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Music Improves Social and Participation Outcomes for Individuals With Communication Disorders: A Systematic Review

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There is increasing interest in exploring the benefits of music in rehabilitation settings. In the field of speech-language pathology, an ultimate goal for individuals with communication disorders is to foster participation across multiple contexts. The goal of this systematic review was to explore social and participation outcomes for individuals with communication disorders who received arts-based interventions. A systematic search of the literature yielded 86 studies, which were coded and summarized in terms of participants, arts-based intervention, social and participation variables, outcome, and quality of evidence. The majority of identified studies (N = 71) utilized music. Results indicated

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that music-based interventions can improve social and participation outcomes, such as frequency of responses, initiation of communication, turn-taking, joint attention, and group participation for children and adults with autism spectrum disorder and developmental and acquired communication disorders; however, future research is needed to expand the use of varied arts-based interventions targeting a larger breadth of social and participation outcomes.

Keywords: *music therapy; speech therapy; communication disorders; participation*

Communication Disorders

Estimates have shown that approximately 40 million Americans have a communication disorder (Tanner, 2007). Communication disorders are impairments in an individual's ability to receive, send, process, and comprehend concepts or verbal, nonverbal, and graphic systems (American Speech-Language-Hearing Association [ASHA], 1993). A communication disorder may be related to the processes of hearing, language, and/or speech and can range from mild to profound (ASHA, 1993).

Communication disorders impact both pediatric and adult populations as individuals may be born with a communication disorder (developmental) or acquire one later in life (acquired). Developmental communication disorders include stuttering, which affects approximately 1% of Americans (Yairi & Ambrose, 2013), and speech-sound disorders (e.g., articulation or phonological disorders), which affect approximately 5% of children in the United States (Black et al., 2015). Acquired conditions can include impairments such as noise-induced hearing loss, impacting approximately 26 million Americans (Lin et al., 2011), and aphasia, which is acquired by nearly 180,000 Americans each year (National Aphasia Association, 2016). Etiologies of communication disorders can include developmental disabilities (e.g., autism spectrum disorder [ASD] and dyslexia); anomalies of oral, pharyngeal, or laryngeal structures (e.g., cleft lip/palate and vocal fold pathology); neurological disease or trauma (e.g., traumatic brain injury, cerebral palsy, and dementia); or genetic disorders (e.g., Down syndrome and fragile X syndrome) (ASHA, 2016).

Speech-language pathologists (SLPs) are the primary interventionists for individuals with communication disorders and deliver services such as screening, assessment, treatment, and counseling (ASHA, 2016). The scope of practice for SLPs encompasses a range of areas, including speech production, fluency, language, cognition, voice, resonance, and hearing.

Social and Participation Outcomes for Individuals With Communication Disorders

In working with individuals with communication disorders, approaches may center on addressing the visible speech side of impairments and to measure changes in those speech outcomes. For example, for individuals who stutter, reduction in disfluencies may be tracked. Changes in nasality or improved loudness may be addressed in voice therapy or spontaneous vocalizations and/or verbalizations may be the focus of interventions with young children or children with ASD. Despite a growing body of evidence-based interventions and access to improved communication technologies, individuals with communication disorders continue to face difficulties participating in social interactions with others, which may negatively impact their quality of life and ability to form meaningful relationships.

The ASHA adopted the International Classification of Functioning (ICF), Disability and Health as a framework for assessment and intervention (ASHA, 2016). Within this framework, an individual's "activities and participation" is one of four main areas to consider in assessment and outcomes with body functions, body structures, and environmental factors as the other considerations (World Health Organization, 2001). A primary goal for individuals with communication disorders is to target the necessary skills for participating in desired activities and successfully engaging in social interactions. Individual skills may be remediated in a therapeutic environment, but the ultimate goal of communication intervention is to improve effective communication with others (Baylor et al., 2010). There is a major interest in the field of communication disorders in targeting the social and participation outcomes (Carroll et al., 2018; Eadie et al., 2006; Palmer et al., 2016; Yorkston & Baylor, 2012). A survey of SLPs in the United States by O'Brien (2014) found that SLPs have an interest in addressing social and

participation outcomes but experience barriers in the time it takes to address these goals (because they require individualization and sometimes nontraditional approaches) or measure the outcomes (because there are no tools to help manage data collection).

Defining Social and Participation Outcomes

Developing operational definitions of social and participation outcomes in speech-language pathology can be elusive (Eadie et al., 2006). The ICF framework provides a comprehensive guide to consider the many aspects of relationship building that occur in activities and participation; however, analysis of the extant literature shows that communication outcomes are defined in a variety of ways with activities covering social, communication, and physical dimensions (Eadie et al., 2006). In order to define interventions and discuss social and participation outcomes, social interaction variables from models of communication underlying speech and language therapy may be useful. For example, in the realm of augmentative and alternative communication (AAC), an area in the field of speech-language pathology which provides communication strategies to supplement or replace the natural speech of individuals with communication disorders, social skills are often discussed as sociolinguistic skills or sociorelational skills within the Communicative Competence Model (Light, 1989).

According to the Communicative Competence Model, sociolinguistic skills, or pragmatic skills, include discourse strategies such as turn-taking, topic initiation and development, cohesion, and coherence of conversation (Light, 1989, 2003). Sociolinguistic skills also include utilizing language for communicative functions, such as requesting objects/actions, requesting attention, protesting, or providing information. Sociorelational skills are those required to navigate the interpersonal components of communication. Sociorelational skills include playing an active role in interactions, being responsive to communication partners, demonstrating interest in the partners while also putting them at ease, projecting a positive self-image, and maintaining a positive rapport with partners (Light, 1989). These skills are frequently targeted as part of participation interventions.

A framework for assessing participation and designing corresponding interventions has previously been developed for individuals

with complex communication disorders. The Participation Model (Beukelman & Mirenda, 2013) provides a framework for SLPs to identify barriers and supports related to an individual's communication. Interventions are then selected or developed to facilitate participation by reducing the identified barriers and introducing the necessary supports. Outcomes for participation-focused interventions may involve reducing barriers by providing training to communication partners or arranging environments to be conducive to interactions. They may also include directly teaching how to make requests, protest, or initiate conversations. These skills can be targeted through a range of methods including arts-based interventions.

Arts-Based Interventions for Individuals With Communication Disorders

The arts encompass a wide range of outlets for creative expression and exploration. Mediums for art can include drawing, painting sculpting, acting, singing, and photography (Barton and Baguley, 2014). Blackstone and McCarthy (1997) suggested that the arts offer a milieu for interaction that avoids right and wrong answers inherent in instructional classroom lessons and focuses instead on new, fun, and creative expression. As such, the arts may serve as a potential method for specifically targeting social and participation outcomes. Several studies have examined the impact of arts-based interventions that incorporate drama and art on participation for children with specific language impairment (Fuijiki et al., 2013), children with complex communication needs (McCarthy and Light, 2001), and children with ASD (Grey et al., 2007). These studies reported positive results such as increased turn-taking (Fuijiki et al., 2013) and topic initiation (Grey et al., 2007). Additional arts-based interventions have explored the use of photography (Boster & McCarthy, 2016) and music (Allgood, 2005) to target social and participation outcomes such as the number of turns taken in conversation in small group activities.

Music Therapy

Music therapy has resulted in positive outcomes for several populations that frequently experience concomitant communication

disorders. For example, music therapy has improved social interactions for individuals with ASD (Geretsegger et al., 2014), language functioning for individuals with Alzheimer's disease (Brotons & Kroger, 2000), and turn-taking and engagement for children with developmental and multiple disabilities (Rainey Perry, 2003; Standley, 1996). The American Music Therapy Association (AMTA) and Certification Board for Music Therapists (CBMT) (2015) require music therapists to have an understanding of the professional roles of other disciplines that may be involved in the client's treatment plan. Music therapists who encounter individuals with communication disorders may interact or collaborate with SLPs. In a survey conducted by Register (2002), 44.6% of music therapists indicated that they had collaborated with an SLP and that they commonly interact to serve individuals with developmental disabilities or older adults. Music therapists also frequently reported working with SLPs when providing services to individuals with ASD or complex communication needs (Kern et al., 2013; McCarthy et al., 2008).

Although there are systematic reviews addressing music therapy and individuals with communication disorders (Gold et al., 2006), there is currently no evidence related to how the arts, specifically music, have been utilized to target social and participation outcomes that can improve the quality of a person's life and the nature of their interactions with other people. While evidence suggests that participation interventions are beneficial for individuals with communication disorders (Chung et al., 2012; Therrien et al., 2016), it is necessary to further explore which social and participation outcomes have been targeted in the context of arts-based interventions.

Research Question

The original study sought to examine the impact of arts-based interventions on social and participation outcomes for individuals with communication disorders. However, as the majority of eligible studies utilized music interventions, this manuscript will focus on answering the following research question: What are the social and participation outcomes for individuals with communication disorders who participate in music-based interventions?

Methods

Inclusion Criteria

Studies included in the review met the following criteria: (a) participants were diagnosed with a communication disorder, (b) the intervention utilized an arts-based intervention, (c) social or participation outcomes as defined below were reported, (d) the article was peer-reviewed, and (e) the article was published or translated into English.

Operational Definitions

Communication disorder. For this review, communication disorders were defined as disorders of verbal and/or nonverbal communication caused by receptive and/or expressive language disorders, cognitive dysfunction, and/or hearing disorders (ASHA, 2016). All communication disorders, regardless of participant demographics, were included in this review.

Arts-based intervention. The definition was created based on classifications from the PubMed MESH system to better aid in identifying studies covering a variety of different kinds of arts-based therapies. An arts-based intervention was defined as the use of art as an adjunctive therapy in the treatment of neurological, mental, or behavioral disorders. The search for arts-based interventions included keyword phrases of music therapy, art therapy, dance therapy, and drama therapy literature. The authors did not delineate whether the interventions were conducted by trained therapists; however, it was noted if the paper specifically stated who completed the intervention. For the purpose of this paper, only articles discussing music therapy were included.

Social and participation outcomes. Social and participation outcomes were defined according to the social domain of the Communicative Competence Model (Light, 1989) and the Participation Model (Beukelman & Mirenda, 2013). Social and participation outcomes were required to fall into one of the following categories: sociorelational skills, sociolinguistic skills, outcomes reducing barriers, and outcomes increasing supports. Sociorelational skills included responses to the social situation, such as active participation, responding, demonstration of interest, and establishing a positive rapport. Sociolinguistic skills referred to a person's use of their language to participate. These include skills in discourse,

such as turn-taking, initiation, and topic maintenance, and skills in the function of communication, such as communicating to request and protest. Finally, social and participation outcomes could reduce barriers or increase supports to communication. Examples of this include increasing communication opportunities or improving facilitators' knowledge and skills. Social and participation outcomes could be reported through qualitative or quantitative data analysis techniques but were only included if the outcomes met the definitions for social and participation outcomes described by Light (1989) and Beukelman and Mirenda (2013).

Search Procedures

Searches were conducted in PubMed, Cochrane, EBSCO databases (CINAHL, PsycINFO, Medline, Academic Search Complete, and ERIC), and Web of Science in April 2018. Figure 1 depicts the search and review process utilized to identify all relevant articles. Search strategies utilized the highest-level Medical Subject Headings (MeSH) term to capture topic areas related to communication disorders and arts-based interventions (e.g., sensory art therapies). See Table 1 for complete search strategies according to the included databases. In addition to this comprehensive search of databases, hand searching was completed of *Journal of the American Art Therapy Association*, *International Journal of Art Therapy*, *Journal of Music Therapy*, *British Journal of Music Therapy*, *Nordic Journal of Music Therapy*, *Journal of Clinical Art Therapy*, and *Music Therapy Perspectives*. All identified articles were evaluated against the defined inclusion criteria. Two independent reviewers completed the review process following the PRISMA protocol for systematic reviews (Moher et al., 2009). This included a title, abstract, and full-text review. This process for inclusion and exclusion of studies based on the inclusion criteria can be seen in Figure 1.

Coding Procedures

A coding manual with operational definitions for all codes was developed to guide the coding procedures for this review. Articles meeting inclusionary criteria were coded by the first and second authors according to (a) participant characteristics (type of communication disorder, participant age), (b) study design, (c) independent variable (type of arts-based intervention), (d) social and

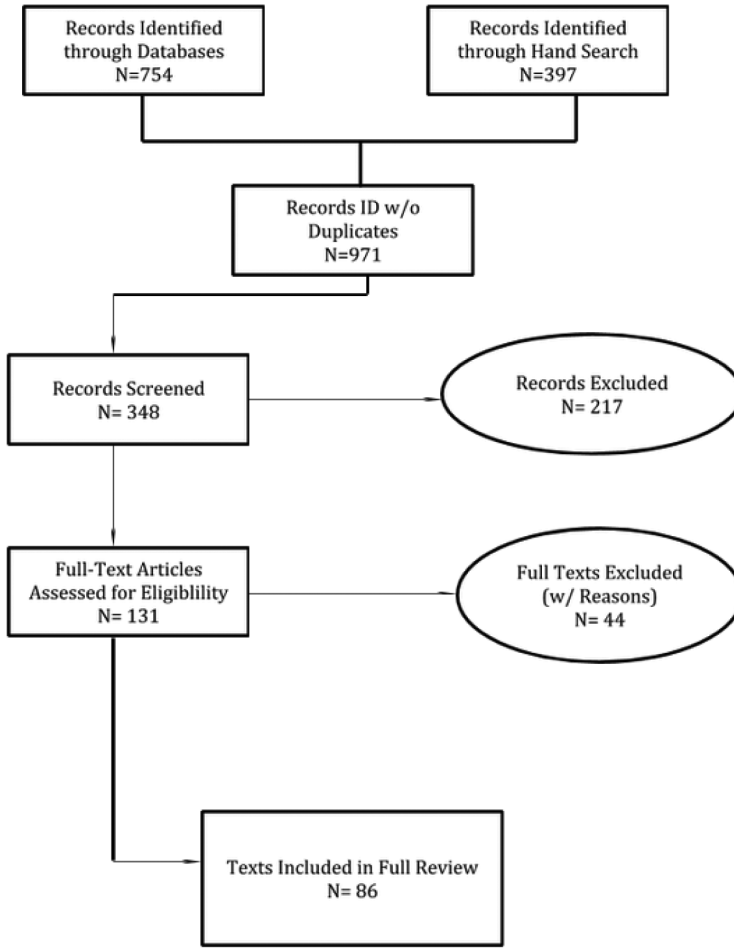

FIGURE 1
PRISMA flow diagram (Moher et al., 2009) detailing the process of database searches and article review to identify texts included in the full review.

participation outcome(s), (e) direction of clinical outcome (positive, negative, and mixed), and (f) quality of evidence. Reviewers also noted whether interventions specified they were conducted by a therapist with a certification in the respective art domain. Following guidelines from the Cochrane Collaboration (http://

Table 1

Complete Search Strategies for all Databases Included

PubMed	(communication disorder OR Communicative Dysfunction OR communication disability OR social communication disorder) AND ((speech therap* OR speech language therap* OR speech language intervention* OR language therap* OR speech intervention* OR language intervention*)) AND (((art OR art therap* OR sensory art therap* OR art rehabilitation* OR music OR music therap* OR drama OR drama therap* OR psychodrama OR poetry OR poetry therap* OR dance OR dance therap*)))
Cochrane	("communication disorder" or "Communicative Dysfunction" or "communication disability" or "social communication disorder") and ("art OR art therap*" or "sensory art therap*" or "art rehab*" or "music" or "music therap*" or "drama" or "drama therap*" or "psychodrama" or "poetry" or "poetry therap*" or "dance" or "dance therap*") and ("speech therap*" or "speech language therap*" or "speech language intervention*" or "language therap*" or "speech intervention*" or "language intervention*")
EBSCO: CINAHL, PscycINFO, Medline, Academic Search Complete, and ERIC	(communication disorder OR Communicative Dysfunction OR communication disability OR social communication disorder) AND ((speech therap* OR speech language therap* OR speech language intervention* OR language therap* OR speech intervention* OR language intervention*)) AND (((art OR art therap* OR sensory art therap* OR art rehabilitation* OR music OR music therap* OR drama OR drama therap* OR psychodrama OR poetry OR poetry therap* OR dance OR dance therap*)))
Web of Science	(communication disorder OR Communicative Dysfunction OR communication disability OR social communication disorder) AND ((art OR art therap* OR sensory art therap* OR art rehabilitation* OR music OR music therap* OR drama OR drama therap* OR psychodrama OR poetry OR poetry therap* OR dance OR dance therap*)) AND (((speech therap* OR speech language therap* OR speech language intervention* OR language therap* OR speech intervention* OR language intervention*)))

www.chochrane.org), the first and second authors used the operational definitions developed as part of the coding manual to code all included studies. Disagreements were resolved through

discussions with the final author until a consensus was reached for 100% agreement on all codes.

Participant characteristics. Included articles were first coded according to participant age and diagnosis. Studies that included only children ages 0 to 21 were coded as pediatric, and studies that included only adults ages 21 and older were coded as adult. Selected studies that included both children and adults were coded as both. Participant diagnoses were identified and based on specific diagnoses, and participants were categorized as having either a developmental or acquired diagnosis. Determination of specific diagnoses and categorization of diagnoses allowed for the examination of patterns of intervention methods according to these diagnoses.

Study design. Included studies were additionally coded based on their study design. Articles included in this review were coded as implementing a: (a) case study, (b) single-subject design (SSD), (c) group design, or (d) randomized controlled trial.

Independent variable. Intervention methods were characterized based on the independent variable. To be included in the review, studies must have implemented an arts-based intervention. Examples of art forms meeting these criteria include music, dance, drama, poetry, and other arts-based activities. The category of other arts-based activities encompasses any art form that was not classified as one of the other distinct categories. Examples of this include painting, drawing, or pottery. For the purpose of this manuscript, only music-based interventions are discussed.

Social and participation outcomes. Included studies were required to have a social or participation outcome meeting one of the aforementioned definitions described in the Communicative Competence model (Light, 1989) and the Participation Model (Beukelman & Mirenda, 2013). Specific outcomes were extracted from articles based on terminology utilized by the authors and then coded according to the components of the Communicative Competence Model (Light, 1989) and Participation Model (Beukelman & Mirenda, 2013), depending on the characteristics of the outcome. These components again include sociorelational skills, sociolinguistic skills, outcomes reducing barriers, and outcomes increasing supports. Included studies may have had dependent variables belonging to one or more of these categories.

Direction of clinical outcome. Results of the included studies were coded according to their outcome. All included studies were

coded as presenting positive, negative, or mixed results. The results of each intervention were determined by reviews of the first and second authors. For SSD studies, reviewers relied on visual inspection of graphs and the report of percent nonoverlapping data (Scruggs et al., 1987). For group design studies, reviewers examined the significant results reported. Disagreements were settled with discussion with the final author until 100% agreement on the coding of outcomes was obtained.

Quality of evidence. The quality of evidence for each study included in the review was evaluated by two reviewers using quality markers from Horner et al. (2005). Experimental single-subject research studies documenting relationships between independent and dependent variables were included. Studies were analyzed in terms of the following: (a) adequacy of participant and setting description, (b) operationally defining and repeatedly measuring the specified dependent variable, (c) reporting the reliability of measurement for the dependent variables, (d) discussion of social validity, (e) describing the intervention with specific necessary to replicate, (f) reporting intervention fidelity, (g) documenting stable baseline, and (h) establishing experimental control. All studies assigned an evidence rating of inconclusive, suggestive, preponderant, or conclusive based on the definitions from Simeonsson and Bailey (1991) and as utilized in Kent-Walsh et al. (2015) and Schlosser and Wendt (2008).

Results

An initial yield of 971 articles were identified and extracted for screening following the initial search of included databases and hand-searched journals. Following title and abstract screenings and a full-text review, a total of 86 articles met the criteria for inclusion in this review. Upon discovering most studies ($N = 71$) were music-related, the authors elected to review music-based studies and other arts-based studies ($N = 15$) separately. The results presented in the current paper will focus on the included music-based studies only. Data extraction highlighted four primary population areas through which results will be discussed. These four primary populations include: (a) pediatrics with ASD ($n = 23$), (b) pediatrics with developmental and acquired disabilities ($n = 29$), (c)

adults with developmental disabilities ($n = 5$), and (d) adults with acquired disabilities ($n = 14$).

Pediatrics With ASD

Participant and study design characteristics. Twenty-three studies included pediatric participants with ASD. Specific participant and study characteristics are displayed in Table 2. The studies in this category had a total of 337 reported participants ranging in age from 2 to 17 years old. One study did not report the number of participants included. A variety of research designs were implemented to answer research questions relevant to each study. These include case studies ($n = 4$), SSDs ($n = 7$), group designs ($n = 7$), and randomized controlled trials ($n = 5$).

Social and participation outcomes. Studies targeted joint attention ($n = 4$), participation in group and peer interactions ($n = 5$), verbal and nonverbal expression and engagement ($n = 13$), and emotional understanding ($n = 2$).

Direction of clinical outcomes. Most of the studies included in this category ($n = 18$) reported positive findings, supporting the use of music to improve social and participation outcomes for children with ASD. Five studies reported mixed results, and no included studies reported negative outcomes.

Quality of evidence. Seven studies demonstrated preponderant evidence. Seven studies demonstrated suggestive evidence, and nine studies presented evidence that was inconclusive. None of the studies presented conclusive evidence.

Pediatrics With Developmental and Acquired Disabilities

Participant and study design characteristics. Twenty-nine studies included pediatric participants with other developmental and acquired disabilities. Specific participant and study characteristics are displayed in Table 3. A total of 561 reported participants were included in studies with pediatrics with developmental and acquired disabilities. Participants ranged in age from 3 months to 21 years, and diagnoses included Down syndrome, cerebral palsy, and multiple disabilities. Study designs included a range of case studies ($n = 8$), SSDs ($n = 13$), and group designs ($n = 8$).

Social and participation outcomes. Social and participation outcomes for pediatrics with developmental and acquired disabilities

Table 2

Summary of Coded Variables for Studies With Pediatric Participants With Autism Spectrum Disorder, Including QoE

Study	*N*	Age	Social/Participation Variable (s)	Outcome	Duration	QoE
Allgood (2005)[a]	4	4–6	Group participation	+	7 weeks	Incon.
Brownell (2002)[a]	4	6–9	Socially appropriate behaviors	+	8 days	Sugg.
Carpente (2017)[a]	4	4–8	Emotions, turn-taking, and engagement in play	+	13 weeks	Incon.
Edgerton (1994)[a]	11	6–9	Frequency of responses	+	10 weeks	Incon.
Gadberry (2012)[a]	9	4–9	Frequency of communication acts	+	1 day	Sugg.
Gattino et al. (2011)[a]	24	7–12	Nonverbal communication behaviors	+/−	16 weeks	Sugg.
Hernandez-Ruiz (2017)[a]	3	2–3	Frequency of responses	+	6 weeks	Incon.
Kalas (2012)[a]	30	4–6	Joint attention	+/−	3 weeks	Sugg.
Katagiri (2009)[a]	12	9–15	Emotions	+	4 weeks	Prep.
Kern and Aldridge (2006)[a]	4	3–5	Peer interactions and play engagement	+/−	8 months	Prep.
LaGasse (2014)[a]	17	6–9	Eye gaze and joint attention	+/−	5 weeks	Prep.
Lim (2010)[a]	50	3–5	Verbal production	+	3 days	Prep.
Lim and Draper (2011)[a]	22	3–5	Verbal production	+	2 weeks	Sugg.
Mössler et al. (2017)[a]	48	4–7	Eye gaze and social overtures	+	5 months	Sugg.
Pasiali (2004)[a]	3	7–9	Frequency of inappropriate responses	+	4 weeks	Incon.
Preis et al. (2016)	5	4–6	Frequency of responses	+	28 weeks	Incon.
Sandiford et al. (2013)	12	5–7	Frequency of responses	+	5 weeks	Prep.
Sindelar and Meini (2017)	N/A	5–7	Joint attention and verbal language	+	N/A	Incon.
Srinivasan et al. (2016)	36	5–12	Frequency of responses	+	10 weeks	Prep.
Stevens and Clark (1969)	5	5–7	Social and interpersonal skills	+	18 weeks	Incon.
Thompson et al. (2014)[a]	23	3–6	Engagement	+/−	16 weeks	Prep.
Thompson (2018)[a]	8	3–4	Social relationships	+	16 weeks	Incon.
Vaiouli et al. (2015)[a]	3	5–7	Joint attention	+	21 weeks	Sugg.

Note. QoE refers to the quality of evidence abbreviated as follows: Incon. = inconclusive; Sugg. = suggestive; Prep. = preponderant.
[a]Study-stated intervention procedures were completed by or paper was authored by a credentialed music therapist.

were varied. Studies primarily targeted outcomes, such as frequency of verbal, nonverbal, or social responses (n = 8); engagement and participation in peer or group interactions (n = 6); use of appropriate nonverbal communication behaviors (i.e., eye-gaze and facial affect) (n = 2); and attention to task (n = 2).

Direction of clinical outcomes. Most studies in this category reported positive outcomes (n = 21). Eight studies reported mixed results, while no studies reported exclusively negative results.

Quality of evidence. One study demonstrated preponderant evidence, 9 of the studies presented evidence that was suggestive, and 19 studies were coded inconclusive. No studies were determined to have conclusive evidence.

Adults With Developmental Disabilities

Participant and study design characteristics. Five studies included adults with developmental disabilities as participants. Participant and study characteristics can be found in Table 4. Studies including adults with developmental disabilities reported 129 participants ranging in age from 17 to 58 years old with diagnoses including developmental disability and intellectual disability. One study (MacDonald et al., 1999) reported participants outside our defined range of adult age (i.e., 21 years and older); however, due to the study primarily consisting of adults, the results of this study will be reported as such. Research designs in this category included SSDs (n = 2) and group designs (n = 3).

Social and participation outcomes. Dependent variables included in this category primarily included frequency of responses and interactions (n = 4) and general understanding and use of pragmatics (n = 1).

Direction of clinical outcomes. Three studies reported positive findings related to social and participation outcomes, one study reported mixed findings, and one study reported negative findings.

Quality of evidence. Four studies presented suggestive evidence, and one study was inconclusive. No studies were conclusive.

Adults With Acquired Disabilities

Participant and study characteristics. Fourteen studies included adults with acquired disabilities. Characteristics of these studies are presented in Table 5. Studies with adults with acquired disabilities

Table 3

Summary of Coded Variables for Studies With Pediatric Participants With Other Developmental and Acquired Disorders, Including QoE

Study	*N*	Age	Social/Participation Variable(s)	Outcome	Duration	QoE
Braithwaite and Sigafoos (1999)	5	3–4	Appropriate responses	+/−	10 mins/2 sessions a week	Sugg.
Colwell et al. (2014)[a]	20	<1–1	Frequency of gestures and verbalizations and engagement	+	4 weeks	Incon.
de l'Etoile (2015)[a]	62	<1	Gaze and affect	+/−	1, 2-min session	Prep.
DeBedout and Worden (2006)[a]	17	5–13	Movement responses	+	5, 2-min trials	Sugg.
Decuir (1975)[a]	16	8–21	Vocal responses	+	N/A	Incon.
Deutsch and Parks (1978)	1	14	Appropriate verbal behaviors	+	N/A	Sugg.
Eidson (1989)[a]	25	11–16	Number of on-task behaviors	+	17 weeks	Sugg.
Geist et al. (2008)[a]	1	4	Greetings and engagement	+	N/A	Incon.
Gilboa and Roginsky (2010)[a]	2	4	Nonverbal and verbal acts	+	2 months	Incon.
Gooding (2011)[a]	35	6–17	Social Skill Functioning: frequency of on-task behaviors	+	5 weeks	Incon.
Gunsberg (1988)	12	3–5	Length of sustained play	+	5 months	Incon.
Harding and Ballard (1982)	3	3–5	Number of verbal responses and initiations: on-task behaviors	+	6 weeks	Sugg.
Howarth and Conti-Hamsden (1987)	6	5–7	Turn-taking, initiation, imitation	+/−	8 weeks	Sugg.
Humpal (1991)[a]	27	3–5	Frequency of interactions	+	15 weeks	Incon.
Jellison and Gainer (1995)[a]	1	11	Frequency of responses	+/−	6 months	Incon.
Jorgenson and Parnell (1970)[a]	4	8–9	Reduction of negative behavior: engagement in activity	+	N/A	Incon.
Krout (1987)[a]	6	12–16	Participation in group therapy	+/−	10 weeks	Incon.

Table 3

Continued

Study	*N*	Age	Social/Participation Variable(s)	Outcome	Duration	QoE
McFerran and Shanahan (2011)[a]	3	11–12	Frequency of eye gaze, facial expression, and vocalizations	+/−	1 week	Incon.
Pasiali (2012)[a]	4	N/A	Frequency of interactions: mutual cooperation	+	8 sessions for 30–60 min	Incon.
Perry (2003)[a]	10	5–11	Reactive communication skills	+	10–15 min	Incon.
Rocca (2015)	7	<1	Attention and imitation	+	8 months	Incon.
Sussman (2009)[a]	9	2–6	Sustained and alternating attention to peers	+/−	4 sessions	Sugg.
Toolan and Coleman (1995)[a]	5	N/A	Engagement	+	30 sessions	Incon.
Underhill and Harris (1974)[a]	4	9–13	Imitation	+	30 sessions	Sugg.
Villa Boas et al. (2016)	1	2	Nonverbal requests for attention	+	7 days	Incon.
Williams et al. (2012)[a]	201	<1–5	Social awareness	+	10 weeks	Incon.
Wingert (1972)	20	N/A	Self-control: group participation	+	18 weeks	Incon.
Wylie (1983)[a]	28	8–20	Frequency of verbal production	+	N/A	Sugg.
Yang (2016)[a]	26	1–3	Number of initiations	+/−	6 weeks	Incon.

Note. QoE refers to the quality of evidence abbreviated as follows: Incon. = inconclusive; Sugg. = suggestive; Prep. = preponderant.
[a]Study-stated intervention procedures were completed by or paper was authored by a credentialed music therapist.

TABLE 4

Summary of Coded Variables for Studies With Adult Participants With Developmental Disorders, Including QoE

Study	*N*	Age	Social/Participation Variable(s)	Outcome	Duration	QoE
Cunningham (1986)[a]	20	N/A	Frequency of group vocalizations	+/−	8 days	Sugg.
Hooper (2001)[a]	4	34–51	Frequency of interactions	+	10 weeks	Sugg.
MacDonald et al. (1999)	64	17–58	Understanding and expression of pragmatics	+	10 weeks	Sugg.
Talkington and Hall (1970)	21	N/A	Number of responses	+	12 weeks	Incon.
Traub (1969)	20	30–55	Verbalization	−	3, 30-min sessions	Sugg.

Note. QoE refers to the quality of evidence abbreviated as follows: Incon. = inconclusive; Sugg. = suggestive; Prep. = preponderant.
[a]Study-stated intervention procedures were completed by or paper was authored by a credentialed music therapist.

reported a combined total of 245 participants ranging in age from 32 to 98 years old. Diagnoses in this category included Alzheimer's Disease and dementia, traumatic brain injury, and Parkinson's Disease. Implemented research designs included a case study ($n = 1$), SSDs ($n = 4$), and group designs ($n = 9$).

Social and participation outcomes. Social and participation outcomes for adults with acquired disabilities consisted of the frequency of verbal, nonverbal, and social behaviors ($n = 6$) and engagement and participation in a group ($n = 3$). Other outcomes included the demonstration of shared interest and change in mood ($n = 1$), use of eye-contact and other nonverbal behaviors to demonstrate affirmation ($n = 1$), and perceived change in social behaviors ($n = 1$).

Direction of clinical outcomes. Eleven studies reported positive findings, three studies reported mixed findings, and no studies reported solely negative findings.

Quality of evidence. Five studies presented suggestive evidence, and nine studies were inconclusive. No studies were determined to have conclusive evidence.

Discussion

The current review demonstrates that music is frequently utilized in interventions for individuals with communication disorders

TABLE 5

Summary of Coded Variables for Studies With Adult Participants With Acquired Disorders, Including QoE

Study	*N*	Age	Social/Participation Variable(s)	Outcome	Duration	QoE
Brotons & Marti (2003)[a]	28	N/A	Verbal and nonverbal communication and participation in group task	+	12 days	Incon.
Clair (1996)[a]	26	62–83	Number of alert responses	+	4 days	Sugg.
Clair and Ebberts (1997)[a]	15	N/A	Verbal behaviors during conversation	+	4 weeks	Incon.
Dassa and Amir (2014)[a]	6	65–83	Conversational topics	+	1 month	Incon.
Fogg-Rogers et al. (2016)	23	32–77	Shared fun interest, mood, movement, voice, breathing, and language	+	N/A	Incon.
Groene (2001)[a]	8	73–90	Number of participants giving eye contact and nodding to show affirmation	+	N/A	Sugg.
Hanson et al. (1996)[a]	51	N/A	Level of response per proportion of time	+/−	12 weeks	Sugg.
Keough et al. (2017)[a]	3	N/A	Appropriate social interactions, conversational approaches, and positive social interactions	+	1 year	Incon.
Millard and Smith (1989)[a]	10	71–98	Frequency of social behaviors and verbal participation	+	5 weeks	Sugg.
Pollack and Namazi (1992)[a]	8	67–85	Frequency of nonverbal and verbal behaviors	+	2 weeks	Incon.
Solé et al. (2014)[a]	16	76–91	Number of verbalizations, physical contact, visual contact, and active participation	+/−	12 weeks	Incon.
Tamplin et al. (2013)[a]	13	N/A	Motivation to participate	+	6 months	Incon.
Wheeler et al. (2003)[a]	10	34–74	Social behavior rating	+	N/A	Incon.
Ziv et al. (2007)[a]	28	N/A	Frequency of observed behavior	+/−	3 weeks	Sugg.

Note. QoE refers to the quality of evidence abbreviated as follows: Incon. = inconclusive; Sugg. = suggestive; Prep. = preponderant.
[a]Study-stated intervention procedures were completed by or paper was authored by a credentialed music therapist.

when social and participation outcomes are targeted. This may be due to several factors including the continued rise of music therapy as an evidence-based treatment strategy, the accessible nature of music for individuals with disabilities, and the communicative nature of music.

Increased Access to Music Therapists

Music therapy continues to grow as a field with music therapists playing larger roles in therapeutic programs for individuals with disabilities. According to information from the CBMT, there are currently over 8,000 individuals with the credential Music Therapist-Board Certified (MT-BC). Over half (73%) of the music-based interventions included in the review were implemented by a credentialed music therapist ($n = 54$). Music therapists are found in a range of settings, including hospitals, schools, and outpatient therapy centers, that often provide services to individuals with communication disorders. Studies frequently included a credentialed music therapist as the interventionist and included specific music therapy techniques. As evidenced by the Register (2002) survey, music therapists frequently collaborate with SLPs and intervene with individuals with communication disorders. These frequent interactions have likely led to the increased exploration of music-based interventions that specifically target social and participation outcomes.

Accessibility of Music

While there are multiple methods for engaging in a range of arts-based interventions, individuals with physical or cognitive disabilities may have greater access to music in comparison to other art forms. Music may be readily available in many settings and can be played easily from a variety of mobile devices that are accessible to professionals. There are also technologies that can facilitate access to music, such as switch-activated toys, recording devices, and technologies, such as the Skoog or Beamz. Such technologies may be particularly motivating and engaging for children and adults and, thus, provide opportunities to address a range of social and participation goals. While music is easily accessible to a range of professionals, it must be noted that casual listening of music on mobile devices is not the same as music therapy that is guided or facilitated by music therapists (AMTA, 2019).

Communicative Nature of Music

Although all art forms can be considered communicative, music may be particularly well suited for supporting communication. Lyrics can be used to introduce a range of vocabulary concepts, provide a method for expressing emotions, and communicate larger ideas. Children and adults can participate lyrically by selecting, singing, or creating a line in a song. For individuals with complex communication needs, song lyrics can be programmed into switch-activated devices such as a BigMack or embedded into pages of a speech-generating device. This would allow the individual to participate in singing the song even if they are unable to use natural speech. Lyrics may also support targeting comprehension of intention and story line. For example, musical lyrics may facilitate interactions by fostering discussions such as why someone does or does not like a song or what they feel when they listen to it. Songs are frequently utilized in activities for individuals with ASD as they provide a means to discuss feelings and emotions that may be difficult to approach via other modalities. Adults with communication disorders may also be drawn to musical lyrics. Adults who have acquired a communication disorder later in life may have specific memories or spiritual connections to songs. As such, they may seek to use these songs to express ideas to loved ones when forming words is difficult.

Social and Participation Outcomes

A range of social and participation outcomes was targeted across the studies included in the review. This suggests that music-based interventions are particularly flexible for addressing social and participation outcomes. The complexity of social and participation outcomes selected across studies ranged from requesting to participating in conversations. The frequency of communicative acts (i.e., initiations, responses, and interactions) was commonly utilized as an outcome measure across all populations. This is consistent with social and participation interventions in the field of communication disorders (Chung et al., 2012; Therrien et al., 2016). For example, for individuals with complex communication needs, participation outcomes are frequently centered on the frequency of interactions and increasing the number of communicative acts that occur between individuals with a disability and

their peers. Although the focus of this review was on social and participation outcomes, those outcomes are mediated through different communication interactions (i.e., requesting information and sharing information). Individuals with severe speech impairments still access and develop their language through such interactions and listening to the speech of others around them. Music has a unique capability to assist with the neural encoding of speech (Patel, 2011).

Characteristics of the target population did appear to influence outcomes reported. For example, frequent outcomes for pediatric participants with ASD were joint attention, involvement in social interactions, and identification of emotions. These outcomes directly address frequently noted limitations for this population. For adults with acquired communication disorders, appropriate social behaviors were often targeted. This is also likely related to characteristics of the included populations following a brain injury, which often results in difficulty with pragmatic functions and inhibition. Overall, the social and participation outcomes selected appeared appropriate for the target populations and addressed skills that would support individuals with communication disorders in their interactions with communication partners. The results of the review are encouraging and highlight a shared interest for music and speech therapists in supporting social and participation outcomes for individuals with communication disorders. This may contribute to better collaboration and increased awareness related to participation-oriented outcomes in the future.

Implications

The results of the current review suggest that music therapists can play a significant role in helping individuals with communication disorders. The range of outcomes targeted and their alignment with population characteristics suggests that music therapy provides a flexible context for targeting a variety of skills to support social interactions. The context of music may be particularly beneficial for individuals with communication disorders who are actively working to develop or regain skills. Music may serve as an inviting way to move out of discrete therapy activities and provide a translational avenue to address participation-based goals for individuals with communication disorders.

Limitations and Future Directions

Most studies included were SSD studies with small sample sizes. SSD research is valuable for identifying relationships between interventions and target behaviors; however, such studies must achieve a high level of experimental control and scientific rigor. Many SSD studies included in the review were inconclusive or suggestive because insufficient details were provided related to reliability and social validity. Future researchers should continue to utilize SSD studies but be mindful of the criteria used to assess the quality of evidence when designing the study and disseminating results. The results of the included studies were largely positive with few negative results reported; this may be due to publication bias. This finding should also be interpreted with caution, as the reviewers did not complete independent or additional analyses to determine the study outcomes. The current study also did not include coding of the types of music interventions that were utilized. There are a variety of different music-based methods, techniques, and interventions, which could have been implemented to be included in the current review. Future analysis may be necessary to further explore the nature of the music-based interventions included in the current review.

Conclusions

Music has been used to address a range of social and participation outcomes for individuals with communication disorders. Findings from the current review suggest that characteristics of target populations may influence the social and participation outcomes selected. Many social and participation outcomes targeted foundational communication skills such as joint attention and initiating vocalization; outcomes with older children and adults may also involve emotions, conversational turns, and appropriate social interactions. Music has been utilized frequently as a context for social and participation intervention, which may be due to its accessibility and communicative nature. While future research is needed, the current review indicates that music-based interventions are beneficial to both pediatric and adult populations with communication disorders.

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