

# Goal Attainment Scaling: A Method for Evaluating Progress toward Developmentally Based Music-Centered Treatment Goals for Children with Autism Spectrum Disorder

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**ABSTRACT:** There is an ongoing need for clinical accountability related to evaluating the effectiveness of music therapy interventions for children with autism spectrum disorder. Moreover, quantifying outcomes of client-centered approaches, such as music-centered music therapy when working with individuals with ASD, has consistently shown to be challenging. Goal attainment scaling (GAS) provides an established practice-based method for quantitatively evaluating individualized treatment goals. Although GAS has been used by a variety of disciplines, it has yet to be utilized in the field of music therapy. The purpose of this paper was to describe and illustrate the use of GAS as a method of evaluating progress toward developmentally based music-centered music therapy goals for children with autism spectrum disorder.

**Keywords:** *goal attainment scaling; assessment; evaluation; music-centered goals; autism spectrum disorder*

Music therapy consists of three main procedures: 1) assessment, 2) treatment, and 3) evaluation (Bruscia, 2014). In client-centered work, these procedures are contextualized within a reflexive process that involves the therapist working in music experience and the relationships formed through them to improve the client's health (Bruscia, 2014). The assessment process deals with understanding the client's strengths and challenges in music therapy. During this time, the therapist formulates specific clinical goals for the client. The treatment process involves the therapist engaging the client in various music experiences aimed at achieving goals that have been set via the assessment (Bruscia, 2014). Finally, evaluation deals with determining whether the client is making progress toward the formulated goals while concluding the effectiveness of treatment.

Historically, evaluating music therapy outcomes has generally been determined through the use of various assessment instruments. This way of evaluating progress, however, may be problematic, as normative measures are often insensitive to important and subtle changes in behavior and social

skills unique to the client (Ruble, McGrew, & Toland, 2012; Schlosser, 2004; Sharp & Read, 2012). In addition, because most assessment tools used by music therapists working with children with Autism Spectrum Disorder (ASD) are either self-created, not music therapy or ASD-specific (Kern, Rivera, Chandler, & Humpal, 2013), and/or not validated (Walworth, 2007), outcomes may have little relevance for the client.

## Goals for Individuals with Autism Spectrum Disorder

ASD is a neurodevelopmental disorder that impacts social communication related to the individual's ability to relate, communicate, reciprocate, engage in joint attention, respond to and/or initiate conversations, read gestures, as well as develop and establish relationships (American Psychiatric Association, 2013). Although impairments in social communication are a core classification of ASD, it is important to note that ASD impacts individuals differently. Therefore, each individual diagnosed with ASD is considered unique and requires an individualized set of goals that are based on his/her needs and resources (Greenspan & Wieder, 1999).

The complexity of ASD can make it challenging to evaluate clinical outcomes (Kern et al., 2013). Each child diagnosed with ASD presents with unique difficulties and strengths; therefore, it is imperative that methods of evaluation are individualized, flexible, and practical (Greenspan & Wieder, 1999, 2006; Ruble et al., 2012). Furthermore, a fundamental challenge when evaluating client-centered progress for children with ASD is identifying a metric that can be used for both process and outcomes (Ruble et al., 2012). Moreover, quantifying relationship-based music-centered outcomes has historically been difficult (Ansdell & Pavlicevic, 2005; Pavlicevic, 1995).

Music therapy practice has a long history of treating children with autism (Alvin & Warwick, 1992; Gattino, Riesgo, Longo, Leite, & Faccini, 2011; Gottfried, Thompson, Carpenite, & Gattino, 2016; Holck, 2004; Kaplan & Steele, 2005; Kern, Wolery & Aldridge, 2007; Kim, Wigram, & Gold, 2008, 2009; LaGasse, 2014; Nordoff & Robbins, 2007; Thompson, McFerran, & Gold, 2014; Wigram, 2000; Wigram & Gold, 2006), and the literature is replete with clinical writings on this topic. Music therapists working with children with ASD focus on a range of goal areas, such as communication, academics, motor, emotional, social, self-regulation, sensory processing, and attention (Kern et al., 2013). According to Kern and colleagues (2013),

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the most common goal area targeted by music therapists is social communication (Kaplan & Steele, 2005).

Social communication can be contextualized either behaviorally or developmentally depending on the therapist's theoretical orientation and approach. The distinction here is between the observable behaviors of social communication, such as eye contact and pointing, and the developmental foundational capacities themselves, such as co-regulation, joint attention, and reciprocal communication (Casenhiser, Shanker, & Stieben, 2013). Thus, developmental relationship-based therapists focus on goal areas that target the functionality of developmental capacities (Briggs, 1991; Carpenter, 2016; Casenhiser et al., 2013; Ingersoll, Dvortcsak, Whalen, & Sikora, 2005; Mahoney & Solomon, 2016; Prizant, Wetherby, Rubin, & Laurent, 2003; Schwartz, 2008) and provide interventions that foster them within a social context. Therefore, goal planning is guided by a developmental sequence that recognizes that advanced skills are dependent on the mastery of lower-level skills. For example, the ability to sustain self-regulation precedes joint attention, which precedes engaging in two-way purposeful communication, and so on (Greenspan & Greenspan, 1985; Greenspan & Wieder, 2009; Prizant et al., 2003; Shanker, 2013).

### Music-Centered Goal Planning

Music therapy goal planning and interventions vary considerably depending on the clinician's working approach. Some music therapists formulate social communication goals via nonmusical isolated behavioral targets such as eye contact, following directions, and so forth (Brownell, 2002; Kern et al., 2007; LaGasse, 2014). Others work within a music-centered framework and focus on musical-social-emotional goal areas such as musical relatedness, communication, adaption, and interrelatedness (Aigen, 2005; Carpenter 2016; Gattino et al., 2011; Geretsegger et al., 2015; Kim et al., 2008; Nordoff & Robbins, 2007; Thompson et al., 2014). For the purposes of this paper, music-centered goal planning will be applied to GAS.

The fundamental notion when practicing in a music-centered framework is that the client's challenges and strengths are reflected in their capacity for relational and communicative musical-play (Abrams, 2011; Aigen, 2014; Ansdell & Pavlicevic, 2005). Therefore, the client's musical expressivity is understood as expressions of his/her social, cognitive, and affective relationship to oneself and others (Aigen, 1995, 2014; Ansdell & Pavlicevic, 2005; Verney & Ansdell, 2010). Hence, clinical significance of a musical response is not determined by the behavioral aspects alone, but with the degree of affective engagement and relational intent being expressed.

Music-centered outcomes dealing with how clients experience music interactions with the therapist may not easily be detected, especially if tools being used are standardized measures or tests that are not music centered and/or not ASD specific (Pavlicevic, 1995; Verney & Ansdell, 2010). Therefore, one of the challenges when evaluating music-centered outcomes is determining the attainment of intended music-based clinical goals.

### Goal Attainment Scaling

Goal Attainment Scaling (GAS) is a measurement system developed by Thomas Kiresuk and Robert Sherman (1968)

that was originally designed to evaluate treatment outcomes of mental health programming. GAS has become a popular method for evaluating outcomes for a range of client groups (King, McDougall, Palisano, Gritzan, & Tucker, 2000); however, it has yet to be used in music therapy practice. GAS has been used to evaluate outcomes for counseling and family therapy (Newton, 2002; Woodward, Santa-Barbara, Levin & Epstein, 1978), substance abuse treatment (Peckham, 1977), and rehabilitation (Hale, 2010; Malec, 1999; Rockwood, Joyce, & Stolee, 1997; Stokes, 2009). In addition, it has been used to evaluate education (Oren & Ogletree, 2000) and Individual Education Plan (IEP) (Ruble & McGrew, 2013) goals as well as communication disorder outcomes (Schlosser, 2004). Furthermore, GAS has been used to evaluate outcomes with a range of elderly populations (Forbes, 1998; Rockwood et al., 2003). Finally, in the area of children with ASD, GAS has been used to evaluate the effectiveness of psychosocial interventions (Dunn, Cox, Foster, Mische-Lawson, & Tanquary, 2012; Ruble et al., 2012), sensory integration therapy (Pfeiffer, Koenig, Kinnealey, Sheppard, & Henderson, 2011; Ruble, McGrew, Toland, Dalrymple, & Jung, 2013; Schaaf et al., 2014; Schaaf, Benevides, Kelly, & Mailloux, 2012), and parent-mediated interventions (Dunn et al., 2012). Although GAS has been implemented by a variety of disciplines and client groups, including children with ASD, it has yet to be utilized in music therapy practice. The purpose of this paper is to introduce and illustrate the use of GAS as a method for evaluating developmentally based music-centered music therapy treatment goals for children with ASD.

As a client-centered method of evaluation, GAS provides an idiographic approach to measuring the uniqueness of the individual, while arriving at nomothetic conclusions about these individuals (Kiresuk, Smith, & Cardillo, 1994; Oren & Ogletree, 2000; Ruble et al., 2012). This convergent connection when evaluating progress offers an essential feature to music therapists evaluating treatment goals for children with ASD, especially those that are driven by process-oriented approaches, such as music-centered music therapy. In addition, GAS provides an individualized, criterion-referenced measure of change which features a set of evaluation procedures that include defining a unique set of goals for each client, specifying a range of possible outcomes for each goal, and using the scale to evaluate change following intervention (King et al., 2000).

GAS measures the process of goal achievement that are specific to the client as opposed to evaluating generic goals or outcomes of predetermined value (Malec, 1999). It is important to emphasize that GAS is not an assessment tool designed to determine treatment goals; rather, it is a method intended to evaluate the client's attainment of already-established goals (Kiresuk et al., 1994; Ottenbacher & Cusick, 1993). Furthermore, GAS is not bound to any theoretical orientation, client group, or a particular type of treatment or assessment instrument, and thus can be applied to any music therapy approach. The utilization of GAS in music therapy requires the therapist to determine and define a set of individualized goals while specifying a range of outcomes for each goal that reflect concrete musical events or responses. Goals are intended to represent realistic expectations regarding the client's performance and are evaluated on a rating scale consisting of five levels of attainment ranging from -2 to +2 (Kiresuk et al., 1994) (see Table 1).

Table 1  
Goal Attainment 5-Point Rating Scale

Score	Predicted Outcomes (attainment)
-2	Least favorable
-1	Less than expected
0	Expected outcome
+1	Greater than expected
+2	Most favorable

### Goal Attainment Scaling Guidelines

The GAS process includes five interconnected steps. They are: 1) establishing relevant goals, 2) crafting goal statements that are measurable and indicate improvements, 3) determining expected outcome levels, 4) weighting goal areas, and 5) calculating scores.

**Establishing relevant goals.** The ability to decide on key targets of change for goal attainment is a skill that improves with clinical experience and time spent applying the GAS method. The therapist must determine factors affecting the client's performance as well as generate ideas about possible variables to change in order to maximize the client's potential to experience and express in relational musical-play. Determining an expected outcome is based on the individual needs of the client. An observable performance expectation that ranges from the worst to the best outcome is listed for each goal statement.

Kiresuk and colleagues (1994) recommended that therapists establish a minimum of three goal areas per client for psychometric purposes (psychometrics will be discussed later in this article). Music therapists working within a developmental framework will determine goals that developmentally prioritize the constricted areas that are interfering with the client's ability to engage in a wide range of musical experiences in a continuous reciprocal manner. For example, if a client displays difficulty in the areas of musical attention (i.e., how the client attends to musical-play), adapting to musical-play (e.g., how the client adjusts to tempo and/or dynamics changes), and initiating musical ideas, musical attention may take priority. Capacities for musical attention such as the ability to musically focus, share, and shift attention in play can be considered prerequisites for musical interaction and may be foundational to more sophisticated forms of musical-play such as adaption and initiating.

**Crafting goal statements that are measurable and indicate improvements.** After determining the goal areas of focus, the therapist will craft goal statements that include operationally defined musical responses or events that are measurable indicators of the client's performance. Each level on the GAS scale should include goals that are written clearly and specify an observable musical response or event. These targets or musical events/responses should be observable and recordable. For example, the therapist may determine that the client needs to improve his/her capacity to shift musical attention. This musical response of shifting musical attention requires further description as well as context in order for it to be clearly understood and measureable. In other words, how can the evaluating therapist determine if the client has attained this goal? Furthermore, what is the client shifting his/her attention from and to? Finally,

how may the therapist conclude if the client has shifted his/her attention randomly, reflexively, or intentionally?

The first step to writing an appropriate goal statement is to determine the most important variable of change. The desired variable of change is then altered in each of the written goal levels, while the other variables are held constant (King et al., 2000). In this example, the focused variable of change is the frequency in which the client musically shifts attention between playing the basic beat on the drum and punctuating the end of a phrase with the cymbal.

To construct this goal in a concrete and measurable form, the therapist may phrase it in the following way: "the client will shift musical attention from playing the basic beat on the drum to punctuating the end of a musical phrase with the cymbal 60% of the opportunities provided by the therapist." This phrasing includes a musical target (shifting musical attention), provides context (shifting attention from relational basic beating to punctuating the end of a phrase with the cymbal), and gives a means of measuring the client's performance (60%, or 3 of 5, or 6 of 10 opportunities provided by the therapist). This goal statement also indicates that the therapist will provide specific musical opportunities or bids for the client to shift attention. This will help determine if the client randomly or intentionally musically shifted attention to the cymbal (the amount of opportunities or bids provided to the client is based on the therapist's clinical judgment and/or the assessment tool being administered).

Furthermore, this goal implies that the client has already displayed several capacities that may be considered prerequisites of musically shifting attention. They are: 1) ability to focus musical attention, 2) ability to maintain musical attention, 3) ability to share musical attention, and 4) ability to independently play the basic beat related to the therapist's music. Finally, the goal also suggests that the client has already demonstrated the ability to musically shift attention in at least 40% of the opportunities provided by the therapist, independently, and without extra-musical support, that is, verbal directive or visual and physical supports. If, however, the client indicates that he/she requires extra-musical support in order to attain a particular goal, it should be explicitly stated in the written goal statement as either a constant factor or the variable that changes over time.

It is important to emphasize that the goal of shifting attention is not constricted to the music experience of changing focus of attention between the drum and cymbal. Shifting musical attention can include a range of experiences, such as, but not limited to, shifting attention between different instruments, person and instruments, musical elements, and/or various media (i.e., vocal, instrument, and movement). Hence, depending on the client's strengths and challenges, the therapist may establish more than one goal statement that deals with shifting musical attention.

Table 2 illustrates a GAS for shifting musical attention. Table 2 indicates at level -1 (less than expected) that the client displayed the capacity to shift musical attention between beating the basic beat on the drum and punctuating the end of the phrase 40% of the opportunities provided by the therapist. Thus, -1 is baseline. It is recommended that baseline be scaled at -1 (i.e., less than expected) (Kiresuk et al., 1994). This leaves room for decline over the intervention period (King et al., 2000). The variable of change indicated in the GAS in

Table 2  
Goal Attainment Rating Scale for Shifting Musical Attention

Attainment Rating	Goal: Musical Attention (Shifting Attention)
-2 Least Favorable	The client will shift musical attention from basic beating on the drum to punctuating the end of a musical phrase with the cymbal in 20% of the opportunities provided by the therapist.
-1 Less than expected (baseline)	The client will shift musical attention from basic beating on the drum to punctuating the end of a musical phrase with the cymbal in 40% of the opportunities provided by the therapist.
0 Expected	The client will shift musical attention from basic beating on the drum to punctuating the end of a musical phrase with the cymbal in 60% of the opportunities provided by the therapist.
+1 Greater than expected	The client will shift musical attention from basic beating on the drum to punctuating the end of a musical phrase with the cymbal in 80% of the opportunities provided by the therapist.
+2 Most favorable	The client will shift musical attention from basic beating on the drum to punctuating the end of a musical phrase with the cymbal in 100% of the opportunities provided by the therapist.

Table 2 is the frequency of how often the client shifts attention when cued by the therapist.

**Determine the expected outcome level.** This step relies on the therapist's clinical experience, judgment, and realistic understanding of the client. It also requires the therapist to accurately identify baseline (-1; less than expected). GAS outcome levels consist of a 5-point continuum ranging from the least favorable (-2) outcome to the most favorable outcome (+2).

**Weighting goal areas.** When formulating goal areas and statements, the therapist may assign weights to each of the identified goals based on level of importance. For example, if the therapist prioritizes four goals, the most important goal is given a weight of +4 and the least important is given a weight of +1. There is no standard procedure for determining how each goal is weighted, and it is not necessary in order to generate outcome scores. If the therapist chooses not to weight goals, then a weighted value of 1 should be given to each goal area for statistical purposes (Ottenbacher & Cusick, 1990). For the purposes of this paper, the author has chosen to discuss goal weighting based on a developmental hierarchy related to Greenspan's functional emotional developmental capacities (Greenspan, DeGangi, & Wieder, 2001; Greenspan & Greenspan, 1985) and Carpenter's (2013, 2014) Individual Music-centered Assessment Profile for Neurodevelopmental Disorders (IMCAP-ND).

Weighting goal areas that are based on a developmental hierarchy should be prioritized in order of the sequence of development. For example, in the case illustration included in Table 3, Joseph's capacity for musical attention is given a higher priority than the other goal areas because attention can be considered a foundational capacity and prerequisite to musical engagement and adaption. Consequently, in order to musically interact, one needs to be musically attentive and available for interaction before he/she can fully engage in music experience. Therefore, the goal area of musical attention is identified as very important and given a weight of +4. The goal area for musical affect is recognized as important, but less important than musical attention, and given a weight of +3. Adaption to musical-play is considered less important and given a weight of +2. Finally, the goal area of musical engagement is considered least important and given a weight of +1. It is important to emphasize that although a weight of +1 is given to musical engagement, this does not imply that this capacity is not important. On the contrary, musical engagement is a very important skill;

however, developmentally, the "lower" level skills such as musical attention generally take precedence because they are foundational capacities that are needed in order to build subsequent skills.

**Calculating scores.** The GAS system includes a statistical procedure for analyzing the extent to which the client is meeting all of his/her individual goals (Kiresuk et al., 1994). The GAS method allows the therapist to set a range of goals and still provide a single numerical outcome to determine the overall achievement of the goal plan. Following the treatment period, the weights of the goals and the rating for each outcome level are used to calculate a goal attainment scale score. This score signifies a numeric indicator of the client's progress.

The recommended procedure is to convert the client's outcome scores into aggregate T-scores (Kiresuk et al., 1994). Mean aggregate T-scores provide an overall evaluation of the client's performance. Another advantage of using T-scores is that they can be compared to other standardized scores (Kiresuk et al., 1994). T-scores can be computed using the following formula (Kiresuk & Sherman, 1968):

$$T = 50 + (10 \times \sum W_i X_i) \div \sqrt{(1-r) \sum W_i^2 + r (\sum W_i)^2}$$

$W_i$  = the weight assigned to the  $i$ th goal (if equal weights,  $W_i = 1$ )  
 $X_i$  = the outcome score or numerical value achieved (between -2 and +2)  
 $r$  = the estimated average intercorrelation for the outcome scores

According to Kiresuk and Sherman (1968), an  $r$  value of .30 can be used as a constant in the formula and a  $T$  value is a standardized score with a mean of 50 and a standard deviation of 10.

Table 3 presents Joseph's four identified goal areas. Each of the goal areas is weighted from +1 to +4. Table 3 also indicates the outcome scores by italicizing the four goals obtained at the evaluation period.

Table 4 illustrates the outcome data for Joseph's GAS. The outcome data illustrated in Table 4 is then input into the T-score formula as follows:

$$T = 50 + (10 \times 7) \div \sqrt{(.70 \times 30) + (.30 \times 100)}$$

$$T = 50 + 70 \div \sqrt{51}$$

$$T = 50 + 9.80$$

$$T = 59.80$$

Table 3  
Joseph's Goal Attainment Scale

Attainment Rating	Goal 1: Musical Attention (Sharing Attention) (weight: +4)	Goal 2: Musical Affect (Stationary Movement) (weight: +3)	Goal 3: Adaption to Musical-Play (Adjusts) (weight: +2)	Goal 4: Musical Engagement (Imitation) (weight: +1)
-2 Least Favorable	When given verbal directives, Joseph will share musical attention by engaging in drum play with the therapist in a mutual tempo for 4–6 consecutive measures.	When given visual cues (facial affect & modeling), Joseph will express affect via stationary movement (arm movements during drumming are congruent to the intensity of the therapist's music) in response to therapist's music in 20% of the opportunities presented.	When given verbal directives, Joseph will adjust his dynamics in musical-play as led by therapist's music while engaged in related play during 60% of the opportunities presented.	When given visual support (positioning), Joseph will imitate a 3-beat melodic rhythm, instrumentally, during related play as cued by therapist's music in 20% of the opportunities presented.
-1 Less than expected (baseline)	When given verbal directives, Joseph will share musical attention by engaging in drum play with the therapist in a mutual tempo for 6–7 consecutive measures.	When given visual cues (facial affect & modeling), Joseph will express affect via stationary movement (arm movements during drumming are congruent to the intensity of the therapist's music) in response to therapist's music in 40% of the opportunities presented.	When given verbal directives, Joseph will adjust his dynamics in musical-play as led by therapist's music while engaged in related play during 80% of the opportunities presented.	When given visual support (positioning), Joseph will imitate a 3-beat melodic rhythm, instrumentally, during related play as cued by therapist's music in 40% of the opportunities presented.
0 Expected	When given verbal directives, Joseph will share musical attention by engaging in drum play with the therapist in a mutual tempo for 8–9 consecutive measures.	When given visual cues (facial affect & modeling), Joseph will express affect via stationary movement (arm movements during drumming are congruent to the intensity of the therapist's music) in response to therapist's music in 60% of the opportunities presented.	When given verbal directives, Joseph will adjust his dynamics in musical-play as led by therapist's music while engaged in related play during 100% of the opportunities presented.	<i>When given visual support (positioning), Joseph will imitate a 3-beat melodic rhythm, instrumentally, during related play as cued by therapist's music in 60% of the opportunities presented.</i>
+1 Greater than expected	Joseph will independently share musical attention by engaging in drum play with the therapist in a mutual tempo for 1–2 consecutive measures.	When given visual cues (facial affect & modeling), Joseph will express affect via stationary movement (arm movements during drumming are congruent to the intensity of the therapist's music) in response to therapist's music in 80% of the opportunities presented.	<i>Joseph will independently adjust his dynamics in musical-play as led by therapist's music while engaged in related play during 20% of the opportunities provided.</i>	When given visual support (positioning), Joseph will imitate a 3-beat melodic rhythm, instrumentally, during related play as cued by therapist's music in 80% of the opportunities presented.
+2 Most favorable	<i>Joseph will independently share musical attention by engaging in drum play with the therapist in a mutual tempo for 3–4 consecutive measures.</i>	When given visual cues (facial affect & modeling), Joseph will express affect via stationary movement (arm movements during drumming are congruent to the intensity of the therapist's music) in response to therapist's music in 40% of the opportunities presented.	Joseph will independently adjust his dynamics in musical-play as led by therapist's music while engaged in related play during 20% of the opportunities provided.	When given visual support (positioning), Joseph will imitate a 3-beat melodic rhythm, instrumentally, during related play as cued by therapist's music 100% of the opportunities presented.

Table 4  
Outcome Data for Joseph's Goal Attainment Scale

Goal Area	$W_i$	$X_i$	$W_i X_i$	$W_i^2$
Musical Attention	4	+2	+8	16
Musical Affect	3	-1	-3	9
Adaption to Musical-Play	2	+1	2	4
Musical Engagement	1	0	0	1
$\Sigma$ = Total	10	-	7	30

Note.  $W_i$ = weight,  $X_i$ = outcome, and  $\Sigma$ = total.

A T-score greater than 50 represents performance above the expected level. A T-score of less than 50 reflects performance below the expected level. In the given example, Joseph's scores on all goal areas were converted to a T-score of 59.80. Thus, his T-score of 59.80 represents a performance above the expected level. Kiresuk and colleagues (1994) created easy-to-use tables that allow for quick and easy conversion of outcome scores into T-scores for clients with up to eight scored scales. T-scores can also be calculated using a statistical computer software package such as the Statistical Package for the Social Sciences (SPSS). Calculation of outcomes are reviewed at an appointed date determined by the therapist; however, goal statements may be reviewed following each therapy session in order to document session-to-session changes.

**Case Vignette.** The following case vignette will be used to provide a context for determining expected GAS outcome levels in a clinical situation. All of the client's information included in this case study has been consented to by his parents. The client's name has been changed to protect anonymity. This case vignette presents a five-year-old boy, Joseph, diagnosed with ASD who was referred to music therapy by his psychologist due to challenges in the areas of focusing attention, engagement, and communication. According to reports, Joseph displays the ability to communicate and relate with peers and teachers via gestures and word approximations; however, he exhibits difficulty sustaining these interactions for extended periods. He has difficulty maintaining attention and engagement and generally becomes easily dysregulated when interactions become more complex. These challenges interfere with his ability to build peer relationships, learn, and complete academic tasks. Furthermore, Joseph exhibits challenges with initiating interactions and is prompt dependent. Music therapy was recommended by his psychologist as a means of providing relational and communicative experiences within a nonverbal medium.

**Music Therapy Session.** Joseph easily transitioned into the music therapy treatment room and immediately began to explore the various instruments by playing them with mallets (i.e., snare drum, floor tom, gathering drum cymbal, and xyl-ymba). Initially, his play appeared to be self-directed, random, disorganized, and lacked intent to relate to the therapist. He did not appear to seek out or socially reference the therapist.

The therapist engaged Joseph's play by improvising music on the floor tom and via singing that followed his lead by matching and reflecting his play and affect. The music therapist accompanied Joseph's music while simultaneously providing extra-musical support that included facial affect and body gestures. The extra-musical support (i.e., facial affect

and body gesture) appeared to engage Joseph and helped him join into playing in a relational manner with regard to tempo and dynamic. In addition, during relational play interactions, Joseph began to socially reference the therapist. Thus, when supported with visual and verbal directives, Joseph displays the capacity to maintain shared musical-play for approximately 6–7 measures.

Generally, the quality of Joseph's musical-play appeared to be fragmented and intermittent with no consistent pattern and he exhibited difficulty rejoining musical interactions unless supported by the therapist's verbal directives and/or visual cues. When playing percussive instruments, while being accompanied by the therapist, Joseph displayed challenges with body affect in terms of stationary movement. Hence, his arm movements during loud drum play were not congruent to the intensity of the therapist's music. However, when provided with visual cues such as facial affect and modeling, Joseph began to occasionally use larger arm movements while expressing facial affect (smiling) toward the therapist.

Although he demonstrated capacities for self-regulation and shared attention, he consistently required specific music conditions (i.e., fast, loud, and detached music experiences) and extra-musical support (i.e., verbal and visual directives) in order to maintain regulation, attention, and musical relatedness. Finally, when provided with visual support, Joseph displayed islands of capacity to adapt to tempo changes briefly, as well as to imitate a three-beat melodic rhythmic phrases on the drum when musically cued by the therapist.

As illustrated in Table 3, Joseph's music therapy GAS focused on four main areas. They included: 1) sharing musical attention, 2) musical affect in terms of movement (i.e., expresses affect through stationary movement in response to music), 3) adaption to musical-play, and 4) musical engagement in terms of imitation. The goal constructed for baseline (-1) in the goal area of sharing musical attention includes: "When given verbal directives, Joseph will share musical attention by engaging in drum play with the therapist in a mutual tempo for 6–7 consecutive measures." The variable that the therapist is seeking to change over time is the frequency of musical measures in which Joseph shares musical attention with the therapist while engaged in mutual drum play, while being provided with verbal directives. The "expected outcome" level (0) indicates an increase of frequency (targeted variable of change) of mutual drum play (8–9 measures) while the other variables remain constant. The "greater than expected" level (+1), however, indicates a change in the targeted variable. The variable of change has been altered from frequency of mutual play to independent mutual play (without verbal directives). Pretest and posttest measures were taken at baseline and at 13 weeks following 13 music therapy sessions. Thirteen weeks is the length of one trimester at our music therapy center. Hence, therapists practicing at this clinic are required to evaluate client progress every 13 weeks. GAS does not include a protocol as to how often to evaluate client outcomes. Therefore, length of treatment is determined by the therapist.

Figure 1 shows each of Joseph's four goal areas and the amount of change before and after music therapy treatment. The table displays raw scores for each goal area (-2 represents most unfavorable outcome, -1 less than expected outcome, 0 expected level, +1 more than expected success,

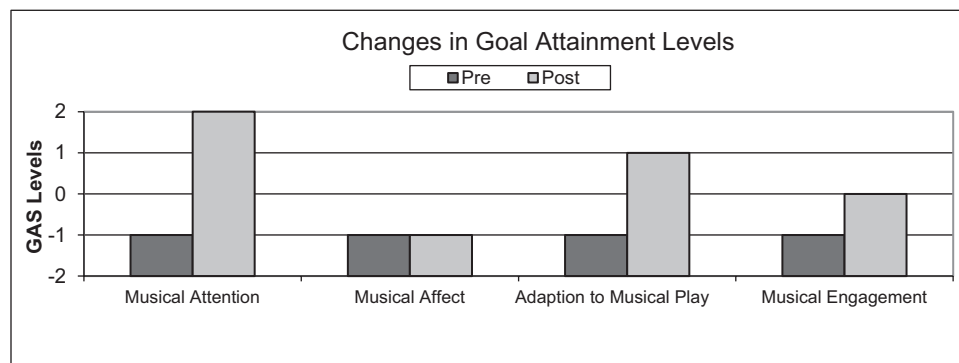


Figure 1. Changes in Joseph's Goal Attainment Levels.

and +2 most favorable outcome). Taking all of these goals collectively, Joseph advanced in three goal areas: three levels in musical attention, two levels in adaption to musical-play, one level in musical engagement, and remained the same in the area of musical affect.

### Discussion

The purpose of this paper was to introduce GAS as a method for evaluating developmentally based music-centered goals for children with ASD. As illustrated in this paper, GAS offers unique features for evaluating goals that may address some of the concerns when measuring music-centered outcomes. The client-centeredness of GAS, and its ability to determine the attainment of individualized goals that may not be detected by standardized measures (Turner-Stokes, Williams, & Johnson, 2009), make it a useful methodology for evaluating clients' capacity for expressive, relational, and communicative musical-play. Furthermore, the music therapist's ability to use the GAS in order to capture subtle changes, while providing a metric that can be used for individual outcome goals (Oren & Ogletree, 2000; Ruble et al., 2012), may make GAS applicable for evaluating musical-social processes between client and therapist. Moreover, from a statistical perspective, GAS can provide a quantitative measure for music-centered outcomes in the form of a T-score to provide overall client progress. Finally, GAS raw scores can provide useful mapping for individual goals.

Despite its positive attributes, there have been noted drawbacks to GAS such as the potential of bias when using the tool, which can affect its reliability and validity (Schlosser, 2004; Sharp & Read, 2012). Bias can occur in scaling goals; for example, goals may be overly easy or too difficult to attain, as well as in the rating of goals, or clients may appear to be making improvements that may not in fact be "real" (Marson, Guo, & Wasserman, 2009; Ottenbacher & Cusick, 1993; Schossler, 2004). According to Malec (1999), reliability related to the outcome values of GAS is dependent on the objectivity with which the outcome levels are described by the therapist. Thus, the therapist's clinical experience and familiarity with GAS is an important component to ensure reliability and validity.

King and colleagues (2000) suggest that reliability and validity can be improved by ensuring that therapists have a minimum of one year of clinical experience specific to the population being assessed so they can realistically set goals

that are relevant to the client's needs. Other recommendations include therapists attending discipline and population-specific GAS training (Ruble et al., 2012; Rockwood et al., 1997), as well as practicing writing goal attainment scaling templates (Ruble et al., 2012; Sharp & Read, 2012). Moreover, Schlosser (2004) suggests using an external rater to ensure reliability; however, while the use of an additional rater may be possible in a research context, costs and time may make it impractical in daily clinical practice.

There have been concerns related to the idiosyncratic nature of GAS (Malec, 1999). Although the individualized nature of GAS has generally been considered a strength of the method (Ruble & McGrew, 2013; Schaaf et al., 2012), Malec (1999) suggested that it can also be viewed as a weakness in terms of measuring behaviors that are only of value to that particular client. On the contrary, many have argued that the individualized nature of GAS is more clinically relevant to the client than global and normative measures that are often insensitive to important changes unique to the client (Ruble et al., 2012; Schlosser, 2004; Sharp & Read, 2012).

Goal attainment scaling is a flexible and client-centered evaluation method that can address the accountability concerns of music therapists. Perhaps most important for clinical work is that GAS is a practice-based and clinician-oriented method that can offer therapists a systematic but flexible procedure for evaluating progress toward treatment goals. Although future research and practice involving GAS and music therapy is needed, GAS holds promise as an idiographic approach for measuring music-centered outcomes for children with ASD.

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