Music and autobiographical memory - Research Article

A New Framework for Understanding Memories and Preference for Music

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Abstract

What can musical memories tell us about preference, and what can musical preferences tell us about memory? In this article we contrast the two perspectives using a dialogic conversation, drawing on insights brought into relief at the recent Music and Lifetime Memories conference. We use dialogue to present two different bodies of relevant background literature and theory and consider their overlaps, interactions, and contradictions in depth. We then compare our two different approaches to the same dataset – the Desert Island Discs archive – which provide complementary perspectives and insights. We interpret each other's analyses from our own perspectives, and finally conclude with reflections on future directions for the field.

Music is a fundamental, highly prevalent, and arguably unique human activity, which can evoke a wide palette of rich emotions (Juslin & Laukka, 2004). What can music tell us about our lives, our memories, and our preferences? This article stems from fruitful discussions begun at the Music and Lifetime Memories conference (Durham, UK, November 2019) around the separate but related concepts of musical memory and musical preference, and in it we provide our fundamental theory and evidence from these two fields and bring them into focus with insights from each other. Our discussions began from points of contact: looking at different background literatures, similar concepts appeared, and looking at data from our two respective positions, we were struck by the overlaps in themes. However, more in-depth discussion uncovered more murky waters, with inconsistent use of terminology and a host of subtle differences in research methods and framing. We address these similarities and differences by critically focusing first on our background literatures and second on a shared dataset that we had independently approached from these two perspectives. Our aim is to clear the ground conceptually by means of an extended literature review, to highlight similarities and differences that arise from approaching the same data from different perspectives, and to provide valuable suggestions for future directions in the field of autobiographical memory

and music preferences. In what follows we identify specifically where we have each individually contributed major sections of text: in the absence of any identification, the article has been written co-operatively and collaboratively.

We begin with some concepts and evidence on the topic that most closely related to the theme of the conference: music and autobiographical memory.

Musical Memories

CL: Looking at the literature, while several mechanisms have been put forward to explain why listening to music can have such a powerful effect on mood, it is widely accepted that implicit and explicit memory play an important part. There is good evidence that, once formed, memories for music are incredibly strong (Krumhansl, 2017), can

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withstand neurological damage (Jacobsen et al., 2015), and have the power to provide highly effective and robust cues for autobiographical remembering (Belfi, Karlan, & Tranel, 2016; Jakubowski & Ghosh, 2019).

The distinction between memories *for* music and memories *associated* with music is an important one for this discussion. Being able to recall or recognise a piece of music should not be confused with the capacity of that piece of music to elicit the memory of a personal experience (Janata et al., 2007; Kristen-Antonow, 2019). We may be able to confidently recognise and name a tune without bringing to mind any particular past moment. Likewise, it is not uncommon to hear a song that evokes a strong autobiographical memory without being able to identify the song itself.

One of the first to formally investigate 'music-evoked autobiographical memories' (MEAMs) was Baumgartner (1992), who simply asked participants to select a song that reminded them of a specific moment in their life. He found that all but three of his 73 participants were able to do this, and most participants linked their music to overwhelmingly positive memories of past or current romantic relationships or friendships. In a similar vein, El Haj et al. (2012) explored the quality of MEAMs triggered by specific self-nominated music. They invited healthy older adults and those with dementia to select important or meaningful pieces of music, and then assessed their autobiographical remembering when the music was played back to them. Compared with silence, music-evoked autobiographical memories were more specific and emotional, and were retrieved more quickly. A recent diary study by Jakubowski and Ghosh (2019) showed that MEAMs occur spontaneously in day-to-day life, tend to be vivid and involuntary, and often reflect social themes.

A contrasting approach is to look for autobiographical recollections in response to a consistent set of experimenter-selected stimuli. For example, Janata et al. (2007) played 30 excerpts of popular songs to each participant, then asked them to judge the extent to which the song felt autobiographical as well as reporting their affective responses. They found that MEAMs were prompted by around 30% of songs and that they evoked a wide range of emotions including nostalgia. Other similar studies have found that MEAMs may be more vivid than memories evoked by other stimuli, such as pictures of faces (Belfi et al., 2016) and that these memories remain intact even in those with dementia-related memory impairments (Foster & Valentine, 2001).

Regardless of whether participants nominate their own music or are played excerpts from well-known songs, there is clear evidence that this activity prompts recollection of autobiographical memories, which Williams and Conway (2009) define as long-term records of personal experiences constructed from personal knowledge and episodic recollection. Autobiographical memories may relate to a specific moment or event, or they may reflect something

more general, but together they play a profound part in our sense of self, the way we view our future, and the relationships we have with others (Conway, 2009). Understanding how and why music offers such a powerful way to promote autobiographical remembering therefore has important practical and theoretical implications.

One intriguing feature of autobiographical memory is that some periods of our life are easier to recall than others, notably the very recent past (a typical 'recency effect') and also our adolescent and early adult years (see Munawar et al., 2018, for a review). The latter phenomenon is termed the 'reminiscence bump' and has been clearly shown for music (e.g., Schulkind et al., 1999; Zimprich & Wolf, 2016). While the reminiscence bump was originally used to describe a better *memory* for experiences that occurred broadly between the ages of 10 and 30, the concept has been extended to describe an increase in *preferences* for things associated with this time, and this is where our two areas of interest begin to overlap. This has been well established for music (e.g., Holbrook & Schindler, 1989) but also occurs for films, books, footballers, and public events (Janssen et al., 2007, 2008).

Different and potentially complementary explanations have been offered for the reminiscence bump. One suggestion is that the memory system is at its optimum during this period, from both a biological and a cognitive perspective (Giedd, 2004; Howe, 2013), while others have argued that memories are enhanced due to an increased likelihood of novel and transitional events during adolescence and early adulthood (Rubin et al., 1998). An alternative theory is based on the premise that this period is critical for the development of identity (Erikson, 1950, 1982), and typically contains many self-defining memories. These are memories of key, often life-changing moments, characterised by high emotionality and frequent rehearsal. The suggestion is that memories from this time play a crucial role in supporting identity and are frequently revisited, therefore becoming more robust (e.g., Rathbone et al., 2008, 2017).

One of the difficulties with evaluating the strength of these different theories particularly in relation to music is that experimenters use a range of different methodologies that tend to confound memory and preference. The most straightforward approach uses a simple memory task, typically playing clips of popular music from different time points to participants and asking for recognition or familiarity ratings (e.g., Krumhansl, 2017; Schulkind et al., 1999; Zimprich & Wolf, 2016). This technique consistently shows better performance for songs released when participants were in their teens, offering support for a traditional reminiscence bump.

However, these studies also typically stray into non-mnemonic domains, inviting ratings of preference, liking, and emotionality, as well as asking participants to comment on whether the song triggers recollection of personal experiences. A frequently cited study by Holbrook and

Schindler (1989) did not measure memory at all, but instead asked participants to rate their preferences for songs. In line with the memory literature, they found a peak preference at around 23 years, although a more recent replication (Hemming, 2013) found this to be closer to 17 years. The intriguing discovery for our conversation is that regardless of whether participants are asked whether they can name a song, whether it triggers an autobiographical memory or whether they like it, there seems to be a consistent and robust peak for songs heard during this critical reminiscence bump period.

This effect also persists in paradigms that allow participants to choose their own music. In a recent study, Rathbone et al. (2017) invited participants to select five personally significant song titles from a predetermined pool of music that spanned the decades, and then to provide the date they most vividly remembered listening to the song. They found a clear peak between the ages of 15 and 19 for both age at release and age at which the song had been personally relevant. A follow-up study showed that personally significant songs were more likely to be associated with a specific personal recollection (autobiographical remembering) compared with control songs. However, they also found a reminiscence bump for recognition of song titles that were known but triggered no recollective experience.

In the memory literature, studies investigating the lifespan retrieval curve tend to be carried out with participants over the age of 35 to avoid any confound between the recency effect and the reminiscence bump. However, in music psychology some studies have explored this phenomenon in younger participants. Schubert (2016) asked participants aged 20–22 to recall a specific music-related autobiographical memory and found a peak occurrence at age 13–14, suggesting that it is still possible to see this effect even in younger groups. Many of these memories were general (performers, bands, composers, or styles) rather than specific (tracks, songs, albums) features, which indicates that the specificity of the evoked musical memories using this technique can vary. Similarly, Krumhansl and Zupnick (2013) found that with young adult listeners, most recent songs were best recognised and liked, but 'cascading' reminiscence bumps were seen for music from 1980-84 and 1960-69, which they interpreted as resulting from influences on participants from music falling into their parents' and grandparents' own reminiscence bump years. This suggests that musical memory and preference might also be shaped by intergenerational influences.

In sum, these studies suggest that there is a reminiscence bump-style peak for the recognition, personal significance, preference, and emotionality of songs, and for associated autobiographical memories. The precise age of the peak varies slightly between studies but this is probably largely due to variations in the age of participants and the specific task instructions. For example, Krumhansl (2017) found liking of music peaked at around 20, while reported memories correlated most strongly with music that was popular when participants were aged 13–29.

The overlap between memory for music, memory associated with music, significance, emotionality, and preference is rarely discussed and often confounded. However, this is important as it potentially sheds light on the underlying mechanisms. We have seen from the memory literature that people are better at making memory judgements for experiences in the reminiscence bump, and similarly, they are more likely to choose experiences from this period when asked to recall autobiographical memories from anywhere in their life. But does that same pattern emerge when people are asked to (a) spontaneously choose songs that are important to them, and (b) make preference judgements for songs that are provided to them? Do we remember songs better because we like them? When asked to choose our favourite songs, are we more likely to spontaneously select songs from our reminiscence bump simply because they come to mind more easily? Or is there an underlying mechanism that promotes an increase in both preference and remembering for our adolescent years? What light can the field of music preferences shed on these topics?

Music Preferences

AL: In contrast to memory research in music, research into music preferences is still developing, although models and explanations are beginning to emerge. First, conceptually, it is important to distinguish between *preference*, defined as a person's liking for one piece of music as compared with another at a given point in time, and the broader concept of *taste*, which reflects the overall patterning of an individual's preferences over longer time periods (Hargreaves et al., 2016). However, the concepts are necessarily intertwined as short-term experiences with specific pieces inform longer-term judgements of taste and vice versa. In contrast to the research on autobiographical memories and music considered earlier, most of the literature on preference adopts a more general 'taste' definition, looking at how genres and styles might wax and wane in listeners' lives over long time spans, but a smaller body of work has looked at preferences and strong memories for specific pieces.

General explanations for music preference have been heavily influenced by Berlyne's (1971) psychobiological theory, which proposed that liking increases and then decreases with familiarity, or complexity, in an inverted U-shape: the more familiar we become with a piece of music the more we like it, up to a point. Much experimental evidence supports the theoretical claim that exposure broadly shapes preference (e.g., Chmiel & Schubert, 2019; Szpunar et al., 2004; Zajonc, 2001), particularly in the short term and under controlled conditions. Qualitative data also suggests that individual listeners regulate their exposure to specific music over longer time periods (Lamont & Webb, 2010) and across the lifespan (Greasley

et al., 2013), putting favourite albums or artists away when they become over-familiar and (sometimes) returning to them at later points in life.

A large body of research has attempted to explain the styles of music that are preferred by listeners over time (really looking at 'taste'). Rentfrow and colleagues attempted to identify underlying style dimensions of preference (Greenberg et al., 2016; Rentfrow & Gosling, 2006; Rentfrow et al., 2011, 2012), and their MUSIC model of five styles (Mellow, Unpretentious, Sophisticated, Intense, and Contemporary) has been used in many studies attempting to link musical preferences to individual difference variables such as age or personality, with a variety of findings summarised briefly in the following.

Looking at age, where most research has been conducted, changes are found in the styles of music preferred. Bonneville-Roussy et al. (2013) found preference for the Unpretentious and Sophisticated dimensions increased with age, the Mellow dimension remained stable with age, and the Intense and Contemporary dimensions were more preferred in adolescence but became less popular between the ages of 12 and 65. Developmental research has suggested, following Hargreaves' (1982) concepts of open- and closed-earedness, that younger children have a broader concept of genres in music, including girls' and boys' music, music suited to different ages (e.g., 'granny' music), and mood-oriented happy or sad music as well as more traditional genres such as rock, classical, and oldies (Bunte, 2014). Exploration is somewhat abandoned in adolescence, when classical music tends to be rejected (Kopiez & Lehmann, 2008), and closed-earedness defines this phase where music forms the basis of allegiances and friendships (Bakagiannis & Tarrant 2006; Selfhout et al., 2009). In early adulthood, more open-eared approaches mean a wider range of styles are tolerated, while later in adulthood preferences again become more entrenched (with many studies showing strong preference for more traditional types of music and a drop off for less conformist, e.g., Bonneville-Roussy & Rust, 2018).

Links have sometimes been found with elements of personality and preferences for particular styles, particularly Extraversion and Openness to Experience with preferences for rhythmic and energetic music (Delsing et al., 2008; Dunn et al., 2012; Vella & Mills, 2017). Other psychological variables have also been linked to music preference, such as liking for reflective, complex, intense or rebellious music being positively related to empathy (Clark & Giacomantonio, 2015) and, in the Music Preferences in Adulthood Model, links between music preferences and interpersonal dispositions such as conformity, self-monitoring, and need for uniqueness (Bonneville-Roussy & Rust, 2018). There are also indications that some people engage with music in a more intense manner, listening more and being better able to access verbal descriptions of how music works for them (Greasley & Lamont, 2011) and finding music more influential for

mood enhancement, coping with distress, identity construction, and social identity formation (ter Bogt et al., 2011).

What functions might music preference fulfil? First, music serves as a badge of identity in adolescence (Lamont & Hargreaves, 2019; North & Hargreaves, 1999) and beyond (Schäfer & Sedlmeier, 2009). Self-identity is also fundamentally tied up with social connections and comparisons. Music preference is one of the most frequently talked-about topics when strangers get to know one another (Rentfrow & Gosling, 2006), and bonding through music is important in friendship formation (Boer et al., 2011). As well as real connections to others through music, imagined connections also exist between listener and artist (e.g., Maton, 2010; see Lamont, 2019), which may explain how music can provide a substitute for social interaction (Schäfer et al., 2020). Early adulthood reflects a period of valuing social connection through music (Groarke & Hogan, 2016), and older adults use music to continue to define and express self, connect to others, and bring back memories of youth (Hays & Minichiello, 2005).

In addition to these social functions, listening to our own preferred music can help in a range of applied settings: it promotes relaxation, decreases anxiety and pain perception, encourages exercise and modulates food intake in a variety of populations (Guétin et al., 2009; Hallett & Lamont, 2015; Mitchell & MacDonald, 2012). Most applied work highlights the importance of tailoring music interventions to the listener (e.g., Garrido et al., 2017; Ragneskog et al., 2001). Self-chosen music promotes particular positive emotions such as liking and contentment (Krause et al., 2015) and reduces negative affect (Groarke & Hogan, 2019). Listeners adapt their music choices to fit the contexts they find themselves in (Greb et al., 2019; Randall & Rickard, 2017), often in relation to mood regulation (Saarikallio, 2010; Saarikallio et al., 2020).

All this research implies that lasting preferences seem likely to be formed at the critical adolescent period, coinciding with a phase of closed-earedness, although they are subject to further development over the lifespan. Importantly, finer-grained analyses of preference taking account of the specifics of the music, listener, and situation are more likely to be useful when thinking about practical applications. A particular tradition of research that allows this is the detailed narrative approach of Gabrielsson (2011). He gathered over a thousand accounts of people's strongest and most intense experiences of music, including a relatively high proportion of listening memories. From these, he generated seven categories of strong experiences with music (Gabrielsson & Lindström Wik, 2003): general characteristics, physical reactions (goosebumps, shivers down the spine), perception, cognition, emotion/feeling, existential and transcendental elements, and personal and social elements. Many of the accounts embodied several characteristics within them, and they mostly recalled self-chosen focused listening situations in considerable detail.

To date this research has been mostly analysed in relation to the emotional impact of music, but there are further obvious parallels with some of the research into musical memories and preferences, in particular in relation to the autobiographical memory method of analysing important participant-generated musical memories.

Dialogue

Bringing these two literatures together, four common themes emerge. First, we know that musical memories are strengthened through repeated exposure, so it is interesting to note that up to a point the same seems to be true for preference. If knowing something better makes it more palatable, then this apparently all-encompassing reminiscence bump for music may simply reflect increased listening during this period. However, while this association is interesting and may account for some effects, it is unlikely to be a complete account. Listening times are very high in early childhood compared with the rest of the lifespan (Lamont, 2008). A frequently cited study for the importance of music in adolescence (North et al., 2000) actually showed that while adolescents prioritise music listening over reading, TV, computer games, and homework, they would prefer to do a broad range of outdoor activities including visiting friends, going shopping, and playing sport. Finally, although some studies show that listening times seem to decline from adolescence through adulthood (Bonneville-Roussy et al., 2013), others find less marked results (Groarke & Hogan, 2016). Nonetheless, it is clear that music experienced in reminiscence bump years is returned to over and again across the lifespan and is more likely to be re-experienced later on (Janssen et al., 2007).

A second important theme that features strongly in both these literatures is identity and sense of self. One convincing explanation of the reminiscence bump is that people revisit and rehearse memories that have occurred during this time because they support their ongoing identity and sense of self. But we have also seen in the preference research that music is a powerful way of defining identity and may become intrinsic to ourselves. A similar overlap is seen with the third theme of relationships and attachment: both memories and musical preferences are shaped by social connections, and in turn facilitated by them. Kristen-Antonow (2019) has offered some recent support for this by illustrating that the frequency of MEAMs is predicted by the capacity to recognise the emotional states and motivations of others – a capacity that matures during adolescence (Blakemore, 2008). So both identity and relationships seem to be intrinsically tied up with both our musical choices and our autobiographical memories.

Emotion is the final thread that clearly connects memories and preference. Adolescence has been described as a time of "storm and stress" (Casey et al., 2010; Hall, 1904) so, given that music is an effective way to regulate strong feelings, it is quite likely that listening is increased during moments of high emotion, both positive and negative. This may therefore explain why music becomes so easily and deeply entwined with our most important autobiographical memories, since we are primed to remember highly emotional events better (McGaugh, 2018). In this case, it would follow that both feelings and preference for a piece of music may be shaped by their association with emotive experiences.

How then do we evaluate these explanations for the interplay between memory and preference, especially given the lack of differentiation between these concepts in much of the experimental work? Here, we interrogate these ideas by turning to a dataset which we have both worked on independently from our respective positions: the radio programme *Desert Island Discs* (Lamont et al., 2018, in preparation; Loveday et al., 2020). The essential premise of the programme is that the guest is invited to imagine they are being cast away to a desert island and can choose eight records to take with them; they are then interviewed about their music choices in the context of a narrative life history interview. This offers a particularly interesting case study that provides rich data on the highly personal nature of people's relationships with music, and is constrained to the single imaginary situation of being cast away to a desert island. Unlike most previous studies that have examined the musical reminiscence bump, this format requires people to make their own choices rather than to make either memory or preference judgements on those they are given by an experimenter. This element of self-selection was important for us both: from a memory perspective, because it more closely reflected the free recall paradigm used in the earliest reminiscence bump studies (Baumgartner, 1992) and from a preferences perspective, because it seems to fit the need to capture the highly personal nature of musical engagement highlighted by the work on contexts and situations and on intense experiences of music over long time spans (Gabrielsson, 2011). In the next section we outline our approaches to the data and the key findings, before considering how they relate to one another.

Approaching Data from Different Perspectives: *Desert Island Discs*

What led you to the programme in the first place?
CL: As a regular listener to the programme, I had noticed that guests' choices of music were often influenced by an association with important personal memories and it seemed that many of the features reported in formal experimental work were also emerging in this naturalistic environment. For example, like Baumgartner (1992), music often seemed to be chosen because it was linked with important relationships or time spent with other people – parties or holidays. In addition, guests frequently referenced music that was associated with events in late childhood and teenage years, in line with experimental findings of a reminiscence bump. These personal

reflections prompted us to develop a formal study to explore the reasons for music selection in this programme, especially in relation to personal memories. It also seemed a perfect opportunity to investigate the musical reminiscence bump in a naturalistic environment.

AL: My research on musical preferences had been leading towards more in-depth individual qualitative explorations of people's engagement with music in different settings. As a consequence of my own qualitative work with young adults (Lamont, 2011), I approached Desert Island Discs prompted by an earlier attempt by Knox and MacDonald (2017) to investigate the music chosen in relation to musical preferences. Looking across a 72-year period, they analysed the music choices made by participants using acoustical features and the MUSIC preference model (Rentfrow et al., 2011, 2012), exploring potential relationships between music preference and occupation and personality using Holland's (1997) model of vocational personality types. They had found some similarities to earlier work exploring personality and preference, such as a preference for sophisticated music found by Artistic occupations, and a preference for unpretentious and contemporary music by more Social occupations. However, they also uncovered slightly different relationships, such as a negative preference for Intense music from those in Artistic occupations. To complement this large-scale approach, I was interested in looking at the subtleties of individual interviewees' music choices from a preferences perspective, the reasons behind these choices and the memories associated with them that could shed light on their origins.

How did you choose the content to analyse?
CL: Piloting had suggested more recent programmes were richer in terms of interview questions and content, so we focused our sample on the last three decades, but also included ten earlier programmes from the 1970s and 1980s. Since we were looking at the reminiscence bump and with a focus on age, we used random quota sampling to select a balance of 80 male and female guests over the age of 35 from a range of professions.

AL: Our sampling is similar to CL's approach in including three different presenters and a wide variety of guests (aged 26 to 82). We used Holland's occupation categories as the basis for selection and chose one male and one female systematically from each category (apart from Conventional, which occurs rarely in the dataset). We added a separate Artistic but not Musician category after our first pass, because the Musicians overwhelmingly chose classical music, and we included 46 participants from the 1980s, 1990s, 2000s, and 2010s.

What was your approach to analysis?
CL: Our analytic approach was guided by two structured research questions: (1) do the music choices reflect a reminiscence bump? and (2) what reasons do people give for

choosing music and how often does this explanation spontaneously include a description of a personal memory? Guests are generally asked by the interviewer to explain their music choices, but always with the very simple prompt, 'tell me why you have chosen this?' We were primarily interested in how many of the choices had been explicitly driven by a personal memory, and we categorised these as *specific events* (e.g., 'the song played as I walked down the aisle'), or *generic memories* (e.g., 'a song that reminds me of being at university').

To do this, we created an a priori coding scheme based on theoretical models of autobiographical memory (see especially Conway, 2009) but was also shaped by some of our earlier pilot work (Table 1). Generic memories were classified as relating primarily to person, place, or period, although these sometimes overlapped. Specific memories were defined as a description of a specific moment or event, and we also looked particularly for things that were first-time experiences, self-defining moments, or culture-defining moments. We also considered other reasons that people gave for choosing their music and classified these into those that evoked a specific emotion (e.g., 'this song always cheers me up'), or those that were selected for their aesthetic quality (e.g., the sound of the voice, structure of the music, or content of the lyrics).

AL: In contrast to this structured deductive approach, we adopted a free idiographic qualitative analytic method similar to my earlier work (Lamont, 2011). We thus approached the data without preconceptions and worked inductively from the transcripts to explore the types of talk around the music choices, building these up using the six steps of thematic analysis (Braun & Clarke, 2006) to develop overarching themes around the music. Since the question in the original programme is fairly well defined, there was a high level of convergence amongst the team on the themes we developed initially separately and later through discussion (Lamont et al., in preparation).

What did you find?
CL: In terms of the distribution of memories, it was important to us to focus on the age that the music appeared to be most significant to the guest, rather than the date that the song was released. Following Rathbone et al. (2017), we referred to this as Age at Importance, and using information provided in the interview we were able to date just under 50% of the choices. Using this approach, we found clear evidence of a musical reminiscence bump in this naturalistic setting, with a significant peak in music choices related to memories from between the ages of 10 and 19. This demonstrated for the first time that over half of people's freely chosen music choices are explicitly linked to autobiographical memories from adolescence.

Having established that many music choices came from the reminiscence bump, the next question was to explore what kinds of memories were associated with these. We found that the most frequent reason for choosing a song

Table 1. Memory coding scheme used deductively in Loveday et al. (2020).

Code	Description
GENERAL MEMORIES	
General memory of a person	Mention of (explicitly or implicitly) a specific person and/or presence. NB: this did not include mentions of the performer, unless the guest referred to a specific personal connection with them.
General memory of a place	Mention of (explicitly or implicitly) a particular location, geographical or identifiable physical space
General memory of a period of time	Mention of a wider life period or memory outside of episodic duration, or described period made up of multiple/repeated events
SPECIFIC MEMORY	
Specific (episodic) memory	Mention/recollection of a definitive episodic event
First-time memory	Mention/recollection of a novel episodic event
Self-defining moment	Mention of memory/and or moment referring to highly significant events that provide people with a better understanding of both themselves or their identity and others in the world
Culture-defining moment	Mention of memory/and or moment that defines a particular culture or era during a given time or shared event/memory on a high level
MUSICAL QUALITY	
Musical structure	Mention of particular musical quality or elements (e.g., melody, dynamics, timbre, tone)
Music lyrics	Mention of lyrical features of music
Music vocals	Mention of vocal features of music
EMOTIONAL RESPONSE	
Emotional response	Mention of emotional detail, either within the memory provided or just as a stand-alone emotional response

was that it reminded the guest of a *person* (just over 17% of all selections), followed closely by memory of a *period of time* (16.2%), and then specific memories relating to *identity* (12.9%). Within this category, we included *first-time memories*, *culture-defining memories*, and what Conway and colleagues have described as *self-defining memories* (Conway & Pleydell-Pearce, 2000), which are typically enduring recollections of life-changing moments. A nice example of this comes from Bruce Springsteen, who said of his chosen Beatles song, 'this was another song that just changed the course of my life', and went on to explain how it had inspired him to pick up the guitar and start a band.

The least common memory-related reason for choosing a song was an association with a specific place, but this still accounted for 5% of selections. Overall, we found that people explicitly referred to personal memories for over half of their selections. From the perspective of a memory researcher, this is particularly interesting becausethe guests have been asked an entirely open question. The request is simply to explain why they would want to have this piece of music if they were in a place of isolation, and there is no requirement or expectation that their preferences will be related to past experiences. Therefore, this data appears to offer strong support for a powerful spontaneous link between music choice and autobiographical memory.

Choices that were not explicitly linked with a memory were most commonly chosen because of their ability to evoke an emotion (16.3% of all choices), which is not surprising given other evidence (Juslin & Laukka, 2004), but the aesthetic features of the music were also a significant factor. While these reasons were broadly considered to be non-mnemonic, it is quite likely that at least some of these are also driven by memory, albeit implicitly. For example, a song may make you feel like you want to get up and dance because it has a lively beat but it is also highly likely that it is associated with previous experiences of dancing.

AL: The age effects found in CL's data are clearly relevant, but our analysis did not show any influence of occupational personality – this had little to do with the music chosen at this level of analysis, or of the ways in which guests talked about their music. The only important distinction found in the musical narratives according to occupation, which did not fall neatly into Holland's (1997) categories anyway, was between guests whose lives were intertwined with music (including professional musicians but also those in music-related careers such as broadcast radio) and those who were not. In terms of other individual differences identified earlier, there were clear indications in the dataset of differences according to knowledge and expressed love of music. Beyond this, given that the details and the timeframe of their actual lives varied so much, it was remarkable that there were so many substantial commonalities in the musical elements of guests' life stories. Based on a comprehensive inductive thematic analysis following Braun and Clarke (2006), we identified three high-level themes around the discussions of the music: Identity, Love, and Support, summarised here briefly.

Identity: We found that music was chosen to reflect guests' national identity, gender identity, and sometimes more hidden psychological states. Explicit mention was made in many interviews of people putting their lives in a wider context and interpreting their own life history as influenced

by their cultural upbringing. Guests often idolised the musicians chosen, showing a sense of role models: 'Doris Day, I mean, from Debbie Harry to Doris Day, both blonde iconic, brilliant women' (investigative, female, 45). In relation to psychological aspects of identity, one participant noted:

> I wanted a separating mechanism, and punk rock was that early separating mechanism . . . Penetration released their second album, but on it, was a track called Shout Above the Noise, and this one track has been the mantra for my entire life. (investigative, male, 51)

Love: This theme hinged on connections to family, particularly children, and partners. To give a very literal example, one participant named David Bowie's 'Absolute Beginners', with the explanation: 'There's a line in it, "I absolutely love you". My husband sang this song to me when we met very early on, and he told me he absolutely loved me' (investigative, female, 45). Both men and women mentioned music connected to love equally frequently, with strong emotions shared by partners for many of the songs: 'Well, this reminds me of seeing Ruth. And it's a fantastic piece of music, it's very important to both of us' (male, realistic, 50).

In keeping with the life history narrative approach, we also found many guests recalled fond memories of music from their early childhood that connected them to their parents, or which was prompted by their parents. Intergenerational influences were also commonly mentioned, with songs that became part of the family. This connected to others' identity: 'this is dad . . . this is the song really that is my childhood' (investigative, female, 45). This kind of connection was more commonly found in families than in relationships with friends, although friendships and connections through music were frequently mentioned in relation to more specific moments such as parties: 'two of my happiest weekends in my life have been my 40th and my 50th. I had my closest mates, my close family, and there was lots of dancing and lots of music, and that what it reminds me of' (female, enterprising, 51).

Support: Connected to the Love theme, we also found music was used as consolation and a way of bringing people together in difficult situations. Much of the music fitted into rituals of love and social connections, including parties, weddings, and funerals. Love and loss were intimately tied up in many accounts, such as this from a social female (54): 'I remember as a child listening to this and being moved by this, but more recently also I've heard it sung at funerals, memorial services of young people who have died in my parish or in my area, and I can just see the faces of the mothers, the families, the pain. I can connect. I can connect with that pain.' Funerals were a way of celebrating important people's lives, and of revisiting music that connected them to happier earlier times, as one participant explained:

Rod Stewart and Sailing, it was something that the boys, when they were back from school, they would have it on full blast upstairs, and when Will's funeral came, not only did we have Onward Christian Soldiers, but we finished with Sailing, to remember him. (realistic, female, 67)

This highlights that music is not just remembered from a single point in someone's life but is typically returned to on multiple occasions: some of these are more positive, some less so, but guests' connections with music are not limited to a single time point.

Dialogue

We next consider our data analysis and the similarities and differences using our four themes from the extended literature review. Whether using an a priori quantitative coding mechanism based on theories of autobiographical memory (CL) or an open qualitative research question about musical preference (AL), two very different and independent approaches to this dataset, we find significant overlap in some of our conclusions, which helps lead to a greater insight into the mechanisms underlying both memory and preference.

First, the idea of repeated exposure being responsible for the formation of strong memories and shaping preferences arises in both our analyses. Guests are given complete freedom in terms of the songs they choose, so while they do choose contemporary songs from that era, they also choose classical music, hymns, folk tunes, songs from musicals, and sometimes even home recordings. From a memory perspective these cannot be dated in the same way as pop songs, but that did not matter because we were interested in the timing of the associated memories. Thus the coding of 'general memory of a period of time', although not particularly prevalent in the data analysed by CL, reflects this sense of connecting music to lifetime eras through repeated listening during that period (Conway & Pleydell-Pearce, 2000). It also links clearly to the way in which music is used as support across the lifetime in AL's data. CL noted that guests would sometimes follow up with additional memories. This repeated listening suggests that music can be used to reinforce those critical self-defining memories, and it would be interesting to specifically explore this in follow-up studies.

The theme of identity in both memory and preference is the clearest point of commonality. CL found a common reason for people to choose music is because it is connected to a specific memory related to identity, and AL also found that identity was at the heart of people's musical choices. Given that CL also found a peak in songs that were important during adolescence, this commonality offers new support for identity theories of the reminiscence bump. The examples given by CL resonate with Gabrielsson's strong experiences of music (2011), where participants often mentioned life-changing events with music. Gabrielsson and

Lindström Wik (2003) labelled this as 'new insights, possibilities and needs concerning music' within the 'personal and social' category in their descriptive system. This category also includes different angles on identity in terms of self-actualisation, following Maslow. The 'new insights' also include CL's 'first time' memories: the first time is inevitably followed by subsequent occasions, but the strong memory is connected to that first transformative moment.

Similarly, both of our analyses highlighted the importance of music in providing social connection, reflecting the third theme of relationships and attachments: memory for a person was the single most popular reason for choosing a piece of music, and love one of the key themes in the data. The context of the endeavour, that people are being invited to imagine themselves on a desert island with no other human contact, probably plays a significant part in this. Nevertheless, this finding is consistent with research by Krumhansl and Zupnick (2013) who uncovered some intergenerational influences in musical memory and preference, and Krumhansl's (2017) finding that music is listened to with parents and siblings throughout childhood. Some of these connections are based on real interactions, while others draw on personal but imagined connections between the performer and the listener (cf. Lamont, 2019). Interestingly, the neural substrates for an imagined relationship overlap significantly with those for a remembered one (Conway & Loveday, 2015). This finding chimes with many others, highlighting the importance of social connection through music (e.g., Groarke & Hogan, 2016; Schäfer et al., 2020).

Finally, the theme of emotion can be seen in AL's Love and Support themes; and in CL's data one of the most popular explanations was a simple description of how the music made the listener feel. Arguably, all the themes are inherently linked with emotion but the significant question in this discussion is whether emotion might be a common mechanism for both memory and preference. While the *Desert Island Discs* format provides some insight into choices, there is no opportunity to follow up. However, this approach could be used in future research to explore emotion as a driver for musical choices, and to specifically interrogate the link between emotion and memory. In our earlier research we found that while a lot of people have good conscious awareness of what the functions of music are and access to their 'back catalogue' to find good examples, there are also people who find this task quite challenging (Greasley et al., 2013). They might have an intuitive sense of how music works for them but are less able to put it into words. Saarikallio (2010) also found differences in her participants in terms of conscious awareness of mood regulation strategies. Groarke and Hogan (2016) found affect regulation to be an important function of music listening, particularly amongst younger adults. Going into more depth, Saarikallio (2010) identified eight different emotion regulation strategies that music can serve: happy mood maintenance, revival and relaxation, strong sensation,

diversion, discharge, mental work, solace, and 'psyching up'. So, while some songs provoke an emotional response because they are associated explicitly or implicitly with past experience, this link may have emerged because the song was inherently emotionally powerful and was therefore played during a challenging or exciting time. There could also be some overlap here between emotional memories and redemption memories where challenging moments are recalled, which would benefit from some more qualitative enquiry.

Relating to the lyrics of a song is an interesting angle that neither of us had predicted and which does not neatly fit into any of our themes, as it has much more to do with explicit semantic meaning than personal, emotional or musical qualities. CL had simply coded lyrics for any instance where the words were mentioned, but on reflection felt they often reflected a deeply held belief (i.e., related to self) or were about love/attachment/loss. Lyrics might be a good way for those less musically engaged people to connect and explain how music works for them and why they like certain tracks, and a more sophisticated coding of how people relate to lyrics and what that might mean for both memory and preference would be helpful.

Critically evaluating the programme itself, as noted earlier the question of what underpins the choices of music is left deliberately vague. There is an implicit undercurrent of separation, in terms of being disconnected from everyday life and challenged for survival, but it is not explicit whether the question is about preference, importance, or love for the music, and the narratives include all of these. This perhaps may explain how the data can speak to different perspectives in such a rich way, and provides an interesting counterpoint to most memory work where the questions are more tightly defined. In addition to identity and social connections, and in contrast to the qualitative themes uncovered by AL, CL identified a significant number of cases where the reasons given for a choice was not an explicit autobiographical memory, but rather something about the aesthetic quality of the performance (e.g., 'This is played so beautifully'), which may also underlie some of the simple emotional responses (e.g., 'I just love this song'). These more aesthetic reasons for choices are found in some other research where people talk about the importance of music in their lives (e.g., Hays & Minichiello, 2005), and remind us of the need to constantly review our analytic frameworks to not miss important insights. In much of the work on musical memory and preference, and also in some of the research on everyday uses of music, the specificities of the music itself are not included and we believe music science needs to include its central topic, that is, the nature of the music itself, in any approach to understanding what music means for listeners and why it is more likely to be important and remembered.

To bring these reflections together and offer something for other researchers to take forwards in different areas and with different types of data, we have proposed a theoretical

Table 2. Potential template for future analytic approaches.

Theme	Characteristics	Description
REPEATED EXPOSURE	General memory of a period of time Repetition of specific piece of music over lifetime	Explicit mention that the piece of music has been listened to repeatedly, either in a given era or across the lifetime (may include songs that are predominately chosen for their aesthetic qualities)
IDENTITY	First-time memory Self-defining moment Redemption memories Culture-defining reference General memory of a place Lyrics that reflect beliefs or values	Music that is explicitly related to personal or cultural identity (e.g., linked to a place or time that defines the self). Includes redemption memories, which are recollection of a difficult time or period. Also includes pieces of music that marks the discovery of a new genre or culture
RELATIONS AND ATTACHMENT	Specific memories of social bonding events or experiences General memory of a person Real or imagined connection to the performer(s) Lyrics that reflect love and attachment	Music that is explicitly linked with one or more real or imagined relationships. Also, music that is linked to togetherness and social connection
EMOTIONS	Emotional response	A focus on the emotions evoked by the music or lyrics, without explicit reference to memories or the musical structure/performance/lyrics
	Mood regulation	Happy mood maintenance, revival and relaxation, strong sensation, diversion, discharge, mental work, solace, 'psyching up'
MUSICAL QUALITIES	Musical structure Performance Recording	Specific reference to the nature/quality of the music itself, whether it is the structure, style or performance

framework that could provide the basis for coding qualitative or open-ended data or for designing experimental investigations in these areas. This draws on CL's earlier memory coding and the themes identified by AL in relation to *Desert Island Discs* as well as the integration of this with other research in music psychology as reviewed earlier. Four high-level themes are those identified in the literature: exposure, identity, relations, and emotions, and we have added a fifth theme of musical qualities (Table 2). We envisage that this template could be used in deductive and grounded theory approaches to qualitative data and in the more specific approach of template analysis (Brooks et al., 2015), or its themes could be considered as variables in experimental design.

Discussion

We began with two distinct but overlapping areas of theory and evidence, centred on memory (CL) and preference (AL). Bringing these two fields together to interrogate the core features of favourite and well-remembered music has highlighted a diversity of concepts, theories, and methods, and has emphasised the need for careful definitions. The important distinction between memory and preference has been too often ignored, and future research needs to be

more precise in order to provide appropriate theoretical insights. One critical point relates to the age of participants. Many studies use young adults who are in the middle of forming their most important musical memories and preferences. Work with adolescents and young adults can play a critical part in understanding precisely why this period is so well-remembered and why self-defining experiences become so closely associated with music, but it also makes it hard to disentangle the temporary from the more permanent. In this field more than most, a lifespan perspective and the inclusion of older participants are also vital to gain the benefit of hindsight.

One key challenge concerns the specificity of the experiences we are investigating. As noted, specific memories are more common in the *Desert Island Discs* data and can be carefully coded using predetermined memory frameworks (Loveday et al., 2020) as well as dated in relation to the participant's life. However, other memories relate to broader periods of time such as university or at a particular job, and still further pieces of music evoke memories from multiple time points across people's lives, sometimes themselves also recalled with differing levels of specificity. The complex picture of engagement, disengagement and re-engagement with music over time that emerges from this data is impossible to describe in a simple inverted U-shaped

curve (Berlyne, 1971), and we suggest that more complex theoretical explanations may be necessary to capture this individuality and fluidity.

We have incorporated the field of emotion to a limited degree in our proposed theoretical framework, since emotion is an underlying subtext to both the memory and the preference fields, and the emotional functions and outcomes of music listening is a large and complex field in its own right, involving important concepts such as nostalgia (Barrett et al., 2010) and chills (Bannister, 2020). Music listening is often driven by emotion regulation without any explicit connections to either memory or preference, although of course it becomes almost impossible to separate this from past experience of the song, even if the memories are implicit rather than explicit. The large related field of mood regulation also has much to bring to understanding people's – and particularly adolescents' – relationships with their own remembered and favourite music (Saarikallio et al., 2020), and more work will be required to flesh out the subtleties of emotional outcomes of music and how these work over long time spans.

Music's ability to regulate emotion could be considered as simply an extension of the themes identified here of relationship and support – effectively the music represents or conveys human communication both in an actual sense (because it is performed) and in a more abstract sense (because it is built from the same components that we use to communicate our most basic attachment signals). There is some emerging evidence for this parasocial function of music evoking memories of significant others in the absence of direct social interaction (Schäfer et al., 2020) that could be interesting to connect to the narratives around the desert island. Allied to this, music may help to strengthen connections between individuals by activating shared memories.

As psychologists specialising in behavioural methods, we have not even touched on the flourishing field of neuroscience and the insights this might bring to understanding strong musical memories (e.g., Ferreri et al., 2020; Freitas et al., 2018) and their association with the self, relationships, emotion and choice. Neuroimaging studies have offered significant insights into emotional responses to music (e.g., Salimpoor et al., 2011; Hou et al., 2017) so it would be useful to explore whether brain activity differs in relation to lifetime period, or across the themes outlined in Table 2. Future work could also explore the extent to which music from the reminiscence bump triggers activity in regions associated with the self and others (Murray et al., 2012).

We have also neglected the field of reminiscence therapy that depends so heavily on the capacity of music to trigger remembering and nostalgia, but where preference and individual choice is not always considered. A recent Cochrane review (Woods et al., 2018) highlight significant inconsistencies in the effectiveness of reminiscence therapy that may in part reflect the variation in personal choice of the music used. Where there is a specific focus on personalisation of the programme, this type of therapy can have significant and sometimes long-term impacts on engagement and social interaction (Evans et al., 2019). The themes we have outlined may offer a useful framework for understanding the important overlap between musical preferences and autobiographical remembering, as well as highlighting the importance of affective responses to music that do not rely on explicit remembering. We hope that the spirit of dialogue and debate we have begun to illustrate here might inspire others working in these connected fields to critically explore theory, concepts, terminology and evidence so that we can better understand the complexity of human engagement with music.

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