EXPLORING THE LONG-TERM IMPACT OF MUSIC THERAPY ON INDIVIDUALS WITH INTELLECTUAL DISABILITIES: A COMPREHENSIVE NARRATIVE REVIEW

Loredana Muntean (PhD)[1]
University Oradea (Romania)

Laura Nicoleta Bochiş (PhD)[2]
University Oradea (Romania)

Cite: Muntean, Loredana, & Bochiş, Laura Nicoleta (2025). Exploring The Long-Term Impact of Music Therapy on Individuals with Intellectual Disabilities: A Comprehensive Narrative Review. *Különleges Bánásmód Interdiszciplináris folyóirat [Special Treatment Interdisciplinary Journal], 11*(4), 123–138. DOI https://doi.org/10.18458/KB.2025.4.123

EP / EE: Ethics Permission / Etikai engedély: KB/2025/0047

Reviewers: *Public Reviewers / Nyilvános Lektorok:*
Lektorok: 1. Anett Fógel Veres (PhD), Debreceni Egyetem (Magyarország)
2. Julianna Árkosi (PhD), Debreceni Egyetem (Magyarország)

Anonymous reviewers / Anonim lektorok:
3. Anonymous reviewer (PhD) / Anonim lektor (PhD)
4. Anonymous reviewer (PhD) / Anonim lektor (PhD)

Abstract

This narrative review examines the long-term effects of music therapy on individuals with intellectual disabilities (ID), including those with comorbid conditions. A systematic search of Scopus and Web of Science identified 684 records, with empirical studies meeting strict longitudinal and methodological criteria retained. The review is structured around five key dimensions: (1) participant characteristics, including ID severity and co-occurring conditions; (2) research designs and methodologies; (3) types of music therapy interventions and their comparative long-term efficacy; (4) targeted cognitive, emotional, and social abilities; and (5) the overall long-term effectiveness of music therapy. Additionally, the review investigates contextual variables and processes of change, offering a nuanced perspective on the long-term impact of music therapy. Findings reveal significant gaps in the literature, particularly the scarcity of longitudinal and follow-up studies, thereby limiting conclusive insights into sustained benefits. This review underscores the pressing need for robust, long-term research to strengthen the evidence base and

[1] Muntean Loredana (PhD), University of Oradea (Romania).E-mail: mt.loredana@gmail.com ORCID: https://orcid.org/0000-0002-0734-5576
[2] Bochiş Laura Nicoleta (PhD), University of Oradea, (Romania). E-mail: totlaura@yahoo.com ORCID https://orcid.org/0000-0002-3086-1106

optimize the use of music therapy in clinical and educational settings. Such efforts are essential for enhancing cognitive functioning, emotional regulation, social interaction, and overall well-being among individuals with ID.

Keywords: intellectual disability, music therapy, long-term effects, narrative review, therapeutic interventions

Discipline: Educational Science

Absztrakt

A ZENETERÁPIA HOSSZÚ TÁVÚ HATÁSAINAK FELTÁRÁSA AZ ÉRTELMI FOGYATÉKOSSÁGGAL ÉLŐ SZEMÉLYEK KÖRÉBEN: ÁTFOGÓ NARRATÍV ÁTTEKINTÉS

Jelen narratív áttekintés a zeneterápia hosszú távú hatásait vizsgálja az értelmi fogyatékossággal (ÉF) élő személyek körében, beleértve a társbetegségekkel rendelkezőket is. A Scopus és a Web of Science adatbázisokban végzett szisztematikus keresés 684 publikációt azonosított; ezek közül a szigorú longitudinális és módszertani kritériumoknak megfelelő empirikus tanulmányok kerültek beválogatásra. Az elemzés öt fő dimenzióra épül: (1) a résztvevők jellemzői, az ÉF súlyossága és a társuló állapotok; (2) a kutatási tervek és alkalmazott módszertanok; (3) a zeneterápiás intervenciók típusai és hosszú távú hatékonyságuk; (4) a célzott kognitív, érzelmi és szociális készségek; valamint (5) a zeneterápia összesített, hosszú távú eredményessége. Emellett az áttekintés feltárja a kontextuális változókat és a változásfolyamatokat is, árnyalt képet adva a zeneterápia hosszú távú hatásairól. Az eredmények rámutatnak a szakirodalom jelentős hiányosságaira: különösen kevés a hosszú távú és utánkövetéses vizsgálat, ami megnehezíti a tartós hatásokra vonatkozó megalapozott következtetések levonását. Az áttekintés hangsúlyozza az átfogó, hosszú távú kutatások szükségességét a bizonyítékalap megerősítése és a zeneterápia klinikai és pedagógiai alkalmazásának eredményesebbé tétele érdekében. Az ilyen irányú kutatások alapvető fontosságúak az ÉF-fel élő személyek kognitív működésének, érzelmi szabályozásának, társas interakcióinak és általános jóllétének támogatásához.

Kulcsszavak: értelmi fogyatékosság, zeneterápia, hosszú távú hatás, narratív áttekintés, terápiás intervenciók

Diszciplína: neveléstudomány

Introduction

The therapeutic potential of music has gained considerable recognition in disability studies for its role in supporting cognitive, emotional, and social development among individuals with intellectual and developmental disorders (Kalgotra & Warwal, 2017; Wigram & Gold, 2006; Gooding, 2011; LaGasse, 2014). When implemented in educational settings, music therapy transcends its function as a tool for skill acquisition, emerging as a transformative practice that responds to diverse learner needs while also countering the social marginalization often experienced by individuals with intellectual disabilities (Baranauskienė & Latakienė, 2023; Rickson, 2014; McFerran & Shoemark, 2013). In this context, it operates simultaneously as an inclusive pedagogical strategy and as a mediator of psychosocial autonomy and identity formation.

Intellectual disability (ID) is defined by the Diagnostic and Statistical Manual of Mental Disorders (5th ed., text rev.; American Psychiatric Association [APA], 2022) as a neurodevelopmental

condition characterized by significant limitations in both intellectual functioning and adaptive behavior. These limitations typically emerge early in development and persist across the lifespan, manifesting as marked difficulties in language acquisition, attention, memory, and environmental processing—factors that directly affect learning, communication, and social integration (Schalock et al., 2021; Tassé et al., 2019; del Corsso, 2024). Such developmental constraints fundamentally shape how individuals with ID think, learn, solve problems, and manage everyday life.

In response to these challenges, music therapy has been explored as an effective modality for fostering emotional, cognitive, and social development (Geretsegger et al., 2012; Blanky-Voronov & Gilboa, 2022; Pater et al., 2023). A growing body of research underscores music therapy's capacity to enhance both emotional and cognitive functioning in individuals with neurodevelopmental conditions. Gu (2024) reported improved empathy and emotional comprehension in adolescents following structured musical activities, while Yum et al. (2024) observed gains in self-regulation and engagement among young children, including those with autism spectrum disorder. Shek and Lee (2024) further emphasised that personalized music therapy can support emotional well-being alongside cognitive skills such as working memory, attention, and verbal expression.

These converging findings reinforce music therapy's role in fostering neurocognitive resilience and emotional self-regulation in individuals with ID. Skills such as recognizing social cues, managing affect, and engaging in meaningful interaction contribute to improved daily functioning and a deeper sense of identity and belonging (Baranauskienė & Latakienė, 2023; Wilson et al., 2017). Yet despite consistent short-term benefits, the durability of these outcomes remains unclear—particularly regarding adaptive behavior and psychosocial development.

Given the chronic and complex nature of ID, longitudinal approaches capable of capturing the maintenance of therapeutic gains are essential. However, extended follow-up studies remain scarce, especially for individuals with comorbidities. This narrative review seeks to address this gap by synthesizing current evidence on the long-term effects of music therapy in individuals with ID, including those with co-occurring conditions such as autism spectrum disorder or genetic syndromes (e.g., Down syndrome, Rett syndrome), which may influence responsiveness and developmental trajectories (Matson & Shoemaker, 2009; Hackett et al., 2013).

To guide this inquiry, the following research questions are proposed: 1. Which populations have been studied in research on music therapy for individuals with ID, particularly in relation to severity of impairment and comorbid conditions? 2. What research designs and methodological frameworks have been employed? 3. Which functional domains (e.g., behavioral, emotional, cognitive) have been targeted, and how have they been assessed? 4. What types of music therapy have been applied in clinical and educational settings? 5. What evidence exists regarding the long-term effectiveness and sustainability of music therapy outcomes for these populations?

Intellectual Disability: A Contemporary Overview

The understanding of ID has undergone significant evolution, shifting from static psychometric models to dynamic, multidimensional frameworks that focus on functioning within a specific context. The three main contemporary diagnostic systems—the American Association on Intellectual and Developmental Disabilities (AAIDD) system, the Diagnostic and Statistical Manual of Mental Disorders (5th ed., text rev.; American Psychiatric Association, 2022), and the International Classification of Diseases (11th rev.; World Health

Organization, 2019)—have aligned on a unified definition that identifies ID through concurrent limitations in both intellectual functioning and adaptive behavior (Schalock et al., 2021; Tassé et al., 2024), with assessment based on age and sociocultural expectations. Although an IQ below 70 remains a key diagnostic criterion, modern approaches emphasize evaluating practical, conceptual, and social skills that affect an individual's ability to function in everyday life (Tassé et al., 2019).

Etiologically, ID develops from a complex interaction of genetic, biomedical, psychological, and environmental factors throughout the lifespan (Schalock, 2019; Bochiş, 2021). While conditions such as Fragile X syndrome, Rett syndrome, or Down syndrome have become increasingly detectable through genetic testing (Hou & Zheng, 2024), a large portion of cases—especially those in the mild range—lack a clearly identified cause (del Corsso, 2024). These profiles are often complicated by co-occurring diagnoses, including autism spectrum disorder (ASD), which add extra difficulties in emotional regulation and social cognition (Akash et al., 2024). Additionally, prenatal adversity, malnutrition, and socioeconomic disadvantage continue to serve as significant factors influencing cognitive development globally (Das, 2024).

Epidemiological data indicate that ID affects between 1% and 3% of the population, with about 85% of cases classified as mild (Harris, 2006; Soltani et al., 2015). The severity level directly relates to support needs in areas such as personal independence, time and money management, and basic literacy (del Corsso et al., 2024; Koper et al., 2024). Adding to these challenges are common deficits in expressive language and emotional self-regulation, often appearing as limited verbal output or dysregulated emotional responses (Wilson et al., 2017; Merrells et al., 2019).

In this complex landscape, music therapy provides a unique pathway for expression, cognitive stimulation, and social connection in individuals with ID, especially when verbal communication and emotional regulation are impaired. Guided by trained therapists, rhythm, improvisation, and shared musical experiences can access inner dimensions often beyond the reach of traditional verbal or pharmacological interventions (Bansal, 2024; Guo et al., 2024).

Music therapy: Description of the Intervention

Music therapy (MT) is a specialized field that involves the evidence-based and clinical application of music interventions to achieve personalized outcomes in health, functioning, and well-being. The World Federation of Music Therapy (WFMT) describes it as "the professional use of music and its elements as an intervention in medical, educational, and everyday settings... to enhance health across physical, social, communicative, emotional, intellectual, and spiritual areas" (WFMT, 2011). The American Music Therapy Association (AMTA) also characterizes MT as "the clinical and evidence-based use of music interventions to achieve individualized goals... by a credentialed professional" (AMTA, 2020). These definitions agree that music is the key medium for change, supported by various theoretical models including psychodynamic approaches, neurologic music therapy (NMT), cognitive-behavioral frameworks, and developmental theories (Bruscia, 2014; Thaut & Hoemberg, 2014).

Although there are some surface similarities, music therapy and music education have distinct goals, methods, and approaches to assessing progress. Music therapy emphasizes personalized therapeutic results, whereas music education concentrates on musical development. For children with ID, this distinction is fundamental, as therapeutic approaches often focus on facilitating communication or developmental progress rather than performance skills (Oldfield, 1995; Wigram & Gold, 2006).

Evidence-Based Music Therapy Practices for Individuals with Intellectual Disabilities

Recent years have seen a proliferation of rigorous clinical trials and single-case designs exploring the efficacy of MT in supporting individuals with intellectual and developmental disabilities (IDD). The following modalities are particularly supported:

a) Active Music-Making. Activities include singing, drumming, body percussion, and simple instrumental play. These interventions have been linked to improved executive function, social interaction, and adaptive behavior (Smeets et al., 2023; Bugos & DeMarie, 2017).
b) Structured and Improvised Music. Improvisational models such as Nordoff-Robbins or Alvin's free music foster self-expression, turn-taking, and spontaneous communication, especially for non-verbal or minimally verbal individuals (Bruscia, 1987; Hackett et al., 2013).
c) Neurologic Music Therapy (NMT). Aimed at addressing sensorimotor and cognitive deficits, NMT techniques like Rhythmic Auditory Stimulation (RAS) have proven effective for children with autism and developmental delays (Williams et al., 2024).
d) Music-Assisted Language Learning. The MAP feasibility RCT (Williams et al., 2024) demonstrated that preschool children with autism and minimal verbal language achieved statistically significant gains in word learning and social responsiveness through parent-mediated music sessions paired with app-based song repetition. Improvements were maintained at 3-month follow-up, highlighting music's potential to scaffold early vocabulary acquisition.
e) Multi-Sensory Music Drama (MSMD) combines storytelling, touch, visuals, and rhythm in inclusive classroom settings. It is effective for students with profound intellectual and multiple disabilities, supporting symbolic representation and engagement (Johnels et al., 2024a, b).

Methods

Search Strategy. A systematic literature search was conducted to identify studies examining the long-term effects of music therapy in individuals with ID. The search was conducted using Scopus and Web of Science, two major databases chosen for their comprehensive coverage of peer-reviewed literature across relevant disciplines, including health sciences, social sciences, and the arts. The final search syntax applied in both databases was: ("music" OR "music therapy" OR "melotherap*" OR "therapeutic* music" OR "musical intervention") AND ("intellectual disabilit*" OR "mental retardation" OR "intellectual developmental disorder*") AND ("long-term impact" OR "long-term efficacy" OR "longitudinal study" OR "long-term outcomes" OR "sustained effects" OR "follow-up" OR "retest" OR "re-test") To refine the results and ensure relevance, the search was limited to peer-reviewed journal articles published in English, specifically within the subject areas of psychology, sociology, neuroscience, arts, health professions, nursing, and multidisciplinary fields. No date restrictions were applied in order to ensure comprehensive coverage of all relevant studies, including earlier publications that may still hold conceptual or empirical value.

Criteria for Considering Studies for This Review

Types of Studies. This review included empirical studies examining the long-term effects of music therapy on individuals with ID. Eligible study designs included randomized controlled trials (RCTs), quasi-experimental studies, longitudinal cohort studies, and pre-post studies that involved follow-up assessments. Studies were excluded if they were non-empirical (such as conceptual papers, expert opinions, or narrative case reports), did not include a longitudinal component or follow-up assessment, or did not involve participants with a diagnosed ID. Only studies published in English were considered. A key inclusion criterion was the

provision of a clear and detailed description of the music therapy intervention protocol.

Types of Participants. The review considered studies involving participants of any age with a formal diagnosis of ID, as defined by standard diagnostic systems, DSM-5 and ICD-11. Studies that included individuals with ID and co-occurring conditions—such as genetic syndromes (e.g., Rett syndrome, Down syndrome) or autism spectrum disorder (ASD)—were also eligible. To ensure a comprehensive analysis, studies representing all levels of ID severity (mild, moderate, severe, and profound) were included.

Types of Interventions. Eligible interventions were structured music therapy programs delivered by a qualified music therapist. These encompassed both active music-making (e.g., instrumental play, singing, improvisation) and receptive methods (e.g., music listening). Studies were included only if they provided a detailed description of the intervention's duration, frequency, and therapeutic content. Research comparing different music therapy approaches or contrasting music therapy with control conditions (e.g., treatment-as-usual, waitlist) was also considered eligible.

Study Selection Process. Search results from all databases were exported to Zotero software for deduplication and organization. The selection process was conducted independently by two reviewers. First, titles and abstracts were screened against the eligibility criteria. Full-text articles of potentially relevant studies were then retrieved and thoroughly assessed (see *Figure 1*). Any disagreements at either stage were resolved through discussion until a consensus was reached.

Data Extraction and Synthesis

Data were systematically extracted and organized according to five pre-defined analytical dimensions:

Dimension 1: Participant Characteristics. This dimension documented participant demographics and clinical characteristics—including age, gender, ID se-verity, and co-occurring conditions such as ASD, psychiatric comorbidities, and genetic syndromes (e.g., Rett or Williams syndrome). Studies were categorized by diagnostic clarity: strong (ID confirmed via DSM-5/ICD-11), moderate (developmental delays without formal diagnosis), or limited (no explicit ID reference, e.g., ASD-only samples).

Dimension 2: Research Designs and Methodologies. This dimension assessed the methodological framework and overall rigor of the included studies. Designs were categorized as randomized controlled trials (RCTs), quasi-experimental studies, longitudinal cohort studies, or pre-post studies incorporating follow-up assessments. Outcome measures employed across studies included standardized instruments, observational tools, and self-report measures.

Dimension 3: Targeted Abilities and Behaviors. This dimension synthesizes the functional improvements attributed to music therapy, revealing four core domains of impact. Cognitive interventions primarily targeted executive functions, attention, and memory, while emotional approaches focused on well-being, affect regulation, and self-esteem. Social domains emphasised communication skills and relational building, and behavioral strategies addressed both internalizing and externalizing challenges.

Dimension 4: Types of Music Therapy Interventions. This dimension examined the structure, objectives, and comparative effectiveness of music therapy interventions. Interventions were classified as: primary music therapy (music as the core modality delivered by a certified therapist); integrated music therapy (music incorporated into a broader therapeutic framework); or non-music therapy (lacking a dedicated therapeutic music component), with the latter category excluded from synthesis.

Dimension 5: Overall Long-Term Effectiveness of Music Therapy. This dimension evaluated the long-term

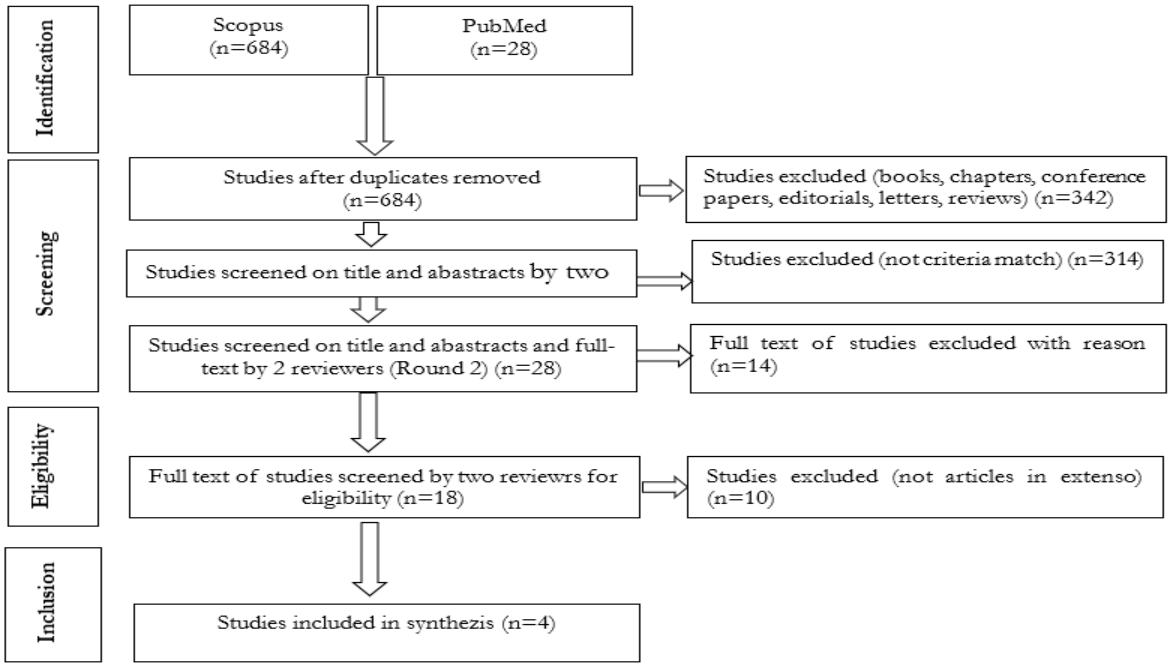
effectiveness of music therapy outcomes, analyzing follow-up duration, effect maintenance, and contextual influences, including setting, therapist qualifications, and participant involvement. To standardize assessment across studies, long-term effectiveness was categorized into three tiers: strong, characterized by a follow-up period of≥ 4 months and outcomes measured using standardized instruments; moderate, with a follow-up period of 2–3 months and evidence of sustained effects; and limited, defined by a follow-up period of < 1 month or the absence of post-intervention data.

*Quality Assessment.*Although no formal scoring system was applied, the methodological rigor of the included studies was carefully evaluated throughout the data extraction and synthesis process. The assessment did not rely on rigid thresholds but instead analyzed the extent to which each study contributed to the core objective of this review: to document the long-term effects of music therapy in individuals with a confirmed diagnosis of ID.

Results

This section offers a structured overview of the selected literature, organized around five key analytical areas: participant profiles, research design, intervention features, targeted functional domains, and evidence of long-term therapeutic effects. The analysis aims to map both the extent and the depth of current empirical findings on the lasting benefits of music therapy for individuals with ID. *Table* 1 offers a systematic comparison of the included studies, detailing follow-up timelines, population characteristics, therapeutic protocols, and documented outcomes. Furthermore, it evaluates the degree of alignment between each study's focus and this review's central aim: investigating long-term efficacy in populations with formally confirmed ID (Appendix).

Figure 1. Flowchart of study selection for scoping review. Source. Authors.



Analysis of 18 studies reveals a fragmented yet promising evidence base for music therapy's long-term effects in ID. The most robust findings come from four high-relevance studies. Hackett et al. (2013) and McFerran & Shoemark (2013) demonstrated sustained gains in communication and engagement in profound ID, while Smeets et al. (2023, 2024) showed maintained behavioral and social benefits in adults over 16+ weeks. Other studies, such as those by Johnels et al. (2024b), provided valuable insights through adapted approaches; however, shorter follow-ups limited the conclusions regarding long-term efficacy. A significant portion of the literature, including that of Pater et al. (2023), was excluded from synthesis due to unclear ID diagnosis or absence of follow-up, highlighting a key methodological challenge in the field. The following section outlines the four high-relevance studies that provide the most substantial evidence for long-term impact.

Dimension 1: Participant Characteristics Across Reviewed Studies

Table 2 provides demographic and diagnostic details of study participants, highlighting variations in age, clinical presentation, and the presence of comorbidities, which collectively shape both intervention planning and therapeutic responsiveness.

The reviewed studies reflect a diverse population of individuals with ID, spanning a broad developmental range—from early childhood to adulthood. While many investigations focus on adults with mild to moderate ID (Smeets et al., 2023; 2024), others explore more complex presentations, including a young child with Rett syndrome (Hackett et al., 2013) and an adolescent with profound multiple disabilities (McFerran & Shoemark, 2013). Across the board, participants often presented with co-occurring conditions—neurological, psychiatric, or genetic—that added to the complexity of both diagnosis and intervention. Difficulties in executive functioning, such as reduced working memory and limited cognitive flexibility, were frequently reported and contributed to challenges in everyday adaptive behavior (Smeets et al., 2024). Challenging behaviors, including aggression and self-injury, were also common, often linked to underlying psychological distress (Smeets et al., 2023). As a result, many participants led socially restricted lives, with limited access to meaningful leisure or community activities—typically engaging in solitary, passive routines within institutional or highly structured settings. Taken together, these findings portray a population facing multifaceted vulnerabilities, for whom therapeutic interventions must be thoughtfully adapted to match their unique developmental, cognitive, and emotional profiles.

Table 2. Participant Characteristics Across Reviewed Studies. Source: Authors.

Authors	Population Characteristics	Sample Size
Hackett et al. (2013.)	4-year-old female diagnosed with Rett syndrome (confirmed via genetic testing). Initially showed normal development until 12 months, followed by regression in motor and social skills.	1 participant
McFerran & Shoemark (2013)	16-year-old male with spastic cerebral palsy (quadriplegia), epilepsy, and cortical vision impairment.	1 participant
Smeets et al. (2023)	Adults aged 18+ with mild, borderline, or moderate ID. Recruited from residential facilities; able to consent and participate in group-based intervention.	29 participants (randomized into music or leisure intervention groups)
Smeets et al. (2024)	Adults aged 18+ with mild to moderate ID and internalizing or externalizing challenging behavior. Excluded if unable to participate for at least 1 hour or with medical contraindications.	97 participants (44 intervention, 53 control)

Dimension 2: Research Designs and Methodologies

The examined studies employ diverse research designs tailored to investigate music therapy's impact on individuals with ID, each offering unique methodological strengths. Table 3 below provides an overview of the methodological approaches employed across studies, highlighting the diversity of designs and the use of both standardized and adapted tools for assessing music therapy outcomes.

The reviewed studies showcase a range of methodological approaches that reflect both the complexity of ID and the evolving sophistication of music therapy research. Designs span from in-depth single-case studies to rigorously controlled trials, each offering distinct insights into therapeutic outcomes. At one end, Hackett et al. (2013) conducted a retrospective single-case analysis using video recordings and Statistical Process Control charts to track subtle changes in a child with Rett syndrome. McFerran and Shoemark (2013) employed a hermeneutic phenomenological approach, using multi-perspective video analysis to explore non-verbal engagement in a profoundly disabled adolescent. At the other end, large-scale trials by Smeets et al. (2023; 2024) adopted randomized controlled designs, comparing music therapy to leisure activities or standard care. Both studies applied linear mixed models and multiple validated instruments to assess behavioral, emotional, and executive function outcomes over time. A key strength across these studies lies in the thoughtful adaptation of assessment tools to the cognitive and communicative needs of individuals with ID. Several studies employed standardized instruments with strong psychometric properties, such as the Adult Behavior Checklist (ABCL), the Basic Psychological Need Satisfaction and Frustration Scale – Intellectual Disability (BPNSFS-ID), and the Personal Wellbeing Index – Intellectual Disability (PWI-ID), each demonstrating high internal consistency (e.g., Cronbach's α ranging from 0.84 to 0.92).

In parallel, researchers also developed tailored instruments—such as computer-based executive function games—to increase accessibility and ecological validity. Additionally, researchers developed accessible tools such as custom executive function games. Qualitative strategies played a complementary role by capturing affective and relational dimensions often missed by quantitative measures.

Table 3. Research designs and assessment instruments in music therapy studies for individuals with ID. Source: Authors.

Study	Research design	Assessment instruments	Key methodological features
Hackett et al. (2013).	Single-Case Design	Video Analysis	Retrospective practice-based evaluation; Statistical Process Control charts for trend analysis
McFerran & Shoemark (2013).	Qualitative Study	Video Analysis	Multi-voice perspectives; Hermeneutic phenomenological approach
Smeets et al. (2023).	Cluster Randomized Controlled Trial	ABCL (α = 0.84); BPNSFS-ID (α = 0.92); SPPA (α > 0.70); Custom EF games	Linear mixed models for data analysis Comparison of music vs. leisure activities interventions
Smeets et al. (2024).	Randomized Controlled Trial	PWI-ID; Anxiety, Depression, and Mood Scale; Custom EF games	Pretest, posttest, follow-up design; Comparison of individual music sessions vs. care as usual

Note: ABCL = Adult Behavior Checklist; BPNSFS-ID = Basic Psychological Need Satisfaction and Frustration Scale - ID; SPPA = Self-Perception Profile for Adolescents; EF = Executive Function; PWI-ID = Personal Wellbeing Index-Intellectual Disability; a = Cronbach's alpha

Dimension 3: Targeted Abilities and Behaviors

Table 4 synthesizes the key cognitive, emotional, social, and behavioral domains targeted by music therapy interventions across the reviewed studies, along with their specific measures and associated research.

Analysis indicates that music therapy activates specific mechanisms across key developmental domains in individuals with ID. In the cognitive domain, it supports executive functioning—including inhibitory control, cognitive flexibility, attention, and working memory—while functional hand use during musical engagement serves as a proxy for cognitive-motor integration (Smeets et al., 2023; Hackett et al., 2013). In the emotional domanin, music therapy significantly enhances subjective well-being, affect regulation, and self-esteem, consistently outperforming standard care or leisure-based interventions, as measured through tools like the PWI-ID (Smeets et al., 2023; 2024). Socially, it fosters relational engagement through non-verbal communicative forms—such as vocal imitation and rhythmic turn-taking—particularly in individuals with profound ID, where conventional communication is limited (McFerran & Shoemark, 2013; Hackett et al., 2013).

Additionally, sustained participation has been associated with notable reductions in internalizing and externalizing behaviors, reinforcing its value for adaptive functioning and behavioral regulation (Smeets et al., 2023; 2024). Together, these findings establish music therapy as a multidimensional and clinically relevant intervention, capable of fostering integrated cognitive, emotional, and social development—even in populations with severe or complex neurodevelopmental profiles.

Table 4. Multidimensional outcomes in music therapy for intellectual disabilities: cognitive, emotional, social, and behavioral. Source: Authors.

Domain	Specific Abilities Targeted	Measurement Operationalization	Key Studies
Cognitive	Executive functioning (inhibitory control, cognitive flexibility) Attention & working memory Functional hand use (motor-cognitive integration)	Custom executive function games Frequency of object/instrument holding Task performance metrics	Smeets et al. (2023), Hackett et al. (2013)
Emotional	Subjective well-being Depression & Anxiety Self-esteem	Personal Wellbeing Index-ID (PWI-ID) Anxiety, Depression, and Mood Scale Self-Perception Profile	Smeets et al. (2024), Smeets et al. (2023)
Social	Social acceptance Communication skills Relationship-building (therapist-client) Turn-taking behaviors	Frequency of vocalizations/eye-pointing Observational analysis of interactions Social participation metrics	McFerran & Shoemark (2013). Hackett et al. (2013)
Behavioral	Internalizing behaviors (e.g., withdrawal) Externalizing behaviors (e.g., aggression)	Adult Behavior Checklist (ABCL) Challenging behavior frequency logs	Smeets et al. (2024), Smeets et al. (2023)

Dimension 4: Types of Music Therapy Interventions and Dimension 5: Overall Long-Term Effectiveness of Music Therapy

This section synthesizes four core studies that exemplify the diversity of music therapy interventions for individuals with ID and their sustained impact over time. Methodologically, they span from randomized controlled trials to in-depth qualitative inquiries, offering a multidimensional perspective on therapeutic effectiveness. Hackett et al. (2013) described a longitudinal single-case study involving a child with Rett syndrome. Weekly, structured sessions over six months led to significant improvements in voluntary hand use and social turn-taking, as confirmed by parental reports and sustained over time. This case illustrates how personalized, sensorimotor-focused music therapy can lead to measurable and lasting behavioral changes, even in individuals with complex neurodevelopmental profiles. Smeets et al. (2023) conducted a pilot cluster-RCT comparing group-based music engagement with leisure alternatives among 29 adults with mild-to-moderate ID. While improvements in executive control (inhibitory tasks) favored the control group, the music group showed greater gains in emotional expressiveness and social inclusion, especially among younger participants. However, these effects demonstrated limited durability after the intervention—highlighting the temporary nature of some group-based outcomes. Expanding this line of research, Smeets et al. (2024) initiated a large-scale RCT (n = 97) involving 16 individual sessions, with outcome measures targeting emotional well-being, challenging behavior, and executive functioning. Although results are forthcoming, the study design—featuring a delayed follow-up—demonstrates increased methodological rigor and a clear orientation toward assessing longitudinal impact.

McFerran & Shoemark (2013) offered a relational, duo-ethnographic case analysis of a nonverbal adolescent with profound multiple disabilities. Through video microanalysis of improvised musical dialogue, the study illuminated how therapist responsiveness and musical attunement facilitated affective synchrony, perceived agency, and non-verbal relational development—outcomes that, while not conventionally "measurable," reflect enduring psychological significance. Nonetheless, limitations persist: modest sample sizes (Hackett, McFerran), heterogeneity of measures, and incomplete follow-up data reduce external validity. Furthermore, relational gains—though meaningful—are underrepresented in standardized assessments.

Across these studies, Table 5 distills key features: intervention format, duration, and long-term effects.

Table 5. *Comparative summary of intervention types and long-term outcomes. Source: Authors.*

Study (Author, Year)	**Intervention Type**	**Duration & Format**	**Long-term Effects Reported**
Hackett et al., 2013	Individual music therapy	6 months, weekly 1:1 sessions	Improved voluntary hand use and turn-taking; sustained through follow-up.
Smeets et al., 2023	Group-based active music making	16 weeks, structured small groups	Gains in emotional expression for younger participants with mild ID; limited durability.
Smeets et al., 2024 (protocol)	Individual active music therapy	Planned: 16 sessions over 8–10 weeks	Outcomes are pending; follow-up is scheduled for 8 weeks post-intervention.
McFerran & Shoemark, 2013	Relational music engagement (Educational)	Ongoing, unspecified length	licitation of agency and affective synchrony; enduring relational effects over time.

Findings converge on the conclusion that individualized and structured music therapy—particularly when responsive and sustained—yields the most consistent benefits in emotional regula-tion, adaptive behavior, and social connec-tedness. Group interventions, while beneficial for some, showed more variable and short-lived results.

Future research should adopt longitudinal mixed-methods frameworks that balance quantifiable outcomes with nuanced analyses of therapeutic interactions. Greater attention to contextual moderators (therapist training, cultural setting, and intervention fidelity) and the inclusion of participant and caregiver perspectives will be essential for developing a more ecologically valid and ethically grounded evidence base. Taken together, these studies consolidate music therapy's role as a multidomain, enduring intervention—especially for individuals with complex and profound disabilities.

Conclusions

Among the 18 studies reviewed, four demonstrated the highest methodological alignment: Hackett et al. (2013), Smeets et al. (2023, 2024), and McFerran & Shoemark (2013). These studies stood out for their diagnostic clarity, structured music therapy protocols, and commitment to assessing longer-term effects. Together, they provide compelling evidence of music therapy's capacity to enhance emotional well-being, motor behavior, social engagement, and executive functioning in individuals with ID.

Each study yielded distinct yet complementary outcomes: improved motor coordination and communicative intent (Hackett et al.), reductions in psychological distress and challenging behaviors (Smeets et al., 2024), increased emotional expression and group participation (Smeets et al., 2023), and relational synchrony in profound disability contexts (McFerran & Shoemark). These findings reinforce the relevance of tailored, sustained music interventions—especially for populations with limited access to conventional therapies. Nonetheless, limitations persist. Two of the four studies employed single-case designs, and several lacked standardized outcome measures, which affected generalizability and cross-study comparability. Participant heterogeneity and limited long-term follow-up further constrain conclusions about the durability of effects.

Despite these constraints, the reviewed work reflects a growing effort to combine method-logical rigor with clinical sensitivity. Music therapy emerges as a flexible and multidimensional approach, adaptable to complex developmental profiles and diverse communication needs. Future research should focus on larger, more diverse samples, standardized metrics, and longer follow-up periods. Mixed-methods approaches are bene-ficial for capturing both numerical results and personal experiences. Further investigation into therapist-related factors, environmental influences, and participant agency will enhance understanding of long-term effectiveness.

The conclusions of this review support the view that music therapy effectively addresses the core dimensions of adaptive behavior—cognitive, emotional, and social. We propose an integrative conceptual model in which these dimensions are dynamically interdependent. For instance, improved emotional regulation (emotional) can enhance turn-taking and relational synchrony (social), which in turn facilitates greater cognitive engagement (cognitive).

Through its inherently multimodal structure, music therapy is uniquely positioned to activate and reinforce these interconnected pro-cesses, promoting long-term adaptive develop-ment—even in individuals with complex clinical profiles. In summary, although the evidence base is still developing, these key studies confirm music therapy's potential as an inclusive and effective psychosocial intervention for individuals with ID—especially when tailored, consistent, and

assessed through rigorous and contextually relevant frameworks.

References

Abbing, A., Haeyen, S., Nyapati, S., Verboon, P., & Hooren, S. V. (2023). Effectiveness and mechanisms of the arts therapies in forensic care. A systematic review, narrative synthesis, and meta-analysis. *Frontiers in Psychiatry*, *14*, 1128252. DOI https://doi.org/10.3389/fpsyt.2023.1128252

American Psychiatric Association. (2022). *Diagnostic and statistical manual of mental disorders* (5th ed., text rev.). DOI https://doi.org/10.1176/appi.books.9780890425787

Azeredo, M. (2007). Real-time composition of image and sound in the (re) habilitation of children with special needs: a case study of a child with cerebral palsy. *Digital Creativity*, *18*(2), 115–120. DOI https://doi.org/10.1080/14626260701401502

Bansal, D. (2024). Effect of Music Therapy on Mental Disorders. *International Journal For Multidisciplinary Research*. DOI https://doi.org/10.36948/ijfmr.2024.v06i01.10944

Blanky-Voronov, R., & Gilboa, A. (2022). The "ensemble"—A group music therapy treatment for developing preschool children's social skills. *International Journal of Environmental Research and Public Health*, *19*(15), 9446. DOI https://doi.org/10.3390/ijerph19159446

Bochiş, L.N. (2021). *Psychopedagogy of persons with intellectual disability. Landmarks on the management of online academic course during the pandemic. Volume I: Learning objectives and learning contents*. Lap Lambert Academic Publishing

Daniel, S., Wimpory, D., Delafield-Butt, J. T., Malloch, S., Holck, U., Geretsegger, M., ... & Amos, P. (2022). Rhythmic relating: Bidirectional support for social timing in autism therapies. *Frontiers in Psychology*, *13*, 793258. DOI https://doi.org/10.3389/fpsyg.2022.793258

Das, J. (2024). ID (Mental Retardation): Focus on Poverty, India, and Use of a Brain-Based Diagnostic Tool. *International Journal of Psychiatry Research*, *7*(2). DOI https://doi.org/10.33425/2641-4317.1186

del Corsso, C., Valentim, L. Ágata, Guimarães, E. M., Bezerra, A. R. S., Sampaio, M. N. C. L., Baijo, M. A., Salermo, G., Tripanon, G., Guimarães, F. da S. A., & Alves, I. L. de M. (2024). *ID across the life course: definition, classification, and intervention strategies*. Seven Editora. (Link)

Fu, Y., Tian, M., Chen, J., Chen, W., & Li, H. (2024). Improvement of symptoms in children with autism by TOMATIS training: a cross-sectional and longitudinal study. *Frontiers in Behavioral Neuroscience*, *18*, 1357453. DOI https://doi.org/10.3389/fnbeh.2024.1357453

Geretsegger, M., Holck, U., & Gold, C. (2012). Randomised controlled trial of improvisational music therapy's effectiveness for children with autism spectrum disorders (TIME-A): study protocol. *BMC pediatrics*, *12*, 1–9.

Gooding, L. F. (2011). The effect of a music therapy social skills training program on improving social competence in children and adolescents with social skills deficits. *Journal of music therapy*, *48*(4), 440-462;

Guo, F., Khatibi, A., & Tham, J. (2024). A systematic literature review of the impact of music therapy on the management of depression in patients with chronic diseases. *Journal of Infrastructure, Policy and Development*, *8*(7), 8020. DOI https://doi.org/10.24294/jipd.v8i7.8020

Hackett, S., Morison, C. J., & Pullen, C. (2013). A retrospective practice-based evaluation of music therapy: A single-case study of a four-year-old girl with Rett syndrome—Rebecca's story. *The Arts in psychotherapy*, *40*(5), 473–477. DOI https://doi.org/10.1016/j.aip.2013.09.005

Harris, J.C. (2006). *Intellectual disability: understanding its development, causes, classification, evaluation and treatment*. New York: Oxford University Press

Hou, K., & Zheng, X. (2024). A 10-Year Review on Advancements in Identifying and Treating ID Caused by Genetic Variations. *Genes*, 26(2), 80–96. DOI https://doi.org/10.3390/genes15091118

Johnels, L., Wandin, H., Dada, S., & Wilder, J. (2024a). The effect of MultiSensory Music Drama on the interactive engagement of students with severe/profound intellectual and multiple disabilities. *British Journal of Learning Disabilities*, *52*(1), 150–165. DOI https://doi.org/10.1111/bld.12559

Johnels, L., Wilder, J., & Vehmas, S. (2024b). Multi-Sensory Music Drama with a student with severe/profound intellectual and multiple disabilities: A case study of teacher–researcher co-production. *Journal of Research in Special Educational Needs*, *24*(3), 530–541. DOI https://doi.org/10.1111/1471-3802.12649

Kalgotra, R., & Warwal, J. S. (2017). Effect of music intervention on the behaviour disorders of children

with ID using strategies from applied behaviour analysis. *Disability, CBR & Inclusive Development*, *28*(1), 161–177.

Koper, M., Lewandowska, M., & Rękosiewicz, M. (2024). The effect of the Bilateral Integration exercise program on the cognitive functioning of pupils with moderate intellectual disabilities. *Frontiers in Psychiatry*, *15*. DOI https://doi.org/10.3389/fpsyt.2024.1409061

LaGasse, A. B. (2014). Effects of a music therapy group intervention on enhancing social skills in children with autism. *Journal of music therapy*, *51*(3), 250-275.

Lee, L., & Ho, H. J. (2023). Effects of music technology on language comprehension and self-control in children with developmental delays. *EURASIA Journal of Mathematics, Science and Technology Education*, *19*(7), em2298.
DOI https://doi.org/10.29333/ejmste/13343

MacDonald-Prégent, A., Saiyed, F., Hyde, K., Sharda, M., & Nadig, A. (2024). Response to music-mediated intervention in autistic children with limited spoken language ability. *Journal of Autism and Developmental Disorders*, *54*(4), 1438–1452.
DOI https://doi.org/10.1007/s10803-022-05872-w

Matson, J. L., & Shoemaker, M. (2009). ID and its relationship to autism spectrum disorders. *Research in developmental disabilities*, *30*(6), 1107–1114.

McFerran, K. S., & Shoemark, H. (2013). How musical engagement promotes well-being in education contexts: The case of a young man with profound and multiple disabilities. *International journal of qualitative studies on health and well-being*, *8*(1), 20570. DOI https://doi.org/10.3402/qhw.v8i0.20570

Merrells, J., Buchanan, A., & Waters, R. (2019). "We feel left out": Experiences of social inclusion from the perspective of young adults with intellectual disability. *Journal of Intellectual & Developmental Disability*, *44*(1), 13–22.
DOI https://doi.org/10.3109/13668250.2017.1310822

Ockelford, A., Welch, G., Jewell-Gore, L., Cheng, E., Vogiatzoglou, A., & Himonides, E. (2011). Sounds of intent, phase 2: gauging the music development of children with complex needs. European *Journal of Special Needs Education, 26*(2), 177–199. DOI https://doi.org/10.1080/08856257.2011.563606

Pater, M., Spreen, M., & Yperen, T. V. (2023). Music therapy for children on the autism spectrum: Improved social interaction observed by multiple informants across different social contexts. *Nordic Journal of Music Therapy*, *32*(1), 29–47. DOI https://doi.org/10.1080/08098131.2022.2046628

Rickson, D. J. (2014). The Relevance of Disability Perspectives in Music Therapy Practice with Children and Young People who have Intellectual Disability. *Voices: A World Forum for Music Therapy*, *14*(3). DOI https://doi.org/10.15845/voices.v14i3.784

Schalock, R. L. (2019). Intellectual disability. In K. D. Keith (Ed.). *Cross-cultural psychology: Contemporary themes and perspectives*. John Wiley & Sons.

Schalock, R. L., Luckasson, R., & Tassé, M. J. (2021). An overview of intellectual disability: Definition, diagnosis, classification, and systems of supports. *American journal on intellectual and developmental disabilities*, *126*(6), 439–442.

Shek, N., & Lee, E. (2024). Investigating the Impact of Music Therapy on Cognitive and Behavioral Development in Special Education. *Asian Journal of Multidisciplinary Research & Review*, *5*(5).

Smeets, G. J., Volkers, K. M., Scherder, E. J., & Moonen, X. M. (2023). Active music making and leisure activities for people with intellectual disabilities: A cluster randomized pilot study. *Research in Developmental Disabilities*, *142*, 104606.
DOI https://doi.org/10.1016/j.ridd.2023.104606

Smeets, G., Volkers, K., Scherder, E., & Moonen, X. (2024). An Individual Music Intervention for Adults With Intellectual Disabilities and Challenging Behavior: Protocol for a Randomized Controlled Trial. *JMIR Research Protocols*, *13*(1), e52497. DOI 10.2196/52497

Soltani, S., Khosravi, B., & Salehiniya, H. (2015). Prevalence of ID in Iran: Toward a new conceptual framework in data collection. *Journal of Research in Medical Sciences*, *20*(7), 714–715.
DOI https://doi.org/10.4103/1735-1995.166234

Tassé, M. J., Havercamp, S. M., Krahn, G., Shogren, K. A., Bonardi, A., Kim, M., ... & Witwer, A. (2024). About Whom Are We Talking When We Use Intellectual and Developmental Disabilities?. *JAMA Pediatrics*. Published online on November 25 by the American Medical Association.

Tassé, M. J., Luckasson, R., & Schalock, R. L. (2019). The relation between intellectual functioning and adaptive behavior in the diagnosis of intellectual disability. *Intellectual and Developmental Disabilities,*

57(5), 387–397. DOI https://doi.org/10.1352/1934-9556-57.5.387

Wigram, T., & Gold, C. (2006). Music therapy in the assessment and treatment of autistic spectrum disorder: clinical application and research evi-dence. *Child: care, health and development*, *32*(5), 535-542. DOI https://doi.org/10.1111/j.1365-2214.2006.00615.x

Williams, C., & Shang, D. (2024). Telehealth for chronic disease management among vulnerable populartions. *Journal of racial and ethnic health disparities*, *11*(2), 1089–1096. DOI https://doi.org/10.1007/s40615-023-01588-4

Williams, T. I., Loucas, T., Sin, J., Jeremic, M., Meyer, S., Boseley, S., ... & Liu, F. (2024). Using music to assist language learning in autistic children with minimal verbal language: The MAP feasibility RCT. *Autism*, *28*(10), 2515–2533. DOI https://doi.org/10.1177/13623613241233804

Wilson, N. J., Jaques, H., Johnson, A., & Brotherton, M. L. (2017). From social exclusion to supported inclusion: Adults with ID discuss their lived experiences of a structured social group. *Journal of Applied Research in Intellectual Disabilities*, *30*(5), 847–858. DOI https://doi.org/10.1111/jar.12275

World Health Organization. (2019). *International classification of diseases* (11th rev.). (Link)

Appendix

Table 1. Characteristics and outcomes of music therapy interventions for individuals with ID: a systematic synthesis

Study (author & year)	Follow-up & duration	Participants	Intervention description	Key outcomes	Relevance to review focus
Hackett et al. (2013)	6-month follow-up using video analysis	4-year-old with Rett syndrome (severe/profound ID)	14 individual sessions; structured improvisation and repetitive songs	Improved hand function and intentional communication	High: confirmed ID and sustained outcomes
Smeets et al. (2023)	16–18 weeks; parent-reported effects	Adults (18+) with mild/moderate ID	16 group sessions; music-making vs. leisure activities	Enhanced motor skills and social interaction	High: ID confirmed; long-term effects reported
Smeets et al. (2024)	17 weeks; planned longitudinal analysis	Individuals with mild/moderate ID and challenging behavior	16–27 individual sessions; manualized but adaptable	Reduction in challenging behavior; improved well-being	High: ID and behavioral outcomes with follow-up
Abbing et al. (2023).	No follow-up data available	Mixed forensic population; possible ID not confirmed	Combined arts therapies: music, art, and dance	Emotional regulation effects observed	Limited: unclear ID diagnosis; no follow-up
Lee & Ho (2023).	2-week follow-up; short-term only	Participants with developmental delays; ID not confirmed	Music-enhanced therapy using assistive technology	Improved language comprehension and self-control	Limited: short follow-up and no confirmed ID
McFerran & Shoemark (2013)	2-year follow-up; school integration noted	Children with profound ID and multiple disabilities	Weekly music sessions over 2 years	Improved non-verbal communication and integration	High: long-term outcome and confirmed ID
Williams, C., & Shang, D.	2-week follow-up;	ASD-only participants;	Neurologic Music Therapy (NMT)	Motor skill development	Limited: no ID and short duration

(2024)	short-term observation	no ID diagnosis		observed	
Johnels et al. (2024a)	20-month follow-up via teacher reports	Severe/profound ID and multiple disabilities	Integrated music, drama, and multisensory approaches	Increased engagement and motor coordination	Moderate: confirmed ID and extended duration
Fu et al. (2024)	7.5-month follow-up with parent/teacher input	ASD-only group; no confirmed ID	Auditory stimulation with music therapy elements	Reduced autism symptoms per CARS/ABC	Moderate: ASD only with sustained effects
Pater et al. (2023).	No follow-up reported	ASD-only population	Structured 'Papageno' music program	Higher social responsiveness	Limited: no follow-up and ASD focus
Geretsegger et al. (2012)	12-month follow-up using standardized tools	Children (4–7 yrs) with ASD, possible ID	Improvisational music therapy; 3 sessions/week for 5 months	Enhanced social communication and joint attention	Partial: ASD with possible ID; long-term data
MacDonald-Prégent et al. (2024)	8–12 week duration; incomplete data	Children with ASD and limited language; ID not confirmed	Child-centered musical improvisation	Better emotional regulation and non-verbal expression	Moderate: unclear ID; emotional/communication outcomes
Azeredo, M. (2007).	8+ months; ongoing observations	Participants with multiple disabilities; some confirmed ID	Sound-image composition with adaptive technology	Greater engagement and motor coordination	Moderate: mixed population; observational data
Daniel, S., et al. (2022)	No empirical follow-up; theoretical framework	Severe/profound ID; non-verbal participants	Rhythm-based and play-oriented music interaction	Improved social synchrony and turn-taking	Partial: theoretical, no empirical results
Blanky-Voronov, R., & Gilboa, A. (2022)	School-year duration; no long-term data	Children with developmental delays and social issues	Group-based music, art, and storytelling sessions	Gains in emotional expression and reciprocity	Moderate: relevant outcomes, unclear ID
Johnels, L. et al. (2024b)	2-month follow-up with staff input	Severe/profound ID; non-verbal	MultiSensory Music Drama (music, drama, multisensory approach)	Improved engagement; method adopted school-wide	Moderate: confirmed ID and structured co-production
Williams, T. I. et al. (2024)	3-month follow-up; standardized measures	ASD-only; limited vocabulary	Receptive and active music tasks over 18 weeks	Vocabulary and social responsiveness gains	Moderate: ASD with short-term results
Ockelford, A. et al. (2011)	8-month program; behavioral coding	Children with profound ID and global developmental delays	'All Join In!' program with integrated music therapy	Improvements in musical engagement and sensory processing	Moderate: music therapy not delivered as primary, stand-alone intervention, ID confirmed