.), utilizing an appropriate non-music therapy protocol that is specific to their discipline. Third, a qualitative or practical analysis such as a survey or case study would be helpful to further analyze the practicality of this assessment tool. Next, an analysis of the music therapy protocol used with the ADSA (e.g. qualitatively by a panel of experts) could yield information about the validity of the assessment. Finally, a technological version of the ADSA could be developed and tested, such as a smart phone application, to facilitate the use of the tool within a music therapy session.

The analysis of the reliability of the ADSA is an important step in promoting effective assessment, documenting and communicating the outcomes of music therapy, and ultimately providing appropriate individualized treatment. In light of the identified absence of appropriate music therapy assessment tools for children with autism, it is the hope of the
researcher that this thesis will serve as a guide for future assessment tool development and analysis. The development of this and other disability-specific music therapy assessment tools will equip music therapists with a method to demonstrate accountability and efficacy to other professionals, clients, and their families, and help meet the demands of evidence-based practice.
APPENDIX A

AUTISM DEVELOPMENTAL SKILLSET ASSESSMENT (ADSA)
Directions for Completing The Autism Developmental Skillset Assessment

Please read all directions carefully. Refer to the assessment tool (pp. 4-5) and operational definitions (pp. 6-9) as you read the directions.

Familiarize yourself with the general format of the tool:

**Rows**
This tool is divided into 4 major assessment domains by rows: expressive speech and language skills, receptive speech and language skills, social skills, and behavior. Subdomains are indicated within each major assessment domain, also by row.

**Columns**
This tool is divided into 7 columns. From left to right, the first column indicates the domain or subdomain. The second column provides a space to code the first opportunity of a behavioral observation. The third, fourth, fifth, and sixth columns provide space to indicate additional occurrences of a behavior. The final column is provided for additional comments about your observations (optional).

Familiarize yourself with the scoring format of the tool:
Within each box is a checklist of behaviors. If you observe the listed behavior, check the line to the left of the behavior. Indicate the type and number of prompts (oral, visual, physical) below each behavior. In some instances, you will also indicate the type of communication (verbal, non-verbal, or alternative).

How to score this tool:
1. Indicate if you observe the defined behavior or an opportunity for a behavior to occur. If a directive or opportunity is given to the client and they do not follow this directive, do not check the line. Mark each subsequent opportunity or observation in the next column to the right.
2. Indicate the type and number of prompts the child received from anyone present in the session even if the child did not exhibit the behavior. For each type of prompt, indicate how many of each prompt was used (1, 2, or 3 or more “3+”). If no prompts were given, leave this section blank.
3. This example illustrates that the child answered a yes/no question after being given 2 oral prompts on the first opportunity; on the second opportunity he/she did not answer a yes/no question after being given 3 or more oral prompts. The child did not answer a ‘wh’ question after being given 3 or more oral prompts and 3 or more visual prompts on the first opportunity; on the second opportunity he/she answered a ‘wh’ question without any prompts.

This example illustrates that the child non-verbally indicated a want/need/choice with 1 visual prompt on the first opportunity; on the second opportunity he/she used AC (alternative communication) to indicate a want/need/choice with no prompts. The child verbally identified the color blue with no prompts on the first opportunity; on the second opportunity he/she verbally identified a cat with one oral prompt.

Please take a few moments to review the tool and the operational definitions. You will be given additional time to review each section of the tool, including definitions, prior to the assessment.
<table>
<thead>
<tr>
<th>Expressive Speech &amp; Language</th>
<th>Initial Response:</th>
<th>Subsequent Responses:</th>
<th>Comments:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speech Development Scores</td>
<td>Vocalizes</td>
<td>Vocalizes</td>
<td>Vocalizes</td>
</tr>
<tr>
<td>Neologisms</td>
<td>Pronoun Reversal</td>
<td>Pronoun Reversal</td>
<td>Pronoun Reversal</td>
</tr>
<tr>
<td>Identification Scores</td>
<td>Indicates Wants/Needs/Choice</td>
<td>Wants/Needs/Choice</td>
<td>Wants/Needs/Choice</td>
</tr>
<tr>
<td>(specify what is IDed)</td>
<td>Non-verb □ AC □ Verbal</td>
<td>Nonver □ AC □ Verbal</td>
<td>Nonver □ AC □ Verbal</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Receptive Speech &amp; Language</th>
<th>Initial Response:</th>
<th>Subsequent responses:</th>
<th>Comments:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Directions Scores</td>
<td>Understands ‘No’</td>
<td>Follows Directions</td>
<td>Follows Directions</td>
</tr>
<tr>
<td>Questions Scores</td>
<td>Answers ‘Yes/No’</td>
<td>Oral Visual Physical</td>
<td>Oral Visual Physical</td>
</tr>
<tr>
<td>Social Conversation Scores</td>
<td>Initiates Conversation</td>
<td>Spontaneous comments</td>
<td>Spontaneous comments</td>
</tr>
<tr>
<td>Social Skills</td>
<td>Initial Response:</td>
<td>Subsequent responses:</td>
<td>Comments:</td>
</tr>
<tr>
<td>--------------</td>
<td>------------------</td>
<td>----------------------</td>
<td>-----------</td>
</tr>
<tr>
<td><strong>Eye Contact Scores</strong></td>
<td>Absent</td>
<td>Absent</td>
<td>Absent</td>
</tr>
<tr>
<td>Glancing</td>
<td>Glancing</td>
<td>Glancing</td>
<td>Glancing</td>
</tr>
<tr>
<td>Fake</td>
<td>Fake</td>
<td>Fake</td>
<td>Fake</td>
</tr>
<tr>
<td>Staring</td>
<td>Staring</td>
<td>Staring</td>
<td>Staring</td>
</tr>
<tr>
<td>Appropriate</td>
<td>Appropriate</td>
<td>Appropriate</td>
<td>Appropriate</td>
</tr>
<tr>
<td><strong>Joint Attention Scores</strong></td>
<td>Watches Others</td>
<td>Watches Others</td>
<td>Watches Others</td>
</tr>
<tr>
<td>Responds to Name</td>
<td>Responds to Name</td>
<td>Responds to Name</td>
<td>Responds to Name</td>
</tr>
<tr>
<td>Initiates Others</td>
<td>Initiates Others</td>
<td>Initiates Others</td>
<td>Initiates Others</td>
</tr>
<tr>
<td>Responding Joint Attention</td>
<td>Responding Joint Attention</td>
<td>Responding Joint Attention</td>
<td>Responding Joint Attention</td>
</tr>
<tr>
<td>Initiating Joint Attention</td>
<td>Initiating Joint Attention</td>
<td>Initiating Joint Attention</td>
<td>Initiating Joint Attention</td>
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<tr>
<td><strong>Interaction Scores</strong></td>
<td>Socially Smiles</td>
<td>Socially Smiles</td>
<td>Socially Smiles</td>
</tr>
<tr>
<td>Responds to Name</td>
<td>Responds to Name</td>
<td>Responds to Name</td>
<td>Responds to Name</td>
</tr>
<tr>
<td>Responsiveness</td>
<td>Responsiveness</td>
<td>Responsiveness</td>
<td>Responsiveness</td>
</tr>
<tr>
<td><strong>Behavior</strong></td>
<td>Initial Response:</td>
<td>Subsequent responses:</td>
<td>Comments:</td>
</tr>
<tr>
<td><strong>Self-Stim Behavior Scores</strong></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Auditory</td>
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<tr>
<td>Echolalia</td>
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<tr>
<td>Gustatory</td>
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<td></td>
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<tr>
<td>Moving Objects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Offactory</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organizing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Other Tactile</td>
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<tr>
<td>Self-Injurious</td>
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<tr>
<td>Sexual</td>
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<tr>
<td>Vestibular</td>
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<tr>
<td>Visual</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aggression</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Destruction</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disruptive</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restricted interest</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stimulus refusal</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Operational Definitions

Prompts
Oral = a verbal command, directive, or cue provided after initial directive to increase the probability of a desired behavior.
Visual = a visual directive or cue provided after initial directive to increase the probability of a desired behavior, e.g. a prop, therapist gesturing (e.g. pointing), a picture, modeling.
Physical = a physical cue provided after initial directive to increase the probability of a desired behavior, ranging from a light touch to full physical guidance.

Forms of Communication
Non-Verbal = gestures or facial expressions used for a communicative intent, or instrumental musical communication, e.g. pointing, eye gaze.
Note. Code sign language as ‘AC.’

AC (Alternative Communication) = alternative or assistive methods of communication, not accounted for in verbal or non-verbal communication, e.g. sign language, pictures, assistive technology devices.

Verbal = vocalizations, babbling, word approximations, or clearly articulated words used for a communicative intent, including singing.

Expressive Speech & Language

Expressive Speech & Language = the use of non-verbal, verbal, or alternative communication to convey wants, needs, thoughts, or intentions to another person.

Speech Development Scores
Vocalizes = uses non-language vowel sounds with a communicative intent or for speech exploration, including sung vowel sounds and communicative crying, e.g. ah, oo, ee. Note. Code nonfunctional vocal self-stimulation as ‘behavior – self-stim – auditory or echolalia.’

Babbles = uses language-based, repetitive consonant-vowel syllables with a communicative intent or for speech exploration, including sung babbling, e.g. na-na, da-da. Does not include word approximations, e.g. ‘buhbuhls’ for bubbles. Note. Code nonfunctional vocal self-stimulation as ‘behavior – self-stim – auditory or echolalia.’

Approximates = imitates words &/or phrases spoken by others without clear articulation with a communicative intent or for speech exploration, including singing, e.g. buhbuhls for bubbles. Note. Code nonfunctional vocal self-stimulation as ‘behavior – self-stim – auditory or echolalia.’

Word = clearly articulates single words with a communicative intent, e.g. ball, dog. Note. Code nonfunctional vocal self-stimulation as ‘behavior – self-stim – auditory or echolalia.’

Word Combo/Sentence = clearly articulates an appropriate combination of words or speaks in sentences with a communicative intent, e.g. dog runs; I want to go to sleep. Note. Code nonfunctional vocal self-stimulation as ‘behavior – self-stim – auditory or echolalia.’

Neologisms = uses made-up words with a communicative intent, not including word approximations or imitation, e.g. shnarfblatz, gagagram. Note. Code nonfunctional vocal self-stimulation as ‘behavior – self-stim – auditory or echolalia.’

Pronoun Reversal = uses ‘she/he’ or ‘you’ instead of ‘I,’ e.g. Sam said, “he is playing” or “you are playing” to refer to himself (instead of “I am playing”). Note. Code nonfunctional vocal self-stimulation as ‘behavior – self-stim – auditory or echolalia.’
Identification Scores
Indicates Wants/Needs/Choice = attempts to make wants, needs, or a choice known using non-verbal, verbal, or alternative communication (AC). Note. If a choice is made, indicate number of options in comments section.
Identification = as directed, child identifies pre-academics (e.g. colors, letters, numbers, actions, sight words), people, objects, etc. using non-verbal, verbal, or alternative communication (AC). Note. Specify what was identified.

Receptive Speech & Language
Receptive Speech & Language = the ability to understand non-verbal, verbal, or alternative communication.

Directions Scores
Understands ‘No’ = responds to directive ‘no’ (or ‘stop,’ ‘don’t do that,’ etc.) by either stopping behavior or through clear defiance.
Follows Directions = successfully completes a task following a specific directive (if attempts but does not succeed, utilize ‘comments’ section).
Note. If imitating modeled actions, code as ‘social – joint attention – imitates others.’
1-Step Direction = one independent directive is given and is completed, e.g. “Clap your hands.”
2-Step Direction = a combination of two directives is given and is completed, e.g. “Smile and say hello.”
3+ Step Direction = a combination of three or more directives is given and is completed, e.g. “Smile, say hello, and wave.”

Questions Scores
Answers ‘Yes/No’ Question = appropriately answers a question in which the only possible answers are yes, no, or maybe, e.g. “Do you want to play the drum?”
Answers ’Wh-’ Question = appropriately answers a question that begins with the word who, what, where, when, or why, e.g. “What do you want to play?”

Social Skills
Social Skills = verbal and nonverbal skills that are used to interact with other people.

Social Conversation Scores
Greets/Goodbye = uses nonverbal, verbal, or alternative communication (AC) to indicate or say ‘hello’ or ‘goodbye’ (or similar) when socially appropriate, e.g. waving, high five, shaking hands, says ‘hi,’ says ‘bye.’
Responds to Conversation = reciprocates or continues conversation by responding verbally, musically, or with alternative communication to continue conversation, e.g. Therapist says, “I like to play the drum.” Child responds, “Me, too.” Note. Code responses to questions as ‘receptive speech and language – questions scores.’
Spontaneous Comments = child comments (unprompted) on a situation without solicitation (verbally, musically, or with alternative communication), e.g. while playing a drum the child says, “I like playing the drum.”
Initiates Conversation = child begins an unprompted communication interaction by asking a social partner a question (verbally, musically, or with alternative communication), e.g. while playing the drum, child asks the therapist, “Do you like music?”
Eye Contact Scores

**Eye Contact** = looks directly into the eyes of a communication or social partner during an interaction. *Note: Code visual self-stimulation as ‘behavior - self-stim – visual.’*

- **Absent (Eye Contact)** = does not make eye contact at all.
- **Glancing (Eye Contact)** = briefly makes eye contact and immediately looks away.
- **Fake (Eye Contact)** = appears to make eye contact but does not look into partner’s eyes, e.g. looks above head.
- **Staring (Eye Contact)** = makes fixed eye contact with a vacant or fixed expression.
- **Appropriate (Eye Contact)** = looks directly into the eyes of a communication or social partner during an interaction without glancing, faking, starting, or visual self-stimulation behavior.

Joint Attention Scores

- **Responds to Name** = exhibits a behavioral response to his/her name being called, e.g. turns and looks when his/her name is called.
- **Watches Others** = nonverbally observes or looks at other people as evidenced by eye gaze.
- **Imitates Others** = performs a behavior after observing another person perform the behavior, including movements (clapping, jumping, etc.) and social behavior (smiling, laughing, etc.). *Note: Code imitated words or phrases as ‘expressive speech & language – speech development – approximates.’*
- **Responding Joint Attention** = acknowledges and responds to a social partner drawing attention to an object/person/event by looking at the object/person/event, then looking back to social partner as a means to nonverbally share the experience, e.g. the therapist plays a drum and says, “look,” the child looks at the drum, then looks at the therapist and smiles.
- **Initiating Joint Attention** = uses eye gaze &/or gestures/pointing to initiate and direct a social partner’s attention to an object/person/event with the purpose of sharing the experience, e.g. the child points to a drum and makes eye contact with Mom to get her to share the experience.

Interaction Scores

- **Socially Smiles** = shows a pleased or kind expression in response to a pleasing social interaction or event.
- **Socially Laughs** = laughs aloud in amusement in response to a pleasing or humorous social interaction or event.
- **Appropriate Interaction** = relevant, on-task verbal and nonverbal social interaction with others present via eye contact, joint attention, conversation, smiling, making music, etc., *without* aggressive or interfering self-stimulatory behaviors, including echolalia.
- **Takes Turns** = alternates sharing an object or instrument with another person.
- **Initiates Transition** = uses appropriate social &/or communicative cues to indicate that he/she is ready to stop the current activity and change to a new activity *without* aggressive, disruptive, destructive, or self-stimulatory behaviors.

Behavior

- **Behavior** = an observable act that interferes with an individual’s ability to communicate or socialize and/or that is unusual, repetitive, or compulsive in nature.

Self-Stimulatory Behavior Scores

- **Self-Stimulatory Behavior** = repetitive, stereotyped behavior used to stimulate any of the self-experienced senses, including tactile, vestibular, visual, auditory, olfactory, and gustatory stimulation.
- **Transition** = behavior occurs during the process of changing from one activity/application/intervention to another; includes the transition into the first activity of the session and the transition after the last activity of the session.
Auditory = repetitive behavior that involves hearing, including repetitive vocalizations or noises (e.g. eee! eee! eee! not including echolalia), playing instrument unnaturally close to ears, tapping object or instrument on ears, turning volume of recording unusually loud, etc.

Echolalia = delayed or immediate repetition of sounds, syllables, words or phrases previously heard, uncontrollable or for self-stimulation purpose, e.g. repeating parts of a commercial heard on television that morning; repeating a question verbatim. Note. If purposeful, code as 'expressive language – speech development – approximates.'

Gustatory = behavior that involves the sense of taste, e.g. licking objects or people.

Moving Objects = repeatedly rotating or feeling an object or preoccupation with parts of an object, e.g. repeatedly feeling all the edges of an object. Note. Code lining up objects as 'organizing; code moving, flicking, or spinning objects in front of eyes as 'visual stim; code tapping objects on ears as 'auditory stim.'

Olfactory = behavior that involves the sense of smell, e.g. sniffing other people, sniffing instruments, etc.

Organizing = behavior related to sequencing, ordering, schedules, or arranging, e.g. lining up toy cars, strict adherence to a routine, sorting objects without request, etc.

Other = repetitive &/or stereotyped behavior not accounted for in the other self-stimulatory categories, including hand or arm flapping, toe-walking, teeth grinding, and clenching muscles repeatedly.

Other Tactile = behavior that involves touching self repeatedly or moving a body part repeatedly, with the exception of self-injurious, sexual, or vestibular actions.

Self-Injurious = behavior that purposefully causes physical harm to self, e.g. head-banging; scratching, biting, hitting self, etc.

Sexual = exposure of, touching, or rubbing genitalia or breasts.

Vestibular = moving head or body in space to stimulate the vestibular system, including spinning, shaking head back-and-forth, rocking, or jumping.

Visual = repetitive behavior that involves sight or the eyes, including moving, flicking, or spinning objects or body parts in front of eyes; repeatedly rolling, blinking, poking, or squinting eyes.

Other Behavior Scores
Aggression = purposeful action that causes or attempts to cause physical harm to another person, e.g. hitting, pinching, scratching, biting, kicking.

Destruction = purposely damaging an object by tearing, throwing, kicking it, etc.

Disruptive = purposefully interrupting an activity with an inappropriate behavior, including self-stimulation, e.g. crying, yelling, throwing oneself on the ground, echolalia.

Restricted Interest = an obsession or all-consuming interest that impacts child’s ability to engage in activity, e.g. topic of conversation obsessively revolves around dinosaurs; child will not accept anything if it is not the color blue; child will only play one key on a piano.

Stimulus Refusal = avoids or refuses to come in contact with any specific sensory stimulation (auditory, visual, olfactory, gustatory, tactile, vestibular), e.g. throws jingle bells or hits when played, refuses to take textured bean bag, refuses social touch (e.g. shaking hands).
APPENDIX B

SUPPLEMENTARY QUESTIONNAIRE
Autism Developmental Skillset Assessment (ADSA)
Supplementary Questionnaire

Today’s date: ____________________________

<table>
<thead>
<tr>
<th>Child’s Name:</th>
<th>Date of Birth:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parents’/Guardians’ Names:</td>
<td>Age:</td>
</tr>
</tbody>
</table>

| Home Address: |

<table>
<thead>
<tr>
<th>Home Phone:</th>
<th>Cell Phone:</th>
<th>Work phone:</th>
</tr>
</thead>
</table>

| Email address: |

Who does your child live with? (Siblings, parents, grandparents, pets, etc.)

Is your child primarily in a special education classroom or with typical peers?

<table>
<thead>
<tr>
<th>School:</th>
<th>Grade:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>District:</th>
<th>Teacher(s):</th>
</tr>
</thead>
</table>

Child’s Primary Diagnosis:

Other Diagnoses:

Please list your child’s medications:

<table>
<thead>
<tr>
<th>Medication</th>
<th>Time of day taken</th>
<th>Side effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Allergies:

- My child wears ☐ glasses ☐ hearing aids

Please list any safety precautions (e.g. seizures, self-injurious behavior, physical aggression):

Please check any areas you have noticed your child experiencing sensitivity and provide any details you feel are important:

- ☐ Auditory (e.g. sensitivity to loud noises or particular sounds, etc.)

- ☐ Other Sensory (e.g. side-looking, touch sensitivity, rocking, spinning, smelling, etc.)

- ☐ Repetitive Behaviors

- ☐ Self-injurious Behavior (e.g. hitting self, biting self, scratching self, etc.)

Please list any behavior concerns or challenges (e.g. tantrums, crying, hitting, biting, etc.)

When do these behavior challenges tend to occur?
Does your child have a behavior plan? If so, please explain.

<table>
<thead>
<tr>
<th>Does your child have difficulty with transitions?</th>
<th>☐ yes</th>
<th>☐ no</th>
</tr>
</thead>
<tbody>
<tr>
<td>How does your child behave or react to new situations?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Is your child toilet trained?</th>
<th>☐ yes</th>
<th>☐ no</th>
</tr>
</thead>
<tbody>
<tr>
<td>What does your child do to let others know they need to use the bathroom?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>My child also receives these therapy services</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Speech Therapy</td>
</tr>
<tr>
<td>☐ Behavior Therapy</td>
</tr>
<tr>
<td>☐ Aquatic Therapy</td>
</tr>
<tr>
<td>☐ Equestrian Therapy/Therapeutic riding</td>
</tr>
</tbody>
</table>

What customs, religion, culture, or heritage is important to your family? Please explain.

**Child’s primary language:**

<table>
<thead>
<tr>
<th>Primary language spoken at home:</th>
</tr>
</thead>
<tbody>
<tr>
<td>My child communicates through</td>
</tr>
<tr>
<td>☐ Speech</td>
</tr>
<tr>
<td>☐ Attempting speech</td>
</tr>
<tr>
<td>☐ Gestures</td>
</tr>
<tr>
<td>☐ Sign language</td>
</tr>
</tbody>
</table>

Who are your child’s friends? What are their ages?

Describe how your child interacts with friends/family/others.

What does your child do best?

What skill area most concerns you about your child? Please be specific.

What motivates your child?

Favorites/likes:

Dislikes:

My child: ☐ avoids physical activity ☐ engages in a lot of physical activity
My child’s *previous* musical instruction:

- Private music lessons: Instrument(s) ____________________________
  Dates of instruction ____________________________
- School music class: with typical peers?  □ yes  □ no
- Music therapy: Previous music therapist(s) ____________________________
  Dates of service ____________________________
- Other (please specify) ____________________________

My child’s *current* musical instruction:

- Private music lessons: Instrument(s) ____________________________
  Dates of instruction ____________________________
- School music class: with typical peers?  □ yes  □ no
- Music therapy: Previous music therapist(s) ____________________________
  Dates of service ____________________________
- Other (please specify) ____________________________

Has your child demonstrated any particular musical talent or interest? Please be specific.

What kind of music does your child prefer?

What music is your child exposed to at home, in the car, at school, at church, etc.? (check all that apply)

- □ Recorded  □ Blues  □ Jazz  □ R&B  □ Country
- □ Live  □ Children’s music  □ Pop  □ Gospel  □ Rock
- □ Classical music  □ Rap  □ Other (please specify) ____________________________
- □ Heavy metal  □ Techno

A musician lives in my home  □ yes  □ no
My child is exposed to a family/friend musician that does not live with me  □ yes  □ no

How did you learn about music therapy?

Why did you request music therapy services?

What do you want from music therapy?

Please provide any additional comments:

*This box for therapist use only*

- □ Group  □ IEP  □ Video consent form
- □ Individual  □ Psych assessments  □ Research consent form
APPENDIX C
UMKC SSIRB APPROVAL LETTER

October 27, 2010

Ms. Alaine Hernandez
3619 Jefferson Street
Kansas City, MO 64111

Dear Ms. Hernandez:

Your research protocol #SS10-42 entitled, "Evaluation of a developmentally-based music therapy assessment tool for children with autism spectrum disorder" was given an expedited review by the UMKC Social Sciences Institutional Review Board.

The IRB approves research protocol IRB #SS10-422 as submitted. You have full approval on the following documents:

- SSIRB application dated 9/1/10
- Autism developmental skillset assessment date stamped 10/4/11
- Child recruitment flier date stamped 10/27/10
- Music Therapist Recruitment Letter/Email date stamped 10/27/10
- Parent/Legal Guardian Consent Form date stamped 10/27/10 through 10/4/11
- Videotape Permission Form date stamped 10/27/10 through 10/4/11
- Rater (Music Therapist) Consent Form date stamped 10/27/11 through 10/4/11
- Confidentiality Agreement (Raters/Music Therapists) date stamped 10/27/10 through 10/4/11

You are granted permission to conduct your study as described in your application effective immediately. The study is subject to continuing review on or before 10/4/2011, unless closed before that date. It is your responsibility to provide a Progress Report prior to that date to avoid disruption of your research.

Please note that any changes to the study as approved must be promptly reported and approved. Some changes may be approved by expedited review; others require full board review. Please feel free to contact me at 816-235-5370 if you need additional information.

Sincerely,

Sheila Anderman, CIP, CIM
Research Protections Program Manager
UMKC Adult Health Sciences
Institutional Review Board

This e-mail is an official notification intended only for the use of the recipient(s). This letter indicates the status of the UMKC Social Sciences IRB review of the referenced research project. When appropriate, a member of the UMKC Social Sciences IRB staff will be contacting the recipient(s) informing them of other IRB documents related to this project that are available to
either 1) be picked up at the IRB office - 5319 Rockhill Road or 2) be mailed via campus mail or postal service - i.e.; revisions to consent form, advertisements, etc. If a signed copy of this letter is needed, please contact a member of the IRB staff. If you have received this communication in error, please return it to the sender immediately and delete any copy of it from your computer system.
Music Therapy & Autism Research

Music therapists use music to help children with autism work on communication skills, social skills, and behavior.

Alaine Hernandez, a music therapist, is doing research at the University of Missouri at Kansas City (UMKC). She needs your help to find out if a new tool is useful to set goals and objectives for children with autism.

Alaine is looking for children diagnosed with autism, ages 2 to 9, to participate in a free 30-minute music therapy session at UMKC. A video of the session will be used by professional music therapists to test the new tool.

This is a great opportunity for parents to introduce their children to music therapy and help improve treatment for children with autism. If you are interested in participating or want to learn more, please contact Alaine Hernandez at 816-960-4852 or aer481@mail.umkc.edu.
APPENDIX E

PARENT/LEGAL GUARDIAN CONSENT FORM
Consent for Participation in a Research Study
Evaluation of a Developmentally-Based Music Therapy Assessment Tool for Children with Autism Spectrum Disorder

Invitation to Participate
You and your child are invited to participate in a music therapy research study at the University of Missouri – Kansas City (UMKC). This study is being conducted as part of a master's thesis research.

Who Will Participate
The researcher would like male and female children between ages 2 and 9 who have been formally diagnosed with autism and who are fluent English speakers (regardless of primary language) to participate in this study. The researcher would like to have at least 2 but no more than 10 children enrolled in this study.

Purpose
The researcher has developed a new music therapy assessment tool for children with autism as part of her master's thesis research. The researcher would like to determine if her assessment tool is effective.

Description of Procedures
The total amount of time involved in this study is approximately 45 minutes. Your participation in this study will involve coming to UMKC Grant Hall room 314 once for a 30-minute music therapy assessment session. You will be given an opportunity to ask questions about the study, sign consent forms for participation in research, and asked to complete a brief demographics questionnaire. The researcher, a board-certified music therapist, will schedule a time for you to participate in a 30-minute music therapy session with your child. The session will be age appropriate for your child, and it will be tailored to meet your child’s ability level to the best of the therapist’s abilities. The activities used will address specific communication skills and social skills. It will also look at how your child behaves in a music therapy session. The researcher requests that a parent and/or guardian remain with the child during the session at all times.

This music therapy session will be video taped. Any individual that attends the session will be viewable in the video, and it is likely that first names will be audible in the video. Board-certified music therapists will watch video clips of your session at a later date and will assess your child using the researcher’s assessment tool. Anyone who sees the video will sign a confidentiality agreement - they cannot share any information regarding what is seen or heard in the video with anyone. The video will be destroyed the conclusion of this study, unless you give permission for the researcher to use the video for scholarly, professional and/or future research.
Voluntary Participation
Your participation in this research is voluntary. You may choose to participate or to withdraw your participation at any time. You will not be penalized if you decide not to participate or choose to discontinue participation after beginning. If you decide to leave the study, the information you have already provided will be stored in a locked cabinet, and it will not be used.

Fees and Expenses
You are not responsible for any costs or expenses associated with this study.

Compensation
Participation in this study means that your child will complete the entire music therapy assessment session, allow the session to be videotaped, and complete all necessary forms. If you agree to allow your child to participate in this study, you will receive a $5 gas gift card and reimbursement for 1 hour of meter parking at UMKC (not to exceed $1). You will also receive a complimentary DVD of the music therapy session, and your child will receive a pair of small shakers or other similar musical instrument. You will be able to use the instrument with the DVD to learn an activity to do with your child at home.

Risks and Inconveniences
As in any physical activity, it is possible that your child could fall during a movement activity or be physically injured from playing a musical instrument. Parents/guardians are requested to inform the researcher if their child tends to exhibit any behavior challenges that could lead to injury or if special accommodations should be made to help ensure the safety of your child during the study. Inconveniences from this study are the travel to and from UMKC and the time it takes to complete the study.

Benefits
Your child will not benefit directly by participating in this study. The main benefit of this study will be to help the researcher and other music therapists learn about how to effectively assess children with autism. You may learn more about music therapy and how it may benefit your child.

Alternatives to Study Participation
The alternative is not to participate in this study. Your decision to not participate will not affect your relationship with UMKC or the researcher now or in the future. During the music therapy session, the researcher will be attuned to any behaviors that could indicate that your child no longer wishes to participate (e.g. leaves Grant Hall room 314, verbally or non-verbally indicates they no longer wish to participate, screaming, physical resistance, etc.). If any of these behaviors are exhibited, the current activity will be adapted and the child will be given an opportunity to continue the session. The session will continue if the behavior stops; the session will be ended if the behavior continues. Your child will not be forced to participate in the music therapy assessment session. If your child demonstrates that he/she no longer wants to participate, you will still be compensated, as previously stated.

Confidentiality
While every effort will be made to keep confidential all of the information you complete and share, it cannot be absolutely guaranteed. Individuals from the University of Missouri-Kansas City Institutional Review Board (a committee that reviews and approves research studies),
Research Protections Program, and Federal regulatory agencies may look at records related to this study for quality improvement and regulatory functions.

In this study, anyone who will view the video of your child will sign a confidentiality agreement—they cannot share any information they see or hear in the video with anyone other than the researcher. Videos and forms will be stored in a locked cabinet for the duration of the study.

**In Case of Injury**
The University of Missouri-Kansas City appreciates the participation of people who help it carry out its function of developing knowledge through research. If you have any questions about the study that you are participating in you are encouraged to call Alaine Hernandez, the investigator, at 816-960-4852 or Dr. Deanna Hanson-Abromeit, Assistant Professor of Music Therapy, UMKC, at 816-235-2906.

Although it is not the University’s policy to compensate or provide medical treatment for persons who participate in studies, if you think you have been injured as a result of participating in this study, please call the IRB Administrator of UMKC’s Social Sciences Institutional Review Board at 816-235-1764.

**Questions**
If you have any questions about this study at any time you may contact the researcher, Alaine Hernandez, at 816-960-4852 or Dr. Deanna Hanson-Abromeit at 816-235-2906.

**Authorization**
By signing below you agree that your child with autism may take part in this study as a research participant.

Printed Name of Participant ___________________________ Signature of Participant ___________________________ Date __________

Printed Name of Principal Investigator ___________________________ Signature of Principal Investigator ___________________________ Date __________

Printed Name of Thesis Committee Chair ___________________________ Signature of Thesis Committee Chair ___________________________ Date __________
APPENDIX F

VIDEOTAPE PERMISSION FORM
PERMISSION TO VIDEO RECORD FOR A RESEARCH STUDY

Dear parent or legal guardian,

I am developing a new music therapy assessment tool for children with autism as part of a master's thesis research study. Effective assessment helps determine appropriate goals for clients seeking therapy. In this research study, board-certified music therapists will be asked to use my new assessment tool to help me determine if my tool is effective.

If you agree, I would like to video record your child during a music therapy assessment session to help evaluate my assessment tool. Board-certified music therapists will be asked to view video clips of your child while completing my music therapy assessment tool.

Any individual who views the video clips will be bound by confidentiality; they cannot discuss any information regarding what is seen in the video clips. The individuals who view the video clips will see everyone participating in the session, including you and your child. They will also hear your child's first name. Any other identifying information will not be shared with anyone, either in the video or in writing, other than my thesis committee advisor, Dr. Deanna Hanson-Abromeit, Assistant Professor of Music Therapy, University of Missouri – Kansas City (UMKC).

This video recording will only be used for this particular study unless you grant permission otherwise. Unless your consent has been given, the video will be destroyed at the conclusion of this study. The video recording and digital files will be stored in a locked file cabinet in a secured office.

The information collected from this study will be compiled into a report that will be available for others to see. The report will not contain any identifying information about your child. It will only describe what was observed in the video recording as it relates to my assessment tool. I will also use the information learned from this study in professional presentations and publications so that other music therapists can learn more about music therapy assessment and autism. Once again, I will never report any identifying information. At a later date, these videos may be used for future research, but no identifying information, other than the use of names in the video itself, will be revealed.

This study is being conducted as a requirement for the degree Master of Arts in Music Therapy at the UMKC. The UMKC Social Sciences Institutional Review Board has approved this study. In addition, my thesis committee members - Dr. Deanna Hanson-Abromeit (UMKC), Dr. Robert Groene (UMKC), Dr. Melita Belgrave (UMKC), and Dr. Rene Jamison (KU Medical Center, Center for Child Health and Development) - have approved the methodology of this study.
There are no direct benefits to you or your child for granting permission to use these videos in this study. The information obtained from this study will help me and other music therapists learn more about how to effectively determine goals for children with autism, which will ultimately help improve the quality of music therapy services.

The University of Missouri-Kansas City appreciates the participation of people who help it carry out its function of developing knowledge through research. You may call Alaine Hernandez at (816) 960-4852 or email her at aer481@mail.umkc.edu, or call Deanna Hanson-Abromeit at (816) 235-2906 if you have any questions about this research study.

Please return a signed copy of this form to Alaine Hernandez if you agree that your child may be video recorded and that these recordings may be used for this research study. You will be provided with a copy of this form for your reference. You will also receive a DVD of the music therapy assessment session free of charge.

If you sign this video recording permission form, you understand that the purpose of the video recording is to assist in the evaluation of a new music therapy assessment tool for children with autism as part of a master's thesis research study. You also understand that board-certified music therapists will view these video recordings. Anyone viewing these recordings will be bound by confidentiality.

I have read this permission form and agree to allow Alaine Hernandez to video record my child participating in a music therapy assessment session as part of this research study. Alaine Hernandez will have to seek my approval for the use of these recordings in other future research (Please check all that apply):

I grant permission to Alaine Hernandez to use these video recordings for:

☐ This research study. (If only this box is checked, the recordings will be destroyed at the conclusion of this study.)

☐ Professional presentations (e.g. conferences and trainings; The recordings will be kept in a secure location. They will not be destroyed.)

☐ Educational purposes (e.g. class lectures and training; The recordings will be kept in a secure location. They will not be destroyed.)

☐ Future research (The recordings will be kept in a secure location. They will not be destroyed.)

Name of Child

Printed Name of Parent

Signature of Parent

Date

UMKC SOCIAL SCIENCES
INSTITUTIONAL REVIEW BOARD
INIT: SH Approv'd from: 10/27/11 to: 11/4/11
APPENDIX G

CHILD PARTICIPANT DEMOGRAPHIC INFORMATION

1. My child’s name is ________________________________

2. My child is □ male □ female

3. My child has a formal autism diagnosis □ yes □ no
   If you answered ‘yes,’ how old was your child when he/she received this diagnosis? ______________________

4. My child has another diagnosed disability □ yes □ no
   If you answered ‘yes,’ please list your child’s other disabilities:
   ________________________________

5. My child’s birthday is ________________________________

6. English is my child’s primary language □ yes □ no
   If you answered ‘no’ please list your child’s primary language: ________________________________

7. The language(s) spoken in my child’s home is: ________________________________

8. Has your child ever received music therapy services? □ yes □ no
   If you answered ‘yes,’ does your child currently receive music therapy services? □ yes □ no
APPENDIX H

IN-HOME MUSIC ACTIVITY HANDOUT

We’re Gonna Shake (B. Bernstein & G. Johnson)

We’re gonna shake, shake, shake it, uh-huh
We’re gonna shake, shake, shake it, uh-huh
We’re gonna shake, shake, shake it, uh-huh
   All day long.

We’re gonna shake it **up high**
We’re gonna shake it **down low**
We’re gonna shake it **in the middle**, oo, oo baby
   All day long.

Ideas for using your chiquita shakers at home:

- **Learn to sing the song** “We’re Gonna Shake” with your child using your DVD.

- **Imitation.** Have your child imitate appropriate movements while singing the song – perform the action you want your child to do. For example, if you want your child to shake the chiquita above his head, you should shake a chiquita above your own head. Give your child a chance to try imitating the action on his own first, and then help him as necessary.

- **Following directions.** As you and your child become more familiar with the song, see if he can do the actions without watching you do them. For example, when you sing “shake it down low,” see if your child will shake his chiquita low towards the ground on his own.

- **Opposites.** Experiment with different opposites, for example, high & low; loud and soft.

- **Movements.** Experiment with different movements, for example, shaking, rolling arms around, tapping chiquitas together.

- **Instruments and props.** If you have access to other instruments or props (e.g. scarves, ribbons), use them in place of the chiquitas. Be creative making your own instruments with your child (e.g. coffee can drums, unsharpened pencils for rhythm sticks).

- **Be creative.** Try these strategies with other songs you enjoy with your child. Play chiquitas to other recordings, move creatively to the “We’re Gonna Shake” song, use the chiquitas as a sound effect while reading a book, or make up a new song with your child to play your chiquitas to.
Dear music therapist:

My name is Alaine Reschke-Hernandez, and I am a board-certified music therapist completing my master’s thesis research study at the University of Missouri – Kansas City (UMKC). I need your help in completing my research.

I have developed a new tool for assessing children with autism in a music therapy session. I would like to determine if it is an effective tool to use. I am looking for up to 10 board-certified music therapists to participate in this study. It does not matter if you have worked with children with autism before.

If you choose to participate in this study you will complete assessments of several children with autism using video clips at UMKC. You will be given an honorarium for your time and provided complimentary refreshments during the assessments. If there are more than 5 children to assess you will also be provided a free meal. There will not be more than 10 children to assess. I expect each assessment to take about 35 minutes. Depending on the number of children to assess, it is estimated you will spend between 1 and 6 ½ hours participating in this study.

If you are interested in possibly enrolling in this study, please contact Alaine Hernandez at 816-960-4852 or aer481@mail.umkc.edu for more information.

Best regards,

Alaine E. Reschke-Hernandez, MT-BC
816-960-4852
aer481@mail.umkc.edu
APPENDIX J

RATER (MUSIC THERAPIST) CONSENT FORM
Consent for Participation in a Research Study

Evaluation of a Developmentally-Based Music Therapy Assessment Tool for Children with Autism Spectrum Disorder

Invitation to Participate
You are invited to participate in a music therapy research study. This study will help develop an effective and efficient music therapy assessment tool for children with autism.

Who Will Participate
The researcher would like at least 2 but no more than 10 board-certified music therapists who are at least 18 years old to participate in this study.

Purpose
The researcher has developed a new music therapy assessment tool for children with autism as part of her master's thesis research. The researcher would like to determine if her assessment tool is effective.

Description of Procedures
You will complete an assessment of several children with autism. You will use an assessment tool developed by the principal investigator and base your assessment on video clips of children participating in music therapy assessment sessions. Prior to viewing the video clips, you will be asked to complete a short questionnaire regarding your level of clinical training, experience, and education, and knowledge and exposure to individuals with autism. Next, you will review the assessment tool, directions, and operational definitions. You will then view each video clip once. You will complete the assessment tool while viewing the video clips. After the assessment is complete, you will be asked to determine a primary and secondary goal for the child, using a form provided. All documents will contain a unique identifier (e.g. XYZ) to maintain your anonymity. Each assessment will take approximately 35 minutes to complete (per child), not to exceed 7 hours. You will be provided with 10-minute breaks between each assessment and, if there are more than 5 children to assess, you will also be provided with a 30-minute meal break. Meals and refreshments will be provided free of charge.

Voluntary Participation
Participation in this study is voluntary at all times. You may choose to not participate or to withdraw your participation at any time. Deciding not to participate or choosing to leave the study will not result in any penalty or loss of benefits to which you are entitled. If you decide to leave the study, the information you have already provided will be stored in a locked cabinet, but it will not be used for the study.

Fees and Expenses
You are not responsible for any costs or expenses associated with this study.
Compensation
If you agree to participate in this study and complete the entire study, you will receive a $40 honorarium. You will also receive complimentary beverages and refreshments during breaks, regardless if you complete the entire study or not. If more than 5 children need to be assessed, a complimentary meal and 30-minute meal break will be provided.

Risks and Inconveniences
There are no anticipated risks associated with this study. A possible inconvenience is the time involved to complete this study.

Benefits
You will not benefit directly by participating in this study. The main benefit of this study will be to help music therapists gain knowledge of how to effectively and efficiently assess children with autism.

Alternatives to Study Participation
The alternative is not to participate. Your decision to not participate will not affect your relationship with UMKC or the principal investigator now or in the future.

Confidentiality
While every effort will be made to keep confidential all of the information you complete and share, it cannot be absolutely guaranteed. Individuals from the University of Missouri-Kansas City Institutional Review Board (a committee that reviews and approves research studies), Research Protections Program, and Federal regulatory agencies may look at records related to this study for quality improvement and regulatory functions.

Your name will not be on the information you provide in the assessment. Your name will only be on the “Consent for Participation in a Research Study” and the “Confidentiality Agreement” forms. Your identity will not be revealed in any compiled reports, publications, or presentations of this material.

You will be required to sign a confidentiality statement to protect the identity and personal information about the persons viewed in the video clips.

In Case of Injury
The University of Missouri-Kansas City appreciates the participation of people who help it carry out its function of developing knowledge through research. If you have any questions about the study that you are participating in you are encouraged to call Alaine Hernandez, the investigator, at 816-960-4852 or Dr. Deanna Hanson-Abromeit, Assistant Professor of Music Therapy, UMKC, at 816-235-2906.

Although it is not the University’s policy to compensate or provide medical treatment for persons who participate in studies, if you think you have been injured as a result of participating in this study, please call the IRB Administrator of UMKC’s Social Sciences Institutional Review Board at 816-235-1764.
Questions
If you have any questions about this study at any time you may contact the researcher, Alaine Hernandez, at 816-960-4852 or Dr. Deanna Hanson-Abromeit at 816-235-2906.

Authorization
By signing below you agree to take part in this study as a research participant.

Printed Name of Participant __________________________ Signature of Participant __________________________ Date __________

Printed Name of Principal Investigator __________________________ Signature of Principal Investigator __________________________ Date __________

Printed Name of Thesis Committee Chair __________________________ Signature of Thesis Committee Chair __________________________ Date __________
APPENDIX K

CONFIDENTIALITY AGREEMENT (RATERS/MUSIC THERAPISTS)
CONFIDENTIALITY AGREEMENT – RESEARCH STUDY

Between ___________________________ and the University of Missouri-Kansas City (UMKC) Music Therapy Department, such that ___________________________

(name of participant)

will observe video clips of a music therapy assessment session held in the music therapy department at UMKC with a child with autism as part of a music therapy master’s thesis study.

I understand that the purpose of viewing these video clips is to help the investigator obtain information pertinent to the research study. I understand the information that I am exposed to is considered private health information. I will not discuss or communicate in any manner (written, verbal, or other) any of the content seen or heard in these video clips with anybody, including but not limited to other professionals, students, family, or friends, except as indicated by the procedures of this research study.

ACCEPTED AND AGREED

________________________________________________________________________

Participant

date signed

________________________________________________________________________

Principal Investigator

date signed

________________________________________________________________________

Thesis Committee Chairperson

date signed

UMKC SOCIAL SCIENCES INSTITUTIONAL REVIEW BOARD
INIT. APPRVD from: ___ to: ___
Knowledge of and Experience with Autism

Autism = a complex neurobiological disability that appears by age 3, manifests as a varied spectrum of characteristics, and lasts throughout a person’s lifetime. It is characterized by qualitative impairments in social interaction and communication, and restricted, repetitive, stereotyped behavior, interests, and activities (APA, 2000)

1. What post-secondary (after high school) degrees do you hold? (check all that apply)
   □ Bachelor of Music Education – Music Therapy
   □ Bachelor of Music – Music Therapy
   □ Other Bachelor (specify) ________________________________
   □ Master of Arts – Music Therapy
   □ Master of Music Education
   □ Other Masters (specify) ________________________________
   □ Doctor of Philosophy (specify emphasis) _______________________
   □ Other post-secondary degree (specify) _______________________

2. Please indicate your total years of music therapy clinical experience (check only 1 box):
   □ 0-5 years
   □ 6-10 years
   □ 11-15 years
   □ 16-20 years
   □ 21 or more years

3. Of your total years of music therapy clinical experience, approximately how many years have you spent in contact with clients with autism? ________

4. Please indicate your current number of active client contact hours with individuals with autism. Include supervision of other therapists or students (check only 1 box):
   □ no clinical contact
   □ monthly clinical contact (only 1 time per month)
   □ bi-monthly clinical contact (less than 1 time per week but more than 1 time per month)
   □ weekly clinical contact (1 to 3 times per week)
   □ daily clinical contact (at least 4 days per week)

5. Please indicate your current level of exposure to individuals with autism (check all boxes that apply):
   □ no exposure (I have not been exposed to individuals with autism in the community, personally, or in clinical practice)
   □ incidental exposure (I have been exposed to individuals with autism in the community but do not interact with him or her regularly)
   □ clinical exposure (I currently treat clients with autism)
   □ personal regular exposure (I know someone with autism and interact with him/her regularly, or I have a close family member with autism, e.g. a sibling, child, aunt, seen regularly)

6. Please provide additional comments regarding your exposure/experience with individuals with autism:
APPENDIX M

MUSIC THERAPY ASSESSMENT PROTOCOL
<table>
<thead>
<tr>
<th>Application: Music Reference:</th>
<th>Transition</th>
<th>Action</th>
<th>Greeting</th>
<th>Movement</th>
<th>Instruments</th>
<th>Speech</th>
<th>Goodbye</th>
</tr>
</thead>
<tbody>
<tr>
<td>I Have 2 Shakers: (Gary W. Coates, n.d.), A Cappella</td>
<td>Hello Everybody, Hello, piggyback to chorus of I Will Remember You (Sarah McLachlan, Mirrorball, 1999; arr. Cary Sharian, n.d.), G Major; Up Up Up (ascending G major scale), A Cappella</td>
<td>I've Got A Silly Song (Brandon Corey, 2010), E Major, blues style improvisation with percussive strum &amp; improvisation; Put Your Mallets in My Bag, piggyback to If You're Happy &amp; You Know It (traditional), E Major, A Cappella</td>
<td>B-b-b-bubbles (Janet Jones, n.d.), E Major, blues style</td>
<td>Bop Shoo Bop (Jean Reece, n.d.), G Major, blues style with slap strum pattern</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Materials: | Remo 22” X 2.5” fish graphic ocean drum | RhythMix Chiquita shakers (pink, purple, red, green, yellow, blue pairs), tote bag (for shakers) | Martin 6-string acoustic electric guitar (model DC-16GTE); Boardmaker color picture representation of hello, yes, & no, including typed word, 10-mil lamination, 3.25” square; TOY! Superstar (echo) microphone (used as visual cue) | Guitar (same); Sonor Imperial Miracle Bubbles; Boardmaker color picture representation of bubbles, including typed word, mounted on poster board, two 3” rubber mallents, four 10.5” cloth-covered rubber mallents | Guitar (same); Boardmaker color picture representation of goodbye, including typed word, 10-mil lamination, 3.25” square; TOY! Superstar (echo) microphone (used as visual cue) |

<p>| Intervention Theory: | Repetitive lyrics signal transition into session • Drum acoustics allow volume adjustments to non-threateningly introduce a new timbre; visual appeal encourages interest &amp; curiosity; can easily be played by 2+ people for social interaction • Familiar, simple melody provides comfort &amp; • I Have 2 Shakers: repetitive lyrics introduce instrument, natural pauses in song &amp; lyrics cue choice-making; simple melody with faster tempo &amp; more complex rhythm provides transition from previous application, preps for next song • We’re Gonna Shake: melody, steady rhythm &amp; faster tempo elicits | Repetitive lyrics introduce, reinforce, &amp; cue movement • Simple melody &amp; repetitive lyrics allow modifications for verbal cues &amp; asking questions • Cadences support question-response &amp; social conversation • Guitar is a reinforcement for appropriate social conversation &amp; answering question; can be adapted on the spot for child to strum | Repetitive lyrics &amp; melody &amp; blues scale support instrument exploration • Driving steady rhythm &amp; faster tempo encourage &amp; support movement • Down Down Down: simple lyrics &amp; descending scale provide auditory cue to sit down | Slower tempo &amp; continuation of blues style provides musical transition • Repetitive lyrics with bi-labial syllables encourage &amp; support speech at various levels of development • Melodic structure provides auditory cues for speech • Bubbles reinforce child’s speech &amp; support meaning of lyrics | Continuation of blues style provides musical transition • Cadences &amp; rhythm &amp; strum style encourage orientation to MT • ‘Woo’ &amp; raising arms encourages eye gaze to eye contact with MT • Repetitive lyrics signal the end of session |</p>
<table>
<thead>
<tr>
<th><strong>Target Skill:</strong></th>
<th>Social Skills: Interaction</th>
<th>Expressive Speech &amp; Language: Identification</th>
<th>Receptive Speech &amp; Language: Questions; Social Skills: Social Conversation</th>
<th>Receptive Speech &amp; Language: Directions (end of application)</th>
<th>Social Skills: Joint Attention</th>
<th>Expressive Speech &amp; Language: Speech Development</th>
<th>Social Skills: Eye Contact</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Procedural Steps:</strong></td>
<td>1. MT plays ocean drum &amp; sings <em>Time for Music.</em> 2. MT gives child a turn to play &amp; explore drum. 3. MT encourages child to share instrument with parent(s) within context of song. 4. MT indicates end of application within context of song &amp; collects drum.</td>
<td>1. MT introduces Chiquita shakers, <em>I Have 2 Shakers</em>; parent(s) models choice-making; child gets choice between 2 colors. 2. MT sings <em>We're Gonna Shake,</em> provides modeling &amp; visual cues as needed for imitation (e.g. shake, roll, tap, click, fast, slow, high, low, middle); parent(s) &amp; child play shakers; fades cues for following directions. 3. MT collects shakers in tote bag, <em>Put Your Shakers in My Bag.</em></td>
<td>1. MT sings <em>Hello Everybody,</em> <em>Hello with guitar accompaniment.</em> 2. Within context of song, parent(s) models “hello” &amp; answering “Who wants to play guitar??” or “Do you want to play guitar??”; child given at least 1 opportunity to say hello &amp; play guitar. 3. At conclusion, MT sings <em>Up Up Up</em> to transition to standing, moves chairs &amp; tripping hazards.</td>
<td>1. MT sings <em>Shake My Silly Eyes Out</em> with guitar accompaniment, provides modeling &amp; visual cues as needed for imitation (shake, twist, jump, clap, etc.); fades cues for following directions; parent(s) encouraged to participate. 2. MT sings <em>Down Down Down</em> &amp; directs child &amp; parent to sit on floor on opposite long sides of metallophone.</td>
<td>1. MT demos how to play metallophone, then distributes yarn mallets to parent &amp; child (replaces with cloth-covered rubber mallets if sound appears over-stimulating to child). 2. MT sings <em>I've Got a Silly Song</em> with guitar accompaniment, guidance to improv embedded in lyrics; MT musically imitates &amp; supports child-parent improv on guitar. 3. MT concludes song, collects mallets, <em>Put Your Mallets in My Bag,</em> &amp; removes metallophone.</td>
<td>1. MT guides parent(s) &amp; child to say, “woo!” &amp; raise arms above head in <em>Bop Shoo Bop,</em> sings song with guitar accompaniment. 2. Parent(s) model, “goodbye;” child given opportunity to say “goodbye.” 3. Session concludes at the end of this song.</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX N

SCRIPTED INSTRUCTIONS FROM DVD

1. The Autism Developmental Skillset Assessment (ADSA)
2. Open the assessment envelope at this time. Your envelope contains 3 sharpened pencils, (an information form), and 2 packets marked “1” and “2.” Use only the materials provided.
3. (Omit this statement after first video). Complete the information form about your knowledge of and experience with autism. When you are finished, return this form to the envelope (pause video and wait for participants to complete form).
4. Open the packet marked “1.” This packet contains directions, the ADSA tool, and operational definitions.
5. You now have 5 minutes to carefully review the directions, the ADSA tool, and the operational definitions (5 minutes of blank screen on video).
6. We will now go through how to use the ADSA together.
7. Look at the ADSA tool. It is arranged in rows and columns. Rows divide the tool into major assessment domains and minor subdomains. The major domains include expressive speech and language, receptive speech and language, social skills, and behavior. The minor subdomains are indicated below each domain. You will only be assessing 1 subdomain at a time.
8. The first column indicates the name of the domain or subdomain. Nothing will be marked in this column.
9. The second column provides a space to mark the first occurrence of a behavior or opportunity for a child to demonstrate a behavior. The 3rd, 4th, 5th, and 6th columns provide space to indicate additional occurrences or opportunities. Comments about your observations can be recorded in the final column. This final column is optional.
10. We will now review the scoring format of the tool.
11. Each box contains a checklist of behaviors. Check the line to the left of the behavior when it is observed. Refer to the operational definition of each behavior to ensure you score it correctly.
12. Below each behavior, indicate the type and number of prompts the child was given. Prompts can be oral, visual, or physical. Take 1½ minutes to look at the operational definition of each type of prompt (1 ½ minutes of blank screen on video).
13. Below some behaviors you need to indicate the type of communication the child used: verbal, non-verbal, or alternative. Take 1½ minutes to look at the operational definitions of these types of communication (1 ½ minutes of blank screen on video).
14. We will now review how to score this tool.
15. First, indicate if you observe the defined behavior OR an opportunity provided for a behavior to occur. As stated in the operational definitions, some behaviors do not require a directive. For example, a child may babble spontaneously. In such cases, the line should be checked across columns from left to right each time you observe the behavior.
16. In other cases, a directive is required. For example, in order for a child to answer a yes/no question, someone must ask the child a question. If a directive is given and the behavior occurs, check the line next to the behavior on the assessment tool. If the behavior does not occur, do not check the line. If the behavior does not occur, make sure you skip to the next column for subsequent opportunities.
17. Next, indicate the type of prompts the child received. Prompts can come from anyone present in the session. Also indicate how many of each prompt was given. Remember to always indicate the type and number of prompts, even if the child did not demonstrate the behavior.

18. Take a moment to review the examples provided in the directions once more before the assessment begins (30 seconds of blank screen on video).

19. You will now complete the first subdomain within the expressive speech and language domain of the assessment tool. Take a moment to review the operational definition of expressive speech and language (30 seconds of blank screen on video).

20. Locate the section ‘speech development’ on both the assessment tool and in the operational definitions. Take 3 ½ minutes to carefully read each of the operational definitions for the speech development scores (3 ½ minutes of blank screen on video).

21. Now you will view a short video clip of a music therapy session. Complete only the section of the assessment tool marked ‘speech development scores’ while viewing this clip (short clip inserted here).

22. You will now have a 30 second break before continuing to the next section of the assessment. Please remain in your seat (30 seconds of blank screen on video).

23. Locate the section ‘identification scores’ on both the assessment tool and in the operational definitions. Take 1 minute to read each of the operational definitions for the identification scores (1 minute of blank screen on video).

24. Now you will view a short video clip of a music therapy session with the same child. Complete only the section of the assessment tool marked ‘identification scores’ while viewing this clip (short clip inserted here).

25. You have completed the Expressive Speech and Language domain of the assessment. You will now have a 30 second break before continuing to the next section of the assessment. Please remain in your seat (30 seconds of blank screen on video).

26. You will now complete the first subdomain within the receptive speech and language domain of the assessment tool. Take a moment to review the operational definition of receptive speech and language (30 seconds of blank screen on video).

27. Locate the section ‘directions scores’ on both the assessment tool and in the operational definitions. Take 1 minute to read each of the operational definitions for the directions scores (1 minute of blank screen on video).

28. Now you will view a short video clip of a music therapy session with the same child. Complete only the section of the assessment tool marked ‘directions scores’ while viewing this clip (short clip inserted here).

29. You will now have a 30 second break before continuing to the next section of the assessment. Please remain in your seat (30 seconds of blank screen on video).

30. Locate the section ‘questions scores’ on both the assessment tool and in the operational definitions. Take 1 minute to read each of the operational definitions for the questions scores (1 minute of blank screen on video).

31. Now you will view a short video clip of a music therapy session with the same child. Complete only the section of the assessment tool marked ‘questions scores’ while viewing this clip (short clip inserted here).

32. You have completed the Receptive Speech and Language domain of the assessment. You will now have a 10-minute break to spend as you wish before continuing to the next section of the assessment. (10 minutes of blank screen on video)...You have 30 seconds remaining of your break. Please begin to return to your seats to complete the assessment.
33. You will now complete the first subdomain within the **social skills domain** of the assessment tool. Take a moment to review the operational definition of social skills (*30 seconds of blank screen on video*).

34. Locate the section ‘**social conversation scores**’ on both the assessment tool and in the operational definitions. Take 2 minutes to read each of the operational definitions for the **social conversation scores** (*2 minutes of blank screen on video*).

35. Now you will view a short video clip of a music therapy session with the same child. Complete only the section of the assessment tool marked ‘**social conversation scores**’ while viewing this clip (*short clip inserted here*).

36. You will now have a 30 second break before continuing to the next section of the assessment. Please remain in your seat (*30 seconds of blank screen on video*).

37. Locate the section ‘**eye contact scores**’ on both the assessment tool and in the operational definitions. Take 2 ½ minutes to read each of the operational definitions for the **eye contact scores** (*2 ½ minutes of blank screen on video*).

38. Now you will view a short video clip of a music therapy session with the same child. Complete only the section of the assessment tool marked ‘**eye contact scores**’ while viewing this clip (*short clip inserted here*).

39. You will now have a 30 second break before continuing to the next section of the assessment. Please remain in your seat (*30 seconds of blank screen on video*).

40. Locate the section ‘**joint attention scores**’ on both the assessment tool and in the operational definitions. Take 2 ½ minutes to read each of the operational definitions for the **joint attention scores** (*2 ½ minutes of blank screen on video*).

41. Now you will view a short video clip of a music therapy session with the same child. Complete only the section of the assessment tool marked ‘**joint attention scores**’ while viewing this clip (*short clip inserted here*).

42. You will now have a 30 second break before continuing to the next section of the assessment. Please remain in your seat (*30 seconds of blank screen on video*).

43. Locate the section ‘**interaction scores**’ on both the assessment tool and in the operational definitions. Take 2 ½ minutes to read each of the operational definitions for the **interaction scores** (*2 ½ minutes of blank screen on video*).

44. Now you will view a short video clip of a music therapy session with the same child. Complete only the section of the assessment tool marked ‘**interaction scores**’ while viewing this clip (*short clip inserted here*).

45. You have completed the Social Skills domain of the assessment. You will now have a 30 second break before continuing to the next section of the assessment. Please remain in your seat (*30 seconds of blank screen on video*).

46. You will now complete the first subdomain within the **Behavior domain** of the assessment tool. Take a moment to review the operational definition of behavior (*30 seconds of blank screen on video*).

47. Locate the section ‘**self-stim behavior scores**’ on both the assessment tool and in the operational definitions. Take 5 minutes to read each of the operational definitions for the **self-stim behavior scores**. Note that if you observe a self-stim behavior, you need to indicate if it happened during a transition or not (*5 minutes of blank screen on video*).

48. Now you will view a short video clip of a music therapy session with the same child. Complete only the section of the assessment tool marked ‘**self-stim behavior scores**’ while viewing this clip (*short clip inserted here*).
49. You will now have a 30 second break before continuing to the next section of the assessment. Please remain in your seat (30 seconds of blank screen on video).

50. Locate the section ‘other behavior scores’ on both the assessment tool and in the operational definitions. Take 2 ½ minutes to read each of the operational definitions for the other behavior scores. Note that if you observe a behavior, you need to indicate if it happened during a transition or not (2 ½ minutes of blank screen on video).

51. Now you will view a short video clip of a music therapy session with the same child. Complete only the section of the assessment tool marked ‘other behavior scores’ while viewing this clip (short clip inserted here).

52. You have completed the Behavior domain of the assessment. You will now have a 30 second break before continuing to the final part of the assessment process. Please remain in your seat (30 seconds of blank screen on video).

53. You will now select a primary and secondary goal for this client. Open the packet marked ‘2.’ It contains a worksheet regarding goals.

54. First, review your completed assessment. Review how you assessed the child in each domain and keep in mind this child is ___ years old. Do not change anything on your assessment.

55. Next, based on your completed assessment, complete the worksheet regarding primary and secondary goals.

56. When you have finished this worksheet, return all papers to the envelope provided and hand it in. Once you have handed in your envelope, you are free to leave. Thank you for your participation in this study.

*Note. Adaptation if more than 1 child to assess: After the first video, eliminate steps 5-18, change the 10-minute break in step 32 to a 30 second break, and cut the time to review operational definitions in half. A 10-minute break would be provided between assessments.
APPENDIX O

COVER PAGES FOR ASSESSMENT PACKETS

Unique Identifier: _________

Autism Developmental Skillset Assessment (ADSA)

*Please wait for instructions before opening this packet.*
Autism Developmental Skillset Assessment (ADSA)

*Please wait for instructions before opening this packet.*
APPENDIX P

GOAL WORKSHEET

Please take a minute to review your completed assessment tool. Review how you assessed the child in each of the following domains:

- **Expressive speech and language**
  - Includes speech development scores and identification scores
- **Receptive speech and language**
  - Includes directions scores and questions scores
- **Social skills**
  - Includes social conversation scores, eye contact scores, joint attention scores, and interaction scores
- **Behavior**
  - Includes self-stim behavior scores and other behavior scores

Based on your completed assessment of this child, what do you think is the broad *primary* goal area (most significant area of need)?

*Please only check one box.*

- Expressive speech and language
- Receptive speech and language
- Social skills
- Behavior

------------------------------------------------------------------------------------------------------------

Based on your completed assessment of this child, what do you think is the broad *secondary* goal area?

*Please only check one box.*

- Expressive speech and language
- Receptive speech and language
- Social skills
- Behavior

Please provide any additional comments regarding the selection of the primary and secondary goal area for this child (*optional*):

Please provide any additional comments regarding this assessment tool and assessment process (*optional*):

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References


VITA

Alaine E. Reschke-Hernández was born on October 4, 1979 in Kansas City, Missouri. She was educated in the North Kansas City public schools and graduated as valedictorian from North Kansas City High School in 1998. She received a Curator’s Scholarship and String Bass Scholarship to the University of Missouri – Kansas City. At this university, she was a member of the orchestra and chamber orchestra (serving as both co-principal and principal string bass), performed a junior recital on the string bass, and was a concerto competition runner up in the strings division. Academically, Ms. Reschke-Hernández worked as an undergraduate research assistant, earned a SEARCH Grant for Undergraduate Research, and was on the Dean’s List for the duration of the degree program. She completed student teaching in both the North Kansas City, Missouri and Olathe, Kansas school districts. Ms. Reschke-Hernández was awarded the Dorothy Dann Bullock Music Therapy Award from the National Federation of Music Clubs for her music therapy internship, which she completed in the Leon County Public Schools in Tallahassee, Florida. She graduated “with distinction” and earned a Bachelor in Music Education (music therapy emphasis) in 2004. Following graduation she earned K-12 instrumental and vocal music teaching certifications from both the Missouri and Florida Departments of Education and a music therapy board certification from the Certification Board for Music Therapists.

After working for three years in the Seminole County Public Schools in Lake Mary, Florida as a music therapist for children with physical disabilities and autism, Ms. Reschke-Hernández began to pursue a Master of Arts in Music (music therapy emphasis) at the University of Missouri – Kansas City in 2008. During this degree, she earned a string bass scholarship and a graduate teaching assistantship, which provided her with music therapy
clinical supervisory experience and university teaching experience. She also earned a Graduate Assistance Fund Grant from the University of Missouri – Kansas City Women’s Council. Ms. Reschke-Hernández was principal string bass of the university orchestra and chamber orchestra. Upon completion of her degree requirements, she plans to continue developing her skills as a music therapy clinician, researcher, and educator in a Ph.D. program in the United States.

Ms. Reschke-Hernández is a member of the American Music Therapy Association, Kansas City Metro Music Therapists, Phi Kappa Phi, the National Honor Society, and Pi Kappa Lambda. She has presented at national and regional conferences of the American Music Therapy Association, provided music therapy workshops to support groups, parents, and co-workers, and has been featured in interviews on WMFE public radio in Orlando, Florida and in the alumni magazine, Perspectives, for the University of Missouri – Kansas City. Her first professional publication will appear in a 2011 issue of the Journal of Music Therapy.

In addition to academic pursuits, Ms. Reschke-Hernández is an avid performer on the string bass, voice, and guitar. She has competed in numerous concerto competitions on the string bass, and was a Naftzger Young Artist Award Candidate in 2003. She has performed professionally in local coffee houses and with numerous orchestras including the Tallahassee Symphony Orchestra, the Springfield Symphony Orchestra, the Kansas City Chamber Orchestra, the Kansas City Ballet Orchestra, the Kansas City Wind Symphony, the Kansas City Lyric Opera Orchestra, the Philharmonia of Kansas City, and the Liberty Symphony. She is also a substitute musician for the Kansas City Symphony, a privilege earned by audition.