



## OPEN ACCESS

EDITED AND REVIEWED BY  
Isabelle Peretz,  
Montreal University, Canada

\*CORRESPONDENCE  
Artur C. Jaschke  
✉ a.jaschke@artez.nl

RECEIVED 16 June 2025  
ACCEPTED 30 June 2025  
PUBLISHED 22 July 2025

CITATION  
Jaschke AC, Papatzikis E and Haslbeck FB  
(2025) Editorial: Medical neurohumanities:  
sharing insights from medicine, neuroscience,  
and music in pediatric care.  
*Front. Neurosci.* 19:1648030.  
doi: 10.3389/fnins.2025.1648030

COPYRIGHT  
© 2025 Jaschke, Papatzikis and Haslbeck.  
This is an open-access article distributed  
under the terms of the [Creative Commons  
Attribution License \(CC BY\)](#). The use,  
distribution or reproduction in other forums is  
permitted, provided the original author(s) and  
the copyright owner(s) are credited and that  
the original publication in this journal is cited,  
in accordance with accepted academic  
practice. No use, distribution or reproduction  
is permitted which does not comply with  
these terms.

# Editorial: Medical neurohumanities: sharing insights from medicine, neuroscience, and music in pediatric care

Artur C. Jaschke<sup>1,2,3\*</sup>, Efthymios Papatzikis<sup>4</sup> and  
Friederike B. Haslbeck<sup>5</sup>

<sup>1</sup>Department of Psychiatry, Evelyn Perinatal Imaging Centre, Rosie Hospital, University of Cambridge, Cambridge, United Kingdom, <sup>2</sup>Department of Music Therapy, ArtEZ University of the Arts, Enschede, Netherlands, <sup>3</sup>Division of Neonatology, University Medical Center Groningen, Groningen, Netherlands, <sup>4</sup>Early Childhood Education and Care, OsloMet-storbyuniversitetet, Oslo, Norway, <sup>5</sup>Neonatology, Universitat Zurich, Zürich, Switzerland

## KEYWORDS

neonatal intensive care unit (NICU), neurohumanities, music therapy, medicine, pediatrics, care

## Editorial on the Research Topic

[Medical neurohumanities: sharing insights from medicine, neuroscience and music in pediatric care](#)

In recent years, the concept of “Medical Neurohumanities” has emerged as a vibrant interdisciplinary field, blending the insights of medicine, neuroscience, and the humanities to deepen our understanding of health, illness, and healing. This Research Topic, “Medical Neurohumanities: Sharing Insights from Medicine, Neuroscience, and Music in Pediatric Care,” brings together diverse perspectives that showcase how integrating knowledge across disciplines can meaningfully enrich pediatric care, particularly for vulnerable populations such as preterm infants, critically ill children and their families.

Neurohumanities have been debated and increasingly applied in medicine, with the vital relationship between music sciences, music therapy, and pediatric care remaining underexplored. On the one hand,

“[...]neurology attempts to understand the biological basis of our humanity. At the same time, neurological conditions profoundly impact our humanity. The practice of neurology requires a curiosity about the person, the disease, and the ability to listen to and hear stories.”

- Carandang (2025; online)

On the other, neurohumanities re-emphasize the humanistic aspects of medical practice and investigate the importance and influence of perspectives, behaviors, and feelings related to the practice of neurology and medical practice at large. Furthermore, they raise self-awareness and the impact of our perspectives on others and explore the intersection of art and neurology medicine and how neurology positively impacts the world.

As our understanding of the young brain expands, creating a shared lexicon that connects music, neuroscience, technological innovations, pediatrics, and healthcare is crucial. By fostering interdisciplinary collaboration, we can deepen our comprehension of the working-mechanisms of music therapy and music medicine for pediatric patients. Sharing insights, approaches, methods and interventions promotes interdisciplinary understanding, enabling the development of more effective, patient- and family-centered healthcare strategies that consider ethical aspects, shared therapeutic goals, care and medical responsibilities. This will lead to a de-disciplined approach, where the expert identifies the boundaries of their discipline, to reach beyond that border toward new frontiers in any given field.

This Research Topic aimed to foster dialogue between scientific and artistic disciplines and highlight innovative approaches where neuroscience, clinical medicine, therapy and music intersect to improve (neuro)developmental as well as clinical outcomes and humanize healthcare experiences. By bridging gaps between empirical evidence and clinical practice, the contributing articles offer new lenses through which pediatric healthcare and development can be viewed, supported, and enhanced.

Several contributions focus on the early developmental period and the unique needs of neonates and their caregivers. For example, [Hugoson et al.](#) present the pioneering work on Creative Music Therapy (CMT) in neonatal intensive care units (NICUS), supporting parent-infant bonding and neurodevelopmental trajectories in preterm infants ([Haslbeck et al., 2023](#); [van Dokkum et al., 2020](#); [Bos et al., 2021](#)). Their study emphasizes that parental singing during kangaroo care, primarily when facilitated by a trained music therapist, strengthens the parents' sense of coherence by promoting experiences of comprehensibility, manageability, and meaningfulness. Interestingly, this is the first study that interviewed singing parents of an intervention group which received CMT and the control group without CMT support. Parents who received CMT reported a deeper understanding of how singing facilitates attachment and enhances self-esteem, reflecting improvements in perceived manageability and comprehensibility. While parents in the control group also expressed joy in singing and noted positive effects on family wellbeing, these experiences were less pronounced, not described as a healing experience and catharsis as in the CMT group and started far later during the NICU trajectory since many parents were not able to raise their voice for singing during the first weeks of their NICU stay. However, particularly during these first weeks, parental anxiety, stress and trauma may evolve and imprint so that therapeutic support, such as CMT, may act as a preventive health intervention for these families as indicated in [Kehl et al. \(2021\)](#). Complementing this, [Dewan et al.](#) examined the impact of live music therapy on the parental stress levels of preterm infants during the neonatal care period. Their findings highlight how music therapy can reduce subjectively perceived parental stress and more objective indicators of stress, such as parental cortisol levels.

While the improvements on parent child bonding are compelling, there are additional benefits from music interventions on emotional and neurodevelopmental outcomes in preterm infants. [Filippa et al.](#), has tracked infants at 12 and 24 months post

intervention revealing enhancements in emotional regulation and neurodevelopmental milestones, underscoring the importance of early auditory stimulation in at risk-populations.

The Euterpe music therapy methodology has been introduced as a structured approach to integrating music therapy in pediatric care ([Liuzzi and D'Arienzo et al.](#)). This methodology includes detailed procedural algorithms designed to standardize and optimize music therapy interventions, ensuring consistency and efficacy in clinical settings.

From a broader theoretical perspective, [Stige \(2012\)](#) offers a conceptual framework for “musicking” in healthcare contexts, linking neurobiological mechanisms with psychosocial processes. He advocates for a relational understanding of music as a co-created, embodied activity that transcends traditional therapy models, opening possibilities for its application in pediatric and family-centered care.

These articles illuminate the transformative potential of the Medical Neurohumanities in pediatric care. They illustrate how integrating arts-based practices, relational neuroscience, and humanistic inquiry can not only optimize developmental outcomes but also rehumanise healthcare environments that are often dominated by technology and protocols.

Innovative research exploring the feasibility of using clinical EEG to recognize music in children, demonstrates the potential for non-invasive monitoring of auditory processing. This approach as is described below, could pave the way for personalized music therapy strategies tailored to individual neural processes.

Three critical tensions persist despite the demonstrable clinical promise illustrated across this Research Topic. First, methodological heterogeneity—ranging from the single-center, low-powered EEG feasibility study by [Bower et al.](#) to the highly “protocolized” yet context-bound Euterpe algorithms detailed by [Liuzzi and D'Arienzo et al.](#) and [Liuzzi, Bompard et al.](#)—impedes meta-analytic synthesis and obscures dose–response relationships. Second, outcome measures remain fragmented: while [Dewan et al.](#) document acute biobehavioural stress attenuation in parents, [van Dokkum et al.](#) reveal downstream respiratory and mood sequelae linked to NICU stress that current interventions leave mostly unaddressed. Third, scalability is constrained by limited implementation science; the carefully staged guidelines for early parental vocal contact advanced by [Filippa and Kuhn](#), although pragmatic, have yet to be benchmarked against health-economic or cross-cultural metrics.

Consequently, future research within Medical Neurohumanities must transition from proof-of-concept to precision, leveraging digital phenotyping ([Insel, 2017](#)), multimodal neuroimaging ([Papatzikis, 2024](#)), and federated data repositories with advanced Machine Learning algorithms to both establish reproducible biomarkers of musical efficacy and inform novel interventions and control the clinical environment on the ward and at bedside ([Jaschke, 2025](#); [Kunikullaya et al., 2025](#); [Jaschke et al., 2024](#); [Jaschke and Bos, 2023](#)). Multi-site adaptive trials—anchored in standardized clinically relevant core outcome sets and harmonized intervention taxonomies—could clarify the timing and sensitivity periods across the developmental trajectory, as suggested by the 12- and 24-month emotional modulation evidenced by [Filippa et al.](#) In parallel, implementation

laboratories should interrogate contextual moderators, integrating caregiver-reported or family-centered feasibility and family health indicators with real-time physiological analytics to inform just-in-time adaptive interventions. Finally, the field would benefit from consensus on an ontological lexicon that unites neuroscientific constructs (e.g., predictive coding, interoceptive attunement) with humanities-derived notions of meaning-making, thereby fulfilling the transdisciplinary mandate of this Special Research Topic and accelerating the translation of embodied musical experiences into equitable, sustainable pediatric care.

This Research Topic invites healthcare professionals, researchers, and artists alike to envision new paradigms of pediatric care—ones that are attuned to the biological, emotional, and relational complexities of early human life. As the field of Medical Neurohumanities continues to evolve, it holds promise for fostering more holistic, compassionate, and effective models of care for children and their families.

This Research Topic underscores the growing recognition of the intersection between the arts and sciences in pediatric care. By highlighting the therapeutic benefits of music and auditory interventions, it advocates for a more holistic approach to pediatric healthcare—one that considers children's emotional and developmental needs alongside traditional medical treatments. Integrating music therapy into clinical practice enriches the healthcare experience for parents and families and opens avenues for future research and innovation in pediatric and neonatal care.

We hope this Research Topic catalyzes further interdisciplinary collaborations and inspires innovative practices that honor both the science and the art of healing.

## Author contributions

AJ: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration,

Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. EP: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. FH: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing.

## Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

The author(s) declared that they were an editorial board member of Frontiers, at the time of submission. This had no impact on the peer review process and the final decision.

## Generative AI statement

The authors declare that no Gen AI was used in the creation of this manuscript.

## Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

## References

- Bos, M., van Dokkum, N. H., Ravensbergen, A. G., Kraft, K. E., Bos, A. F., and Jaschke, A. C. (2021). Pilot study finds that performing live music therapy in intensive care units may be beneficial for infants' neurodevelopment. *Acta Paediatr.* 110, 2350–2351. doi: 10.1111/apa.15867
- Carandang, R. (2025). *UMass Chan Medical School*. Available online at: <https://www.umassmed.edu/neurology/residency-program/program-highlights/neurohumanities-at-umass-chan/> (Accessed June 13, 2025).
- Haslbeck, F. B., Mueller, K., Karen, T., Loewy, J., Meerpohl, J. J., and Bassler, D. (2023). Musical and vocal interventions to improve neurodevelopmental outcomes for preterm infants. *Cochrane Database Syst. Rev.* 9:CD013472. doi: 10.1002/14651858.CD013472.pub2
- Insel, T. R. (2017). Digital phenotyping: technology for a new science of behavior. *JAMA* 318, 1215–1216. doi: 10.1001/jama.2017.11295
- Jaschke, A. C. (2025). Neural development, music therapy, and active noise control in the NICU—no preterm neonate needs Mozart. *JAMA Pediatr.* 179, 591–592. doi: 10.1001/jamapediatrics.2025.0125
- Jaschke, A. C., and Bos, A. F. (2023). Concept and considerations of a medical device: the active noise canceling incubator. *Front. Pediatr. Sect. Neonatol.* 11:1187815. doi: 10.3389/fped.2023.1187815
- Jaschke, A. C., Mirta, S., and Bos, A. F. (2024). Music therapy in tertiary neonatal intensive care: a matter of unlikely allies? *Acta Paediatr.* 113, 1772–1777. doi: 10.1111/apa.17297
- Kehl, S. M., La Marca-Ghaemmaghami, P., Haller, M., Pichler-Stachl, E., Bucher, H. U., Bassler, D., et al. (2021). Creative music therapy with premature infants and their parents: a mixed-method pilot study on parents' anxiety, stress and depressive symptoms and parent–infant attachment. *Int. J. Environ. Res. Public Health* 18:265. doi: 10.3390/ijerph18010265
- Kunikullaya, K., Pranjic, M., Rigby, A., Pallás-Ferrer, I., Anand, H., Kunnavil, R., et al. (2025). The molecular basis of music-induced neuroplasticity in humans: a systematic review. *Neurosci. Biobehav. Rev.* 175:106219. doi: 10.1016/j.neubiorev.2025.106219
- Papatzikis, E. (2024). Neuroimaging-guided music interventions for infants in NICU. *JAMA Pediatr.* 178, 853–854. doi: 10.1001/jamapediatrics.2024.1886
- Stige, B. (2012). "Health musicking: a perspective on music and health as action and performance," in *Music, Health, and Wellbeing*, eds. R. MacDonald, G. Kreutz, and L. Mitchell (Oxford; online edn, Oxford Academic). doi: 10.1093/acprof:oso/9780199586974.003.0014
- van Dokkum, N. H., Jaschke, A. C., Ravensbergen, A. G., Reijneveld, S. A., Hakvoort, L., de Kroon, M. L. A., et al. (2020). Feasibility of live-performed music therapy for extremely and very preterm infants in a tertiary NICU. *Front. Pediatr.* 8:581372. doi: 10.3389/fped.2020.581372