Potential of music experiences for augmentative and alternative communication users and their effect on communication training: a scoping review protocol

(overview essay)

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Abstract: *Music-based experiences were found to be effective in supporting and promoting purposeful communication by non-speaking people who use benefit from augmentative and alternative communication (AAC). However, this area is fragmented into several disciplines (e.g. speech and language therapy, special education, music therapy, etc.) and the possibilities of music-making for AAC training have not been systematically reviewed. The aim of the planned scoping review is to analyze the types of experiences that use music-making as a form of AAC and overview their effects for different groups of AAC users. The scoping review will be conducted according to JBI methodology. We will search in databases (BMC, CINAHL, EMBASE, ERIC, MEDLINE, ProQuest Central, PsycINFO, Scopus, and Web of Science), and the sources of unpublished and gray literature (Central, Clinical Trials, Current Controlled Trials, Google Scholar, and Open Dissertations) including the reference lists of relevant texts, language, location or publication period will not be limited. Study selection and charting of data from relevant studies will be done independently by two reviewers. The findings of the scoping review may enable classification of different types of music experiences and their effects in the context of AAC training, and propose recommendations for a more intentional usage of those experiences by AAC users, professionals (e.g. music therapists or special teachers), families, and other non-professionals.*

Keywords: *alternative communication, AAC, music, experiences, AAC training, JBI, scoping review, protocol*

1 Introduction

The shared problem of different groups of augmentative and alternative communication (AAC) users is a difficulty with oral expressions caused by speech and/or language disorder, which in turn complicates shared meaning making in communication (Beukelman & Light, 2020). Consequences of limited oral expressions are that opinions, feelings and ideas appear as brief expressions or remain tacit. Thus, social and academic learning throughout the lifespan is hindered (Simmons-Mackie, King, & Beukelman, 2013). In the proposed scoping review, we will focus on how making music and expressions through music can compensate and support communicative expressions in multimodal ways. Multimodality is a central approach in the field of AAC.

Research has shown that music has effect on supporting and promoting communication for people who use AAC, especially in case of people limited to severe and profound levels of functioning (Elefant, 2010; Lee & Ferran, 2012; Thompson & Ferran, 2015). If these people have difficulty in communicating and responding, it is often difficult to determine their level of cognitive function, and people's expectations may be very low. But many practitioners know that if you can enable those people to express themselves by performing or creating music, it can become obvious that they understand far more than was apparent from just indicating 'yes' and 'no', if they can even do that. Furthermore, music may be essential also to other groups of AAC users, including individuals with high level of cognitive functions. AAC technology can make a big difference for many AAC users, to develop from not being able to say anything, to being able to make choices and express themselves, and connect with the world. People who only have the tiniest movements can connect to a computer using sensors, and operate a communication scanning system, or play music via specialist music software (Samuels, 2015; Skogdal, 2021). People who can't control body movement at all can use their eyes with an 'eye-gaze' tracking system – if they look at different items on a computer screen, they can play music! (van der Wel, 2018; Vamvakousis, year unknown) Similar technology as used to play music can be utilized to scan through communication symbols, words or sentences on a computer screen, which can be spoken aloud. By making small movements or looking via eye-gaze, a person can develop their communication skills. This is quite physically demanding, as well as requiring concentration to hold one's gaze on a symbol. Also, there is a need to keep track of 'where you are' in the communicated phrase. All this combines to make the process laborious for many beginners, and it can often be difficult for them to successfully communicate. If expending a lot of energy while learning without achieving results, it is hard to maintain motivation. But if someone has already used a similar system in a more intuitive way to play music and gained practice and confidence, these skills can then be far more easily transferred to communicating. Thus, playing music via technology can act as a 'way in' to communicating.

Music-based approaches include very heterogenous groups of experiences that are done by both – professionals, e.g. music therapists, as well as non-professionals including families (Goldbart & Caton, 2010). Communication in musical context has many similarities with communication using AAC and communication goals are central for many music therapist clinicians (Gadberry & Sweeney, 2017). Other professionals, e.g. music teachers, also refer that music instructions influence communicative behaviors of AAC users (DeVito, 2006) and some authors present interdisciplinary perspectives on the musical communication (Meyer, Zentel, & Sansour, 2016). However, this area has not been systematically reviewed. Many practitioners could benefit from an overview of possible usage of music-making experiences and their effects in the context of AAC training.

Music experiences can be classified into improvisational, re-creative, compositional and music listening methods (Bruscia, 2014). All the methods have numerous variations and techniques that enable rehabilitation of pre-verbal, non-verbal or alternative communication (Howland, 2014). Heterogenous terminology for concrete music-based procedures and techniques is used in literature, mainly in the music therapy field. According to transformational design model (TDM), some non-musical exercises within any area of speech and language treatment (including AAC) can be easily translated into the musical exercises (LaGasse, 2016).

We hypothesize that a gap in the literature exists between AAC studies against music intervention studies. We propose that music has a big potential for AAC training and future development of this field requires the research evidence to be reviewed in a systematic way. There is a need to identify effects of different types of music experience on AAC training in different groups of AAC users. Furthermore, this review could influence creating interdisciplinary relationships between music therapy / related professions and the area of AAC – those areas have not been closely connected until now, and the importance of music hasn't been sufficiently recognized by most AAC practitioners. The search in databases (Epistemonikos, Prospero, JBI, and Cochrane) didn't find any systematic or scoping review focused on music and AAC. Therefore, this protocol was planned and published prospectively with an intention to carry out a scoping review in the future. The scoping review will be conducted according to JBI methodology (Peters et al., 2020).

2 Methods

Review questions:

- What types of music experiences can be used for communication training in different groups of AAC users?
- What is the effect of music experiences in the context of communication training in different groups of AAC users?

Eligibility criteria

Participants: Population for this scoping review will be different groups of AAC users or candidates for AAC that are limited in oral expression and would benefit from some form of AAC system. It is expected that the participants will have diagnoses such as autism spectrum disorder, intellectual disability, cerebral palsy, amyotrophic lateral sclerosis, stroke, etc. It is also expected that the participants will have different ability profile related to:

- Level of functioning, mainly level of communication development that can be identified by different assessment tools, e.g. Communication Matrix (Rowland & Fried-Oken 2010).
- Level of music-making experiences, e.g. music perception, musical aptitude, or music appreciation (Kupferstein, 2020; Kupferstein & Walsh, 2016).

We will exclude studies with participants with functional verbal communication who are presumed not to have any benefit from AAC training. No further limitation by age, gender, or comorbidities will be applied.

Concept: We will include approaches using music experience as it relates to AAC training and use. Any type of music experience focused on verbal communication and/or development of ordinary speech, as well as music experiences for artistic and other purposes will be excluded.

Context: Training of AAC. We suppose that most of the studies will not explicitly mention that the music was applied in the context of AAC training. In those cases, we will consider the relevance of the outcomes gained by music experience from the perspective of AAC training.

Type of sources: This review will consider any quantitative or qualitative primary studies, as well as systematic reviews of any type. Experimental and quasi-experimental study designs, including randomized and non-randomized controlled trials, before-and-after studies and interrupted time-series studies will be included. In addition, analytical observational studies (including prospective and retrospective cohort studies, case-control studies, analytical cross-sectional studies) and descriptive observational studies (including case reports and descriptive cross-sectional studies) will be considered for inclusion. Qualitative studies will also be considered including, but not limited to, designs such as phenomenological, grounded theory, ethnography, qualitative description, action research, and feminist research studies. Bachelor theses, text and opinion papers and all types of non-systematic reviews will be excluded.

Search strategy

The search strategy will consist of three stages and will target the retrieval of both published and unpublished articles from electronic searches, manual searches of

reference lists, and hand searches of key journals, where required. An initial limited search was performed in March 2021 in EBSCO host (accessed by the Palacky University e-sources), Scopus and ProQuest Central. The text words contained in the titles and summaries of the relevant articles and the index terms to describe the articles were used to create a complete search strategy for identifying relevant articles. The search strategy, including all identified keywords and index terms, will be adjusted for each included source. Reference lists of all relevant studies will be screened for additional studies. The publication period will not be limited.

The databases to be searched include BMC (Medvik), CINAHL Plus, EMBASE, ERIC, MEDLINE (OvidSP), ProQuest Central, PsycINFO, Scopus, and Web of Science. Sources of unpublished studies and gray literature to be searched include Central, Clinical Trials, Current Controlled Trials, Google Scholar, and Open Dissertations.

Table 1: *Key words and their synonyms for main components*

Main components	Key words and synonyms
Participants	Not applicable
Intervention	Music therapy OR music therapist OR music intervention OR music education OR music instruction OR music experience
Outcome	Intentional communication OR targeted communication OR non-verbal communication OR communicative behavior OR alternative communication OR communication act

Study selection

Following the completion of the search, and to conform to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, the extension for scoping reviews (Tricco et al., 2018), a full set of results will be exported into Zotero V5.0.85. After the removal of duplicates, articles will then be selected in a two-step process by two reviewers (NČ, JK) working independently at each step.

Step 1 – screening of all the titles and abstracts returned for potential relevance: Each reviewer will assess the article against the eligibility criteria, and compare the proposed abstracts for full-text review.

Step 2 – screening of full-texts of articles with potential relevance will be undertaken for each abstract selected. The full version of the article will be retrieved and imported into Zotero-5.0.85. Two reviewers (NČ, JK) will independently undertake full-text analyses. Reasons for exclusion of full-text articles will be noted, and reported in a PRISMA flowchart, and provided as an appendix in the full review. Upon disagreement at any stage, the final agreement will be sought by discussion or by mutual consensus with input from a third reviewer.

Table 2: *Data charting tool developed by the authors*

Author, year, title
Study design/levels of JBI
Country/setting, language
Population (number of participants, diagnosis, functional classification and level of severity, age, gender, comorbidities, ability profile related to music…)
Experimental procedure(s) (description of control, length and frequency of music-based activity, presence of non-musical interventions, etc.)
Data collection method (self-report, tests, first-hand narrative, observational, researcher's reflections, etc.)
Type and context of music experience (active music-making / listening experience, instruments, strategies/techniques, the presence and role of AAC technologies, etc.)
Effects of the music experience (iatrogenic effect, positive experience, risk, or harm)
Sponsorship/affiliation, declared conflict of interest

3 Data charting and presentation

Data will be charted from papers included using an author-developed data charting tool (Table 2). We expect to find different types of studies, from different countries and settings. The quantitative study design will be classified according to JBI levels of evidence in quantitative research (Klugar, 2015) and the type of paradigm will be identified in qualitative studies (e.g. phenomenological, ethnographic, critical, etc.). We are interested in different characteristics of participants, not limited to their diagnosis, deficits, and levels of functioning. The data on musical as well as other abilities and skills will be charted whenever possible. Different characteristics concerning research experiments (e.g. description of control, presence of non-musical interventions, or methods of data collection) will enable to consider the methodological heterogeneity of studies. The data on the type and context of music experience is essential for classification of music-making methods / techniques and to suggest recommendations concerning intentional usage of musical experiences in AAC training. Data describing the effect of music experiences will show the potential of music towards the AAC training, including possible risks or harms. Finally, we will chart the data concerning the sponsorship and declared conflicts because there exist controversial discussions among AAC practitioners (ASHA, 2018; United for Communication Choice, 2018) and there may be potential biases in the studies. Data will be charted by two reviewers (NČ, JK). Any disagreements that arise between the reviewers will be resolved through discussion. The charted data will be presented in a tabular form and as a narrative summary that aligns with the objectives of the review. Any deviation from this protocol will be clearly detailed and justified.

The team's roles and a scoping review plan

The findings will be discussed by an international multi-field team of professionals. After the preparation of all the above steps, the team will hold discussions as needed to review and synthesize the evidence, and draw conclusions. The team consists of experts from the area of AAC, inclusive and special education, psychology, music therapy, music education, medicine, and methodology.

JK will be responsible for the management of the project, overseeing and taking part in the search, screening, charting, and discussions. All members will discuss regularly, and, specifically, will be involved in making the final decision for inclusion/exclusion of texts, reviewing of charted data, drawing conclusions, and revising the draft of the manuscript. All authors will contribute to the development of the draft manuscript, and before submission, will be asked to approve of the final text. The scoping review outline is also shown in Table 3.

Table 3: *Scoping review plan*

Search	Professional information specialists
Abstract screening	JK, NČ
Full-text screening	JK, NČ (texts for inclusion approved by all members)
Bibliography hand search	All members
Data charting	JK, NČ
Data reviewing and discussions	All members
Writing of the first draft, discussions, development of the final manuscript for submission	All members

Expected results, publication, and dissemination

The expected results of this scoping review may enable the development of a classification of different types of music experiences in the context of AAC, and provide an overview of the possible effects of music experience on communication training in different groups of AAC users. Based on the findings, it may be possible to achieve a better understanding of the relevance of music for AAC users, and to discuss the many possibilities for how to use music experiences by AAC users, the professionals (e.g. music therapists or special teachers) and non-professionals. Above all, we will compare the findings of professionals who utilize music experiences, the description of these experiences by AAC users themselves, and the reported data provided by families of AAC users and other non-professionals.

The results of the scoping review will be published in a scholarly journal, and disseminated among the AAC stakeholders (professionals, users, and interested non-professionals), members of music-related communities, and in related conferences.

Ethical aspects / Conflict of interest

No financial conflicts of interest declared but there may be a potential "intellectual conflict of interests" as JK is a director of Palacky University Center of Evidence-based Education & Arts Therapies.

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