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Music and Autobiographical Memory

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Listening to music can bring back vivid memories from one's past. In recent years there has been an increase in both scientific and public interest in the ability of music to evoke vivid, emotional, and rich autobiographical memories. For example, several "viral" videos have taken the internet by storm, illustrating powerful instances of music evoking memories in individuals with dementia – perhaps the most recent example is a clip of a former ballerina with Alzheimer's disease who recalls her dance movements at the sound of "Swan Lake." Current scientific work in this area informs the mechanisms by which music induces emotions and provides critical evidence for assessing whether music is a uniquely effective memory cue. Research on music and autobiographical memory is also of practical relevance by informing the development of music-based interventions, for example, for people with memory disorders.

The aim of this Special Collection on Music and Autobiographical Memory is to bring together contributions in this growing area of research from a diverse array of scholars and interdisciplinary perspectives. The contributions to this Special Collection investigate this topic from a variety of angles: across the lifespan in both experimental and everyday settings, in healthy and clinical populations, and using a range of quantitative, qualitative, and theoretical methodologies. The collection was also prompted by two recent and relevant symposia: a symposium on music-evoked autobiographical memories at the 2019 Society for Music Perception and Cognition conference co-chaired by the Guest Editors (Drs Belfi & Jakubowski) and Music & Lifetime Memories: An Interdisciplinary Conference (directed by Dr Jakubowski at Durham University in November 2019). Several articles within this collection grew directly out of these symposia, though the collection also covers a wider range of perspectives from researchers across the globe with expertise in music, memory, identity, emotion, and ageing.

The bulk of psychological research on this topic has been conducted within the last several years, although initial investigations span the past few decades. One of the earliest explorations of music and autobiographical memory found that participants were frequently able to recall songs that evoked specific memories, and their memories tended to be of positive emotional experiences (Baumgartner, 1992). Other early work established that popular music triggers autobiographical memories of general events for both younger and older adults (Schulkind et al., 1999). With the proliferation of neuroimaging techniques, researchers later began investigating the neural underpinnings of music and autobiographical memory, suggesting a role of the medial prefrontal cortex (Ford et al., 2011; Janata, 2009). A more recent trend in the field has been to characterise differences between autobiographical memories evoked by music and other sensory cues, including pictures (Baird et al., 2018; Belfi et al., 2016, 2020), words (Zator & Katz, 2017), and television shows (Jakubowski et al., 2021).

The set of articles featured in this special collection adds to this developing literature in several important ways. Below, we highlight four central themes that emerged across the body of work in this collection: youth, ageing, and reminiscence bumps; music-evoked memories in special populations; identity, relationships, and emotions; and musical qualities. For each theme we provide background context of prior work done in this area, followed by summaries of the featured papers and their key contributions to the growing field of music and autobiographical memory.

Youth, Ageing, and Reminiscence Bumps

Much of the prior work on music and autobiographical memory has tended to focus on younger adult participant populations. However, more recently researchers have begun investigating how music evokes autobiographical

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memories across the lifespan. One key area in which this work has focused is on whether memories evoked by music display a similar "reminiscence bump" to that observed using other memory cues. The "reminiscence bump" is a concept used to describe enhanced memory for events that occur during adolescence and early adulthood (Rubin & Schulkind, 1997). Research on music and autobiographical memory has taken advantage of this reminiscence bump effect, often by selecting musical cues from this time period as a way to evoke autobiographical memories (e.g., Belfi et al., 2016). Prior research on reminiscence bumps and music has indicated that not only music-evoked memories, but also musical preferences show a reminiscence bump (Janssen et al., 2007; Krumhansl, 2017; Krumhansl & Zupnick, 2013). That is, people prefer music that was popular during this period of life, and this effect seems relatively consistent across the lifespan (although for conflicting evidence about the existence of a "bump" for musical preferences, see Kopiez et al., 2021).

Several articles in this special collection touch on these concepts of ageing, lifespan development, and reminiscence bumps. For example, Lamont and Loveday (2020) propose a novel framework for integrating music-evoked autobiographical memories and musical preferences in the context of a naturalistic dataset and focus a portion of their analyses on the timeframe of the reminiscence bump. Taking complementary qualitative approaches, the authors analysed a real-world dataset from the radio show *Desert Island Discs.* In this show, guests are asked to describe eight records they would take with them on a desert island. In analysing this dataset, the authors identified a reminiscence bump similar to that found in previous work. That is, guests on *Desert Island Discs* tended to choose music that was related to memories from the lifetime period of adolescence. The authors interpret this finding in the context of their novel framework, which posits that music-evoked autobiographical memories influence musical preferences. They suggest that individuals tend to prefer music that is associated with autobiographical memories, and that these memories show a reminiscence bump (Lamont & Loveday, 2020).

Jakubowski et al. (2020) took a lifespan approach by studying musical reminiscence bumps in participants ranging in age from 18 to 82 years old. Participants were shown the titles and artists of 111 hit songs from the years 1950–2015 and asked to rate their autobiographical salience, familiarity, and liking of each song. Their results replicated prior research, indicating that participants showed a reminiscence bump for songs that were popular during adolescence, and this was consistent for both ratings of autobiographical salience and familiarity. However, they found a distinction in the liking ratings, which showed "cascading" reminiscence bumps (Krumhansl & Zupnick, 2013), such that younger adults also liked music that was popular during their parents' generation. Interestingly, the authors also compared the distribution of the reminiscence bump for music-evoked memories to that from word-cued and self-reported important memories. This analysis identified that music-evoked memories show an age distribution that is similar to a more traditional method of memory cueing via word cues (Jakubowski et al., 2020).

The work of both Jakubowski et al. (2020) and Lamont and Loveday (2020) on reminiscence bumps suggests that the periods of youth and adolescence are particularly important for the formation of musical preferences and associating music with autobiographical memories. In another paper in this collection, Peck & Grealey (2020) focus specifically on the period of youth and the importance of musical experiences during this time. In this qualitative study, participants were asked to describe musical experiences from their youth that contributed to their identity and sense of self. The authors identified several emerging themes, including themes relating to the self, social relationships, and emotional responses. These themes nicely converge with those put forth by Lamont and Loveday (2020), who identified similar themes underlying both musical preferences and memories (including identity, relations and attachment, and emotions). The data from Peck & Grealey (2020) suggest that meaningful musical experiences during youth can contribute to one's identity and sense of self, and perhaps suggest a particular mechanism underlying the musical reminiscence bump.

Music-evoked Autobiographical Memories in Special Populations

One of the larger bodies of work on music and autobiographical memories relates to the use of music as a memory cue in persons with dementias or other neurological disorders. A number of studies have shown that listening to background music significantly improves autobiographical memory retrieval in persons with Alzheimer's disease (El Haj et al., 2012, 2013, 2017; Foster & Valentine, 2001; Irish et al., 2006). More recent work has suggested that music-evoked memories tend to be relatively preserved in Alzheimer's disease (AD), such that persons with AD report similar frequency of music-evoked autobiographical memories (MEAMs) as healthy comparison participants (Baird et al., 2018; Cuddy et al., 2017). In contrast to the work in persons with AD, recent evidence suggests that music may be a less effective memory cue in persons with frontal lobe damage, either due to focal lesions (Belfi et al., 2018) or neurodegenerative disorders such as frontotemporal dementia (Baird et al., 2020a). In sum, this work suggests that music may be a particularly effective memory cue for individuals with certain types of neurological damage, but not others.

In this special collection, Baird et al. (2020b) investigated the stability over time of music- and picture-evoked autobiographical memory in persons with AD and behavioural variant frontotemporal dementia (bvFTD), as compared to healthy comparison participants. Participants reported autobiographical memories in response to famous songs and famous event photographs at two time

periods, six months apart. The authors found more stability in music- and photo-evoked memories in the AD and healthy comparison groups, while the bvFTD group showed significantly lower levels of stability. Perhaps counterintuitively, they found that the bvFTD group displayed an increase in the percentage of stimuli evoking MEAMs at the second timepoint, while the AD and comparison groups showed no change over time. In a single case study of a participant with bvFTD who was administered the task at a third timepoint, they found yet another increase in the frequency of MEAMs. This suggests that repeated exposure to musical stimuli might be necessary to evoke MEAMs in individuals with bvFTD (Baird et al., 2020b).

While there is a relatively large and growing body of work on music and autobiographical memory in persons with neurological disorders, there is less work on individuals with psychiatric or psychological disorders. The contribution from Sakka and Saarikallio (2020) in this special collection is one of the first to investigate music-evoked autobiographical memories in individuals experiencing depression. Here, the researchers compared MEAMs between a group of individuals with depression and healthy comparison participants. In this task, participants listened to personalised music cues (both experimenter- and self-selected) and described and rated the memories evoked by the cues. Individuals with depression more frequently recalled negative memories than non-depressed individuals and experienced more negative affect. These findings have important implications for the use of music in individuals with depression. While negative memories are not necessarily *bad* per se, it is important to treat this issue with careful consideration when using music as a therapeutic tool for this population (Sakka & Saarikallio, 2020).

Identity, Relationships, and Emotions

One of the major themes in nearly every paper in this collection revolved around the concepts of identity, interpersonal relationships, and emotional responses. For example, Lamont and Loveday (2020) identified four common themes underlying both music and autobiographical memories as well as musical preferences: these themes include personal identity and sense of self, interpersonal relationships and attachment, emotional responses, and repeated exposure. Peck & Grealey (2020) highlighted the importance of identity in the formation of autobiographically salient musical experiences during youth. And as was shown in Sakka and Saarikallio (2020), music-evoked autobiographical memories tend to be associated with emotions, though the valence of these emotions may differ for depressed and non-depressed individuals.

Krause et al. (2020) sought to investigate the characteristics of individuals' favourite musical experiences, and specifically looked at themes relating to the self, relationships, and emotions. In their survey, the researchers asked participants to describe their favourite musical experience and its impact on them. Most favourite experiences involved attending live music events and/or performing music, and nearly every favourite experience involved active participation. Importantly, a social/community aspect was a highly prevalent theme across these favourite experiences, seconded to feelings of emotions and physical sensations. Therefore, the socioemotional aspects of attending and performing live music appear to be critical in shaping these meaningful, and memorable, musical experiences (Krause et al., 2020).

Musical Qualities

A final theme that is relatively under-investigated to date is how qualities of the music itself impact the retrieval of associated memories. Many previous studies have focused on using chart-topping pop music to evoke autobiographical memories (e.g., Baird et al., 2018; Belfi et al., 2016; Janata et al., 2007; Krumhansl & Zupnick, 2013), which allows the researchers to isolate the time period during which participants were most likely exposed to the music, but may limit our understanding of whether the results of these studies generalise to other musical styles. Some studies have also used participant-selected music, mostly for investigating MEAMs in people with AD (e.g., El Haj et al., 2012, 2013). Recent work has revealed relatively similar results as those identified using pop music when examining everyday MEAMs elicited via a wider range of musical styles (Jakubowski et al., 2021; Jakubowski & Ghosh, 2021). In this special collection, Sakka and Saarikallio (2020) expanded on this approach by utilising both experimenter- and participant-selected music as stimuli, while Krause et al. (2020) reported favourite musical experiences elicited by a wide range of genres (see Table 4 of their article). These works point to the importance of broadening the range of musical styles when selecting cues for evoking autobiographical memories.

Wanke and Santarcangelo (2021) present a theoretical framework for understanding the relationship between memory and contemporary art music (CAM). CAM is a highly underexplored type of music in memory studies, and in particular, the authors have focused here on genres that are particularly difficult to memorise, such as those with virtually no repetition, those built entirely on repetition of a particular pattern, or those that do not use traditional or discrete pitch or rhythmic categories (examples include free improvisation, aleatoric music, and minimalism). Instead, such music is often built on sound configurations that can lead to memory associations (both autobiographical and otherwise, such as abstract visual imagery), although the authors suggest that since such music is difficult to segment and memorise verbatim, it may elicit different memory associations on different listenings more than other musical styles. The authors also posit that CAM causes listeners to adopt a different perceptual stance than traditional Western genres, in which the focus is

more vertical, rather than on the linear progression of subsequent elements, which may also lead to a more directly embodied engagement with the music. The concepts and formulations proposed within this article lead to many interesting questions about how CAM is mentally represented, remembered, and associated with other memories (Wanke & Santarcangelo, 2021).

The qualitative coding carried out by Lamont and Loveday (2020) and Peck & Grealey (2020) also both revealed that musical qualities are a key contributor toward a piece of music's autobiographical relevance. For instance, Lamont and Loveday (2020) reported instances of participants relating to the lyrics of a song: that is, some songs may elicit memories because the lyrics describe similar events or sentiments to a listener's own past experiences. The extent to which autobiographical memories are triggered by lyrics versus other features of the music, and whether memories triggered via these different means differ in any qualitative way, is still a highly under-researched topic. Peck & Grealey (2020) also highlighted the influence of song lyrics on identity formation, and provided an example in which a participant found a piece of music meaningful in part because its musical features ("It was energetic, rebellious, melodic, fast-paced…", p. 4) reflected the listener's own personality.

Conclusions

To conclude, the body of work in this special collection has extended the literature on music and autobiographical memory in several substantial ways. These papers have broadened our knowledge on reminiscence bumps for music-evoked autobiographical memories, highlighted the role of identity in the relationship between music and memory, informed how the relationships between music and memory may differ in certain populations, and provided insights on how different qualities of the music itself many influence autobiographical associations. These papers also represent a variety of methodological approaches and advances in the field – several use qualitative methods, the results of which provide informative data for outlining theoretical and thematic frameworks. The themes identified in these studies, while revealing on their own, could also be used to inform future quantitative experiments by highlighting the important aspects of this experience (i.e., the evocation of autobiographical memories via music) that should be measured or manipulated in an experimental context.

The papers in this collection also span a wide range of participant ages and other demographic differences, including two studies focusing on special populations. Interestingly, both of these studies highlight populations for which music may not necessarily be the most useful memory cue: Baird et al. (2020b) identified that for individuals with bvFTD, music may require multiple exposures in order to evoke memories, and Sakka and Saarikallio (2020) identified that music can evoke negative memories in persons with depression. These two studies highlight the importance of reminding researchers, as well as the general public, that music is not always a benign or all-powerful cue for memory retrieval (see also Halpern et al., 2018; Silverman et al., 2020). Furthermore, the work of Wanke and Santarcangelo (2021) reminds us that the vast majority of studies in this area to date have focused on Western tonal music (primarily pop music), whereas different approaches may be needed to understand the relationship between memory and other musical genres, such as contemporary art music.

In sum, the papers in this collection provide a diverse range of perspectives on music and autobiographical memory, including a variety of participant populations and methodological approaches. The authors of these works highlight the utility of music as a memory cue while also providing caveats about its use, particularly with certain groups of individuals or genres of music. We hope that the papers in this collection spark interesting questions and further dialogue on this important and growing research topic.

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References

Baird, A., Brancatisano, O., Gelding, R., & Forde, W. (2018). Characterization of music and photograph evoked autobiographical memories in people with Alzheimer's disease. *Journal of Alzheimer's Disease*, *66*, 693–706. https://doi.org/10.3233/JAD-180627

Baird, A., Brancatisano, O., Gelding, R., & Thompson, W. F. (2020a). Music evoked autobiographical memories in people with behavioural variant frontotemporal dementia. *Memory*, *28*(3), 323–336. https://doi.org/10.1080/09658211.2020.1713379

Baird, A., Gelding, R., Brancatisano, O., & Thompson, W. F. (2020b). A Preliminary Exploration of the Stability of Music- and Photo-Evoked Autobiographical Memories in People with Alzheimer's and Behavioral Variant Frontotemporal Dementia. *Music & Science*, *3*, 1–15. https://doi.org/10.1177/2059204320957273

Baumgartner, H. (1992). Remembrance of things past: Music, autobiographical memory, and emotion. *Advances in Consumer Research*, *19*(1), 613–620.

Belfi, A. M., Bai, E., & Stroud, A. (2020). Comparing methods for analyzing music-evoked autobiographical memories. *Music*

Perception, *37*(5), 392–402. https://doi.org/10.1525/mp.2020.37.5.392

Belfi, A. M., Karlan, B., & Tranel, D. (2016). Music evokes vivid autobiographical memories. *Memory*, *24*(7), 979–989. https://doi.org/10.1080/09658211.2015.1061012

Belfi, A. M., Karlan, B., & Tranel, D. (2018). Damage to the medial prefrontal cortex impairs music-evoked autobiographical memories. *Psychomusicology: Music, Mind, and Brain*, *28*(4), 201–208. https://doi.org/10.1037/pmu0000222

Cuddy, L. L., Sikka, R., Silveira, K., Bai, S., & Vanstone, A. (2017). Music-evoked autobiographical memories (MEAMs) in Alzheimer disease: Evidence for a positivity effect. *Cogent Psychology*, *4*(1), 1–20. https://doi.org/10.1080/23311908.2016.1277578

El Haj, M., Clément, S., Fasotti, L., & Allain, P. (2013). Effects of music on autobiographical verbal narration in Alzheimer's disease. *Journal of Neurolinguistics*, *26*, 691–700. https://doi.org/10.1016/j.jneuroling.2013.06.001

El Haj, M., Gandolphe, M. C., Gallouj, K., Kapogiannis, D., & Antoine, P. (2017). From nose to memory: The involuntary nature of odor-evoked autobiographical memories in Alzheimer's disease. *Chemical Senses*, *43*(1), 27–34. https://doi.org/10.1093/chemse/bjx064

El Haj, M., Postal, V., & Allain, P. (2012). Music enhances autobiographical memory in mild Alzheimer's disease. *Educational Gerontology*, *38*(1), 30–41. https://doi.org/10.1080/03601277.2010.515897

Ford, J. H., Addis, D. R., & Giovanello, K. S. (2011). Differential neural activity during search of specific and general autobiographical memories elicited by musical cues. *Neuropsychologia*, *49*, 2514–2526. https://doi.org/10.1016/j.neuropsychologia.2011.04.032

Foster, N. A., & Valentine, E. R. (2001). The effect of auditory stimulation on autobiographical recall in dementia. *Experimental Aging Research*, *27*(3), 215–228. https://doi.org/10.1080/036107301300208664

Halpern, A. R., Talarico, J. M., Gouda, N., & Williamson, V. J. (2018). Are musical autobiographical memories special? it ain't necessarily so. *Music Perception*, *35*(5), 561–572. https://doi.org/10.1525/mp.2018.35.5.561

Irish, M., Cunningham, C. J., Walsh, J. B., Coakley, D., Lawlor, B. A., Robertson, I. H., & Coen, R. F. (2006). Investigating the enhancing effect of music on autobiographical memory in mild Alzheimer's disease. *Dementia and Geriatric Cognitive Disorders*, *22*(1), 108–120. https://doi.org/10.1159/000093487

Jakubowski, K., Belfi, A. M., & Eerola, T. (2021). Phenomenological differences in music- and television-evoked autobiographical memories. *Music Perception*, *38*(5), 435–455. https://doi.org/10.1525/mp.2021.38.5.435

Jakubowski, K., Eerola, T., Tillmann, B., Perrin, F., & Heine, L. (2020). A cross-sectional study of reminiscence bumps for music-related memories in adulthood. *Music & Science*, *3*, 1–13. https://doi.org/10.1177/2059204320965058

Jakubowski, K., & Ghosh, A. (2021). Music-evoked autobiographical memories in everyday life. *Psychology of Music*, *49*(3), 649–666. https://doi.org/10.1177/0305735619888803

Janata, P. (2009). The neural architecture of music-evoked autobiographical memories. *Cerebral Cortex*, *19*(11), 2579–2594. https://doi.org/10.1093/cercor/bhp008

Janata, P., Tomic, S. T., & Rakowski, S. K. (2007). Characterisation of music-evoked autobiographical memories. *Memory*, *15*(8), 845–860. https://doi.org/10.1080/09658210701734593

Janssen, S. M. J., Chessa, A. G., & Murre, J. M. J. (2007). Temporal distribution of favourite books, movies, and records: differential encoding and re-sampling. *Memory*, *15*(7), 755–767. https://doi.org/10.1080/09658210701539646

Kopiez, R., Weigang, J., Platz, F., & Düvel, N. (2021). Farewell to Holbrook & Schindler's (1989) "Song-Specific Age"? – Little Evidence for Lifelong Influence of Age-Specific Musical Preferences. *Music & Science*, *4*, 1–20. https://doi.org/10.1177/20592043211001794

Krause, A. E., Maurer, S., & Davidson, J. W. (2020). Characteristics of Self-reported Favorite Musical Experiences. *Music & Science*, *3*, 1–17. https://doi.org/10.1177/2059204320941320

Krumhansl, C. L. (2017). Listening Niches across a Century of Popular Music. *Frontiers in Psychology*, *8*(431), 1–18. https://doi.org/10.3389/fpsyg.2017.00431

Krumhansl, C. L., & Zupnick, J. A. (2013). Cascading Reminiscence Bumps in Popular Music. *Psychological Science*, *24*(10), 2057–2068. https://doi.org/10.1177/0956797613486486

Lamont, A., & Loveday, C. (2020). A New Framework for Understanding Memories and Preference for Music. *Music & Science*, *3*, 1–14. https://doi.org/10.1177/2059204320948315

Peck, L., & Grealey, P. (2020). Autobiographical significance of meaningful musical experiences: Reflections on youth and identity. *Music & Science*, *3*, 1–12. https://doi.org/10.1177/2059204320974221

Rubin, D. C., & Schulkind, M. D. (1997). Distribution of important and word-cued autobiographical memories in 20-, 35-, and 70-year-old adults. *Psychology and Aging*, *12*(3), 524–535. https://doi.org/10.1037//0882-7974.12.3.524

Sakka, L. S., & Saarikallio, S. (2020). Spontaneous Music-Evoked Autobiographical Memories in Individuals Experiencing Depression. *Music & Science*, *3*, 1–15. https://doi.org/10.1177/2059204320960575

Schulkind, M. D., Hennis, L. K., & Rubin, D. C. (1999). Music, emotion, and autobiographical memory: They're playing your song. *Memory & Cognition*, *27*(6), 948–955. https://doi.org/10.3758/bf03201225

Silverman, M. J., Gooding, L. F., & Yinger, O. (2020). It's…complicated: A theoretical model of music-induced harm. *Journal of Music Therapy*, *57*(3), 251–281. https://doi.org/10.1093/jmt/thaa008

Wanke, R., & Santarcangelo, V. (2021). Memory as the Aspatial Domain for the Perception of Certain Genres of Contemporary Art Music. *Music & Science*, *4*, 1–18. https://doi.org/10.1177/2059204321997658

Zator, K., & Katz, A. N. (2017). The language used in describing autobiographical memories prompted by life period visually presented verbal cues, event-specific visually presented verbal cues and short musical clips of popular music. *Memory*, *25*(6), 831–844. https://doi.org/10.1080/09658211.2016.1224353