



“Family Upbringing” vol. XXXIII (1/2026)

„Wychowanie w Rodzinie” t. XXXIII (1/2026)

Paweł Piotrowski

Institute of Pedagogy, University of the National Education Commission in Krakow (UKEN),
Kraków, Poland

Paweł Piotrowski  <https://orcid.org/0000-0003-4565-0317>

Music in Support Systems for Individuals with Intellectual Disabilities: Forms of Intervention and Practical Implications

**Muzyka w systemie wsparcia osób z niepełnosprawnością intelektualną:
Formy oddziaływań i znaczenie praktyczne**

Submitted: March 3, 2026 – Accepted: May 15, 2026

Abstract

Aim. The aim of this article is to analyse the role of musical interventions in supporting individuals with intellectual disabilities by presenting forms and methods of musical activities, reviewing empirical research findings, and discussing practical implications for support systems.

Method and materials. The article adopts a theoretical and review-based approach. A literature analysis was conducted, including studies from the fields of special education, psychology, music therapy, and neuroscience concerning the impact of music on the psychosocial functioning of individuals with intellectual disabilities.

Results and conclusion. The reviewed studies indicate that musical interventions may support cognitive development, emotional regulation, and social competences. Participation in musical activities has been associated with improvements in attention, sensory

Corresponding author: Paweł Piotrowski, e-mail: pawel.piotrowski@uken.krakow.pl,
Instytut Pedagogiki, Uniwersytet Komisji Edukacji Narodowej w Krakowie,
Podchorążych 2, 30-084 Kraków, Polska

integration, reduction of challenging behaviours, and the development of interpersonal relationships. However, the effectiveness of such interventions depends on the professional preparation of facilitators, appropriate methodological choices, and the integration of musical activities with other forms of support. Music may therefore constitute an important component of support systems and promote the social inclusion of individuals with intellectual disabilities.

Keywords: intellectual disability, music therapy, music in education, psychosocial support, special education, musical interventions

Abstrakt

Cel. Celem artykułu jest analiza roli interwencji muzycznych w systemach wsparcia dla osób z niepełnosprawnością intelektualną. Punktem wyjścia jest założenie, że muzyka – dzięki swoim właściwościom rytmicznym, emocjonalnym i społecznym – może stanowić istotne narzędzie wspierające rozwój oraz funkcjonowanie psychospołeczne tej grupy osób. Artykuł koncentruje się na charakterystyce głównych form i metod działań muzycznych stosowanych w kontekstach edukacyjnych i terapeutycznych, takich jak wspólne śpiewanie, rytmizacja czy różne formy muzykoterapii.

Metody i materiały. Artykuł przyjmuje podejście teoretyczne i przeglądowe. Analiza opiera się na przeglądzie literatury naukowej z zakresu pedagogiki specjalnej, psychologii, muzykoterapii oraz neuronauki dotyczącej wpływu muzyki na funkcjonowanie osób z niepełnosprawnością intelektualną. W badaniu przeanalizowano wybrane prace empiryczne i teoretyczne opisujące poznawcze, emocjonalne i społeczne efekty interwencji muzycznych.

Wyniki i wnioski. Analiza badań wskazuje, że interwencje muzyczne mogą wspierać rozwój poznawczy, regulację emocji oraz kompetencje społeczne. Udział w działaniach muzycznych wiąże się z poprawą koncentracji uwagi, integracji sensorycznej, redukcją zachowań trudnych oraz rozwojem relacji interpersonalnych. Skuteczność takich interwencji zależy jednak od profesjonalnego przygotowania prowadzących, odpowiedniego doboru metod oraz integracji działań muzycznych z innymi formami wsparcia. Muzyka może zatem stanowić ważny element systemów wsparcia i sprzyjać włączeniu społecznemu osób z niepełnosprawnością intelektualną.

Słowa kluczowe: muzykoterapia, niepełnosprawność intelektualna, pedagogika specjalna, muzyka w edukacji, wsparcie psychospołeczne, interwencje muzyczne

Introduction

For many decades, music has been a subject of interest for scholars representing various academic disciplines, including psychology, pedagogy, music therapy, neurobiology, and the social sciences. This interest arises from the multidimensional character of music's influence on human beings. The structure of music encompasses rhythmic, melodic, and harmonic elements, as well as emotional and social components that may affect cognitive processes, emotional regulation, and interpersonal relationships. The literature on the subject emphasises that music may serve both as a form of artistic expression and as a tool supporting human development and psychosocial functioning (Poćwierz-Marciniak, 2018).

The significance of musical influence becomes particularly evident in work with individuals with intellectual disabilities, who often require integrated support in various areas of functioning, including cognitive, emotional, social, and communicative domains. Contemporary research indicates that musical interventions may support the development of adaptive competencies, facilitate emotional regulation, and help build interpersonal relationships. Due to its accessibility and engaging potential, music may serve as a medium that enables participants' activation, strengthens their sense of agency, and fosters the development of creative expression (Kłysz-Sokalska, 2025). Contemporary theoretical approaches also emphasise that music should be perceived not only as an aesthetic phenomenon but also as a tool for psychosocial and therapeutic influence. DeNora points out that music can function as a specific "technology of the self," enabling individuals to organise emotional experiences and regulate their own psychological states (DeNora, 1999). From this perspective, musical activity becomes an important element of processes that support development, social integration, and the building of interpersonal relationships.

The application of music in work with individuals with intellectual disabilities encompasses a wide range of methods and forms of activity. The most commonly used include group singing, rhythmic activities and rhythmisation, active listening to music, playing simple instruments, and various forms of music therapy-both active and receptive. The literature indicates that musical interventions may contribute to improving the quality of life of individuals with intellectual disabilities, support the development of cognitive and social competencies, and strengthen sensory integration. At the same time, the effectiveness of such interventions depends on many factors, including the individual needs of participants, the organisation of activities, the selection of musical repertoire, and the institutional context in which educational and therapeutic activities are implemented.

The aim of this article is to analyse the role of music as a tool supporting the functioning of individuals with intellectual disabilities. In particular, the study seeks

to present the basic forms and methods of musical interventions, discuss the results of empirical research concerning their effectiveness, and indicate practical implications for specialists working in the fields of education, therapy, and social support.

The structure of the article consists of three main parts. The first part presents the most important forms and methods of musical interventions used in work with individuals with intellectual disabilities. The second part is empirical in nature and focuses on the analysis of research concerning the impact of musical interventions on the psychosocial functioning of this group. The third part presents practical implications related to the possibilities of using music in educational, therapeutic, and care institutions. The adopted interdisciplinary perspective allows for highlighting the importance of music as a significant element of the support system and for indicating directions for further research on its application in work with individuals with intellectual disabilities. Recent international studies confirm that music-based interventions may influence neuroplasticity, executive functioning, and emotional regulation processes (Magee & Stewart, 2015; Sihvonen *et al.*, 2017; Thaut & Hoemberg, 2014). These findings situate musical interventions within the broader field of evidence-based psychosocial support and highlight their relevance in contemporary interdisciplinary research.

Forms and Methods of Musical Interventions in Work with Individuals with Intellectual Disabilities

Music constitutes an important component of educational, therapeutic, and developmental interventions undertaken in work with individuals with intellectual disabilities. The subject literature emphasises that contact with music – both in active and receptive forms – may support the development of cognitive, emotional, and social competencies and facilitate the building of interpersonal relationships (Poćwierz-Marciniak, 2018). Music is also often perceived as a medium that engages attention, stimulates cognitive processes, and motivates participants to undertake shared activities, which may strengthen social integration and a sense of belonging to a group (Greenberg *et al.*, 2021).

From the perspective of special education and music therapy, particular importance is attributed to those forms of musical activity that can be adapted to the cognitive and social capabilities of individuals with intellectual disabilities and implemented in various contexts of support, including educational, therapeutic, and care settings (Ryczkowska, 2024). One of the most frequently used forms of musical intervention is group singing. It represents a natural mode of sound expression and, at the same time, fosters the integration of participants and the development of a shared communal experience. The repetition of melodic and rhythmic structures may facilitate

the organisation of attention as well as the coordination of motor activities related to articulation and breathing. Joint performance of musical pieces also creates a space for the development of communication skills and the strengthening of interpersonal relationships, which is particularly important in group work (Stachyra, 2012).

Rhythmic activities and rhythmisation also play a significant role in musical interventions, as they use rhythm as a fundamental element of musical structure. These activities include, among others, movement to music, clapping, repeating rhythmic patterns, and using simple percussion instruments. In educational and therapeutic contexts, rhythm may support sensory integration, improve motor coordination, and help organise participants' physical activity (Ryzkowska, 2024). Rhythmisation also fosters the creation of a safe environment for collective activity in which participants can experience cooperation and success.

Another form of activity involves playing simple musical instruments, particularly percussion instruments such as drums, tambourines, maracas, or xylophones. These instruments are easy to use and enable active participation in musical activities for individuals with diverse cognitive abilities. Contact with an instrument provides multisensory stimuli engaging auditory, tactile, and kinaesthetic perception while also supporting the development of visuomotor coordination. In music therapy practice, playing instruments may be used both in rhythmic exercises and in instrumental improvisation, thereby encouraging the development of a sense of agency and the planning of actions (Stachyra, 2012).

Active listening to music constitutes another important form of intervention and belongs to receptive methods. In such cases, participants focus on listening to music and responding to auditory stimuli. This method is particularly useful in work with individuals who experience difficulties with verbal expression but respond emotionally to musical stimuli. An appropriately selected repertoire may support attention concentration, emotional regulation, and relaxation processes (Poćwierz-Marciniak, 2018).

A more advanced form of intervention is musical improvisation, both instrumental and vocal. In music therapy, improvisation serves as an important tool for supporting creative expression and nonverbal communication. Therapeutic approaches such as the Nordoff-Robbins method emphasise the possibility of engaging the creative potential of the participant regardless of their level of ability or musical experience. Improvisation may support the development of a sense of autonomy, strengthen self-awareness, and facilitate the building of relationships between the therapist and the participant through the joint creation of music (Stachyra, 2012).

In work with individuals with intellectual disabilities, elements of both active and receptive music therapy are also increasingly employed. Music therapy is understood as the intentional use of music and sound in the process of supporting development, compensating for deficits, and improving the quality of life of participants

involved in therapeutic interventions (Stachyra, 2012). The selection of music therapy methods should always be adapted to the individual needs of participants and the goals of therapeutic intervention, such as emotional regulation, the development of communication competencies, or the strengthening of social functioning.

It should be emphasised that the described forms of musical interventions do not function autonomously in practice. Their effectiveness depends on many factors, including the competencies of the facilitator, the group context, and the adaptation of musical material to the capabilities of participants. It is also important to skilfully combine active and receptive elements within the process of educational and therapeutic work. Therefore, incorporating musical activities into pedagogical practice requires conscious planning and consideration of individual differences in the functioning of individuals with intellectual disabilities (Poćwierz-Marciniak, 2018; Ryczkowska, 2024; Stachyra, 2012). Comparable forms of musical interventions are described in international literature, where group singing, rhythmic training, and improvisation are applied in educational and therapeutic contexts across diverse cultural settings. This confirms the cross-cultural applicability of music-based interventions and their consistency with contemporary models of psychosocial support (Magee & Stewart, 2015; Thaut & Hoemberg, 2014).

The Impact of Musical Interventions on the Psychosocial Functioning of Individuals with Intellectual Disabilities: An Empirical Perspective

In the scientific literature, there is growing interest in the empirical analysis of the effects of musical interventions directed toward individuals with intellectual disabilities. Research indicates that music, due to its temporal, modal, and rhythmic structure, can influence key areas of psychosocial functioning, such as cognitive, emotional, communicative, and social competencies (Vuust *et al.*, 2022). Numerous studies have demonstrated that participation in musical activities contributes to improvements in attention, organisation of actions, memory, and learning abilities, while also supporting processes of emotional regulation (Poćwierz-Marciniak, 2018). Musical interventions may take various forms; however, regardless of the specific method applied, they often lead to the strengthening of affective regulation processes and the development of participants' social competencies. This perspective is also supported by studies indicating that musical expression may reflect complex emotional states and facilitate the articulation of difficult or socially inhibited experiences (Piotrowski, 2024). Findings from neuropsychological research and case studies suggest that musical activity may support both improved cognitive functioning and increased readiness to engage in social interactions (Koelsch, 2014; Kruczyńska & Kurkowski, 2013). Recent systematic reviews indicate that music-based interventions may support neural plasticity and en-

hance cognitive flexibility, particularly through mechanisms of rhythmic entrainment and auditory-motor coupling (Sihvonen *et al.*, 2017; Thaut, 2015).

One of the most frequently analysed areas of music's influence concerns cognitive competencies, particularly memory, attention, and executive functions. Studies conducted among individuals with intellectual disabilities have shown that regular participation in musical activities involving rhythmisation and the repetition of sound sequences may contribute to improved concentration and the development of working memory (Ryczkowska, 2024). The structural properties of music facilitate the organisation of information and support learning processes by engaging auditory memory and mechanisms of sound prediction. Research on the use of music with a clear rhythmic structure among children and adolescents with developmental disorders further indicates that repetitive sound sequences may support sensory integration processes and facilitate the formation of motor patterns (Srinivasan, 2013).

Another important domain influenced by music is emotional functioning. Music may facilitate mood regulation, reduce emotional tension, and limit so-called challenging behaviour. Neuropsychological studies indicate that the perception of music activates brain structures responsible for emotional processing, including elements of the limbic system (Koelsch, 2014). Appropriately selected musical stimuli may influence the intensity of experienced emotions and support processes of emotional self-regulation. In therapeutic practice, receptive music therapy based on the selective choice of musical works is used, among other purposes, to reduce anxiety and support relaxation states among individuals with more profound intellectual disabilities (Galińska, 2011; Stachyra, 2012). In this way, music may serve as a safe channel for emotional expression among individuals who experience difficulties in verbally expressing their feelings.

Another important area concerns social functioning. Research on group forms of musical activity indicates that musical actions foster the development of interpersonal relationships, cooperation skills, and improvements in the quality of social communication (Greenberg *et al.*, 2021). Phenomena such as motor and vocal synchronisation, joint performance of rhythms, or group singing strengthen the sense of belonging to a group and increase the willingness to engage in social interaction. Musical interventions based on group activities also promote the development of communication competencies, as music creates a natural space for nonverbal contact and shared experience.

Studies conducted among adults with moderate intellectual disabilities have shown that regular participation in active music therapy sessions may contribute to increased spontaneity in social interactions and a reduction in isolating behaviour. An important component of musical interventions is creative expression, which remains closely related to participants' sense of autonomy and agency. Individuals with intellectual disabilities participating in instrumental or vocal improvisations may experience satisfaction from

engaging in creative activities, which fosters the strengthening of self-confidence and the development of self-awareness. Research on the Nordoff–Robbins method indicates that musical improvisation conducted in a manner adapted to the participant's abilities may support the development of interpersonal relationships and strengthen individual psychological resources (Stachyra, 2012).

Empirical analyses also emphasise the importance of factors mediating the effectiveness of musical interventions. Among the most important are the quality of the relationship between the therapist and the participant, the organisation of activities, and the selection of musical material. Research also indicates that the effectiveness of musical interventions depends on the frequency and regularity of sessions as well as on the environment in which they are conducted (Ryczkowska, 2024; Stachyra, 2012).

A review of empirical studies therefore, indicates that musical interventions may constitute an important element in supporting the psychosocial functioning of individuals with intellectual disabilities. Their effectiveness results not only from the properties of music as a sensory-emotional medium but also from the possibility of adapting forms of musical activity to the individual needs of participants. The growing body of research confirms the importance of music in processes of cognitive development, emotional regulation, and the formation of social relationships, emphasising its interdisciplinary character and its practical potential within support systems for individuals with intellectual disabilities.

Practical Implications of Using Musical Interventions in the Support System for Individuals with Intellectual Disabilities

Contemporary models of support for individuals with intellectual disabilities emphasise the need to integrate educational, therapeutic, and social interventions within a coherent system of services implemented in institutions such as special and inclusive schools, rehabilitation and educational centres, occupational therapy workshops, community support centres, social welfare homes, and non-governmental organisations (Ryczkowska, 2024). In this context, musical activities—including music therapy and music education classes—constitute an important component of support aimed at development, rehabilitation, and improving quality of life. In practice, a wide spectrum of forms of musical engagement is used, such as singing, playing instruments, movement activities with music, music-based relaxation, and listening to repertoire selected according to the participants' abilities and needs (Poćwierz-Marciniak, 2018; Ryczkowska, 2024).

For musical activities to be recognised as therapeutic interventions, they must be purposeful, planned, and embedded within a broader program of interventions

rather than treated merely as recreational activities (Cylulko, 2003; Galińska, 2005). The implementation of such activities also requires the competencies of facilitators and the organisational preparedness of institutions. It is emphasised that a music therapist should possess both musical competencies (including performance skills, improvisation, and repertoire selection) and psychological and pedagogical knowledge enabling them to understand the specific functioning of individuals with intellectual disabilities as well as their emotional and social needs (Cylulko, 2003; Galińska, 2005). Attention is also drawn to the need for the standardisation of professional training and for clearly distinguishing professional music therapy from music education and general music activities, which relates to the quality and safety of interventions (Cylulko, 2011). At the same time, it is noted that special educators, music teachers, and occupational therapists may responsibly incorporate elements of developmental music therapy, provided that they possess basic knowledge about the aims, limitations, and principles of this form of work (Cylulko, 2011; Knapik-Szweda, 2014).

At the organisational level, it is necessary to create conditions conducive to active participation, including small groups, appropriately structured session durations, suitable spaces, and access to instruments and materials supporting the achievement of therapeutic goals (Ryczkowska, 2024). In practice, small groups are particularly beneficial because they allow for ongoing monitoring of participants' functioning and flexible adaptation of the course of activities. Acoustic safety is also an important requirement, especially in relation to individuals with sensory hypersensitivity. A significant role is played by the selection of musical material, which should take into account the participants' level of intellectual functioning, perceptual abilities, and musical preferences. In work with individuals with intellectual disabilities, it is recommended to combine a culturally rooted repertoire (*e.g.*, traditional songs) with simple compositions characterised by a clear rhythmic and melodic structure, which facilitates active musical participation and helps structure the course of activities (Poćwierz-Marciniak, 2018).

From the perspective of the support system, it is also important to incorporate musical activities into broader programs of social activation and integration. Music may strengthen the sense of belonging, meaning, and agency through participation in group forms of artistic expression (Biela, 2015). In the context of individuals with intellectual disabilities, such activities may create opportunities for cooperation and experiencing success within choirs, ensembles, artistic projects, or integrative workshops (Biela, 2015). The most effective outcomes are achieved when musical interventions are integrated with other forms of support; psychological, educational, and rehabilitative-within the framework of interdisciplinary teamwork. Such an approach enables a coherent influence on adaptive competencies, emotional self-regulation, and social participation, while also facilitating the continuation of activities beyond institutional settings in the local community (Ryczkowska, 2024).

An essential element of practice is the evaluation of the effectiveness of musical interventions. Researchers emphasise the need to combine quantitative indicators (*e.g.*, behavioural observation scales) with qualitative assessment that take into account the perspectives of participants as well as their families and caregivers. Comparative studies show that individuals with intellectual disabilities may respond to musical stimuli differently than individuals without disabilities, which should be considered when selecting criteria for evaluating outcomes (Hooper *et al.*, 2011). In practice, systematic documentation of the goals and course of activities, as well as observed changes in participation, initiative, behaviour, and the quality of interpersonal relationships, is recommended. Additionally, the analysis of audiovisual material may be useful, as it allows for capturing subtle changes in expression and interaction that are difficult to record using only traditional research tools (Hooper *et al.*, 2011).

In summary, the effective implementation of musical interventions within the support system for individuals with intellectual disabilities requires a systemic, interdisciplinary, and evidence-based approach. Key factors include the professionalisation of activities, clearly defined objectives, appropriate organisational conditions, and reliable evaluation of outcomes. Such an approach makes it possible to utilise the potential of music as a tool supporting development and social participation (Cylulko, 2003; Ryczkowska, 2024; Stachyra, 2012). Such an approach is consistent with international professional standards developed by organisations such as the World Federation of Music Therapy (WFMT) and the European Music Therapy Confederation (EMTC), which emphasise ethical responsibility, methodological rigour, and evidence-based practice in the implementation of music-based interventions.

Conclusion and Implications

Based on the analysis of both national and international literature, music occupies a significant place in the support system for individuals with intellectual disabilities, both in theoretical and practical terms. Musical interventions may serve as tools that stimulate cognitive, emotional, and social development, while at the same time creating a space for aesthetic, symbolic, and relational experience that goes beyond traditionally understood educational and therapeutic goals. The multidimensional nature of music facilitates the integration of different areas of human functioning and supports the development of relationships based on participation, dialogue, and mutual understanding.

From a theoretical perspective, contemporary biopsychosocial and ecological models emphasise the need to understand intellectual disability not solely in terms of deficits, but also in relation to the resources and potential of the individual, as well as their emotional, social, and cultural needs. In this context, music constitutes a par-

ticularly suitable medium for strengthening adaptive competencies and supporting the subjectivity and agency of individuals with intellectual disabilities.

An analysis of empirical research findings-both national and international-indicates the beneficial impact of musical interventions in several key areas of functioning. Participation in musical activities is associated with improvements in attention concentration, working memory, and sensory integration, as well as with better emotional regulation and a reduction in challenging behaviour. At the same time, the literature emphasises that these effects are mediated by factors such as the quality of the therapist-participant relationship, the organisation of the environment, and the nature and intensity of musical stimuli. This highlights the need for the conscious design of interventions and their individualisation.

From a practical perspective, the professionalisation of musical activities is of fundamental importance. This includes clearly defining the role of the music therapist and incorporating music into systemic support programs implemented in educational, care, and therapeutic institutions. Ensuring effectiveness requires the provision of adequate organisational resources (including appropriate facilities, musical instruments, and work in small groups) as well as the development of coherent evaluation procedures that allow for reliable assessment of outcomes. The importance of interdisciplinary cooperation should also be emphasised, as only the integration of musical interventions with other forms of support enables the full use of music's potential in developing adaptive competencies and improving the quality of life of individuals with intellectual disabilities.

In a broader perspective, music may also function as a cultural and inclusive medium that promotes social participation and the development of local communities based on reciprocity, respect, and dialogue. Musical activities may create spaces in which individuals with intellectual disabilities are not merely recipients of support but also active co-creators of artistic and relational practices, thereby expanding traditional understandings of therapy and education.

The conclusions drawn from the presented analyses indicate that musical interventions should be treated as an integral component of the support system, not as an additional activity, but as an element of educational, therapeutic, and social practices implemented in a purposeful, responsible, and evidence-based manner. At the same time, further research appears justified and necessary, particularly in the following areas: 1) deepening knowledge about the mechanisms through which music influences individuals with intellectual disabilities, 2) developing and comparing innovative intervention models, including those involving new technologies, and 3) evaluating the long-term effects of musical interventions in different institutional and community contexts. Musical interventions may therefore be conceptualised not as supplementary activities but as essential elements of interdisciplinary and evidence-based support systems that contribute to the development of adaptive competencies and social participation.

References

- Biela, A. (2015). Terapia zajęciowa z wykorzystaniem muzyki jako forma aktywizacji w okresie starzenia się i starości [Occupational therapy using music as a form of activation during aging and old age]. *Konteksty Pedagogiczne*, 2(5), 125–139. <https://doi.org/10.19265/kp.2015.2.5.93>
- Cylulko, P. (2003). Rola muzykoterapii w procesie usprawniania niepełnosprawnych pacjentów [The role of music therapy in the rehabilitation of disabled patients]. *Muzykoterapia Polska*, 1(5), 15–25.
- Cylulko, P. (Ed.). (2011). *Projekt ustawy o zawodzie muzykoterapeuty: Materiały do konsultacji środowiskowej* [Draft act on the music therapist profession]. Stowarzyszenie Muzykoterapeutów Polskich.
- DeNora, T. (1999). Music as a technology of the self. *Poetics*, 27(1), 31–56. [https://doi.org/10.1016/S0304-422X\(99\)00017-0](https://doi.org/10.1016/S0304-422X(99)00017-0)
- Galińska, E. (2005). Muzykoterapia [Music therapy]. In L. Grzesiuk (Ed.), *Psychoterapia: Teoria: Podręcznik akademicki* (pp. 531–542). Eneteia.
- Galińska, E. (2011). *Muzykoterapia w praktyce klinicznej* [Music therapy in clinical practice]. Wydawnictwo Lekarskie PZWL.
- Greenberg, D. M., Decety, J., & Gordon, I. (2021). The social neuroscience of music: Understanding the social brain through human song. *American Psychologist*, 76(7), 1172–1185. <https://doi.org/10.1037/amp0000819>
- Hooper, J., Wigram, T., Carson, D., & Lindsay, B. (2011). The practical implications of comparing how adults with and without intellectual disability respond to music. *British Journal of Learning Disabilities*, 39(1), 22–28. <https://doi.org/10.1111/j.1468-3156.2009.00600.x>
- Kłysz-Sokalska, N. (2025). Interakcje muzyczne jako medium wspierające rozwój więzi emocjonalnej w relacji dziecko–opiekun [Musical interactions as a medium supporting the development of emotional bonds in the child–caregiver relationship]. *Problemy Opiekuńczo-Wychowawcze*, 641(6), 37–47. <https://doi.org/10.71358/pow.2361>
- Knapik-Szweda, S. (2014). Muzykoterapia i jej właściwości w usprawnianiu dziecka z autyzmem [Music therapy and its properties in the rehabilitation of children with autism]. *Interdyscyplinarne Konteksty Pedagogiki Specjalnej*, 6, 81–97.
- Koelsch, S. (2014). Brain correlates of music-evoked emotions. *Nature Reviews Neuroscience*, 15(3), 170–180. <https://doi.org/10.1038/nrn3666>
- Kruczyńska, A., & Kurkowski, Z. M. (2013). Muzyka i jej oddziaływanie na organizm człowieka [Music and its impact on the human body]. *Nowa Audiofonologia*, 2(3), 24–29.
- Magee, W. L., & Stewart, L. (2015). *Music therapy and neuroscience*. Oxford University Press.

- Piotrowski, P. (2024). Muzyczne portrety depresji i samobójstwa: Analiza międzykulturowa [Musical portraits of depression and suicide. A cross-cultural analysis]. *Homo et Societas. Wokół Pracy Socjalnej*, 9, 141–151. <https://doi.org/10.4467/25436104HS.24.009.20947>
- Poćwierz-Marciniak, I. (2018). Muzyka i muzykoterapia a zdrowie i rozwój dzieci [Music and music therapy in children's health and development]. *Aspekty Muzyki*, 8, 235–261.
- Ryczkowska, A. (2024). Zastosowanie muzyki w pracy z osobami z niepełnosprawnością intelektualną [The use of music in work with people with intellectual disabilities]. *Annales Universitatis Mariae Curie-Skłodowska. Sectio J: Paedagogia-Psychologia*, 37(2), 135–168. <http://dx.doi.org/10.17951/j.2024.37.2.135-168>
- Sihvonen, A. J., Särkämö, T., Leo, V., Tervaniemi, M., Altenmüller, E., & Soinila, S. (2017). Music-based interventions in neurological rehabilitation. *Annals of the New York Academy of Sciences*, 1423(1), 161–181. <https://doi.org/10.1111/nyas.13382>
- Srinivasan, S. M. (2013). A review of “music and movement” therapies for children with autism. *Frontiers in Integrative Neuroscience*, 7, 22. <https://doi.org/10.3389/fnint.2013.00022>
- Stachyra, B. (2012). *Muzykoterapia: Teoria i praktyka* [Music therapy: Theory and practice]. Harmonia Universalis.
- Thaut, M. H. (2015). *Rhythm, music, and the brain*. Routledge.
- Thaut, M. H., & Hoemberg, V. (2014). *Handbook of neurologic music therapy*. Oxford University Press.
- Vuust, P., Heggli, O. A., Friston, K. J., & Kringelbach, M. L. (2022). Music in the brain. *Nature Reviews Neuroscience*, 23(5), 287–305. <https://doi.org/10.1038/s41583-022-00578-5>

