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Using sensory cues to curate, study and support autobiographical remembering across the lifespan

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Using sensory cues to curate, study and support autobiographical remembering across the lifespan

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Abstract

Autobiographical memory is integral to who we are and how we connect with the world around us. One intriguing feature of personal memories is that people typically find it easier to access memories from late adolescence and early adulthood. This phenomenon, the reminiscence bump, has been riddled with inconsistencies in the methodology. This has implications for understanding the underlying mechanisms, which in turn impacts on both the theoretical models of memory and the clinical practices that rely on personal narrative. This programme of research specifically addresses key confounds within the literature by systematically exploring the effect of different task instructions on the temporal location of memories.

Study 1 explored secondary data of 55 interview guests from a popular radio programme, in which they chose eight songs to take to a desert island in a free recall setting. Despite no explicit instruction to describe a specific memory, self-selected songs produced a reminiscence bump and particularly included memories of people. Study 2 developed this methodology for an experimental setting and also compared music with tangible stimuli, which produced distinctive retrieval curves. These distinctions may have been due to the wording and order of instructions therefore this was addressed in Study 3. The refined procedure was carried out with an older group, which also directly compared self-selected with experimenter-provided stimuli as memory cues. Self-selected stimuli produced more specific memories overall and once again, the different stimuli evoked memories that reflected distinctive lifespan retrieval curves. Given that the musical reminiscence bump remained reliable in all studies, Study 4 examined this across different choice conditions and cue modalities. Freely chosen music evoked higher nostalgia and a greater number of specific and self-defining memories than music selected from a fixed list. Lastly, Study 5 explored this methodology in an applied setting for an individual with mild cognitive impairment. The findings revealed the positive but unexpected impact of collaborative remembering with a cognitively healthy partner, who facilitated memory retrieval.

While the reminiscence bump has been considered a robust finding, these experiments have shown that it is significantly influenced by the nature of retrieval, in particular the degree of choice and cue type. Personally curated cues evoke important memories including those that are self and relationship-defining. This has significant implications for clinical interventions and social policy.

Declaration

The work presented in this thesis is the work of the author and has not been submitted to any other University.

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Thank you to all my friends and family who have been there as I went through the motions of this wild ride. Harry, thank you for knowing exactly how to deal with me from being on top of the world to bedrock (and back up again) in a matter of hours. I'm not quite sure who has the most impressive show of endurance. You're the best.

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Publications and Conferences

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Journal Articles:

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An overview of the current thesis

Memory is an integral part of our identity and our everyday functioning; it is involved in every thought, feeling and experience we have, and connects us with our past, present and, in some respects, our future. In short, we are the sum of our memories. When our memory is disrupted, there can be devastating consequences for our sense of self, our sense of coherence and our relationships with others.

This research is interested in how we can use sensory cues to form vital scaffolding for our memories, and the following personal anecdotes illustrate this premise. At the time of writing this, I am mere months away from submitting this thesis. Overall, I am very proud of my progression as a researcher, but sometimes I need reminding. Reminding of where I was when I began this journey, with little more than rough proposal and no real sense of what lay ahead of me. There is a song that I listened to whilst I prepared for my interview in 2015. It made me feel triumphant and unstoppable, and it still does. Sometimes I purposefully visit this song to reaffirm my journey, but often, it sneaks up on me and I find myself subconsciously returning to that period of time. In a similar instance, I was sorting through a pile of journal articles and came across the program of the conference where I first presented my work. These memories I have described are intrinsic to my sense of self and define my identity as a psychologist. The song and conference program are more than just plain sensory stimuli. They are valuable cues for autobiographical remembering.

Whilst past research has looked at memory in response to music and tangible stimuli, there is a lack of focus on the nature of the memories that they evoke, and how they may be used to support sense of self and social relationships. Within the current literature, choice and ownership has rarely been considered. The song that reminds me deeply of my academic identity likely evokes something completely different in someone else, or indeed may hold no importance to them whatsoever.

Research on autobiographical remembering has consistently shown that some memories appear to be more accessible than others. One of the more unusual temporal aspects of autobiographical memory is characterized by a non-uniform increase in

retrieved memories during the period of 10-30 years old. Various accounts suggest that this period of greater elaborate recall can be explained by heightened cognitive performance and neurobiology, whilst others view this peak as a pivotal point of identity formation. In addition, the range of inconsistent methodologies used to investigate the reminiscence bump in the literature have also contributed to contention between different theoretical accounts. This thesis aims to revisit and refine these methods, focusing particularly on the concepts of 'preference' and 'accessibility' for experiences and memories occurring during adolescence and early adulthood.

This body of work contributes novel insights into the theory and nature of autobiographical memory, the effects of reminiscence using sensory cues, and the scaffolding they provide in the lives of older adults. Findings from this thesis provide methods for real life application with people who have been displaced from their scaffolding, their memories and their identity.

"*Nothing is ever really lost to us as long as we remember it.*"

— L.M. Montgomery, *The Story Girl*

1. An Introduction to Autobiographical Memory

Before you begin his chapter, try to imagine yourself cast way on a desert island. With warm sunshine, golden sand and the majestic ocean, this is where you will reside from now on. Nobody else lives on this desert island; you are in complete isolation. However, you are allowed to take some souvenirs along with you on your one-way trip, in the form of music or tangible objects. How will you utilise this choice? Perhaps in your solitary state, you will choose a song that sonically transports your loved ones to your side or a track that takes you back to a specific time in your life. You may indeed choose to bring things you just happen to enjoy, but this enjoyment is likely to be associated with reminiscence of the past in some capacity.

1.1 Autobiographical memory and how it is experienced

Autobiographical memories are experienced as recollective episodes of personal past events. These memories can be retrieved in a voluntary and involuntary manner, although they are usually encoded and stored without conscious intention (Williams, Conway, & Cohen, 2008). Voluntary memories are explicit memories that involve a controlled and strategic retrieval process (Rubin & Berntsen, 2009). Meanwhile, involuntary memories are those that were brought to consciousness with no intentional preceding cue or retrieval attempt (Rasmussen, Ramsgaard, & Berntsen, 2015). Research has focused primarily on voluntary memory retrieval, and very little on their involuntary counterparts, despite being experienced three times more frequently in daily life (Ball, 2007; Hall & Berntsen, 2008; Schlagman, Kvavilashvili, & Schulz, 2007).

Autobiographical memory is of interest and relevance to people from many professional backgrounds. Clinicians, practitioners and academics within neuropsychology, cognitive and developmental psychology all rely on knowledge and understanding of autobiographical memory to contribute to their practices. For instance, theoretical knowledge of memory can be useful for understanding the effects of trauma, developmental conditions and traumatic brain injury (Fleming, Shum, Strong, & Lightbody, 2005), to inform therapeutic practices. These therapies, such as cognitive behavioural therapy, are widely used to treat anxiety and depression, and to

improve emotional regulation (Mennin et al., 2015). These therapies often rely on the patient or participants' ability to access the past to understand and guide healthy attitudes and behaviours.

It is important to acknowledge that these memories are not exact copies of lived experiences, rather reconstructions based predominantly on episodic and semantic detail (Conway, 1990). Tulving (1972) first introduced the distinction between episodic and semantic memory systems. He described episodic memory as consisting solely of information regarding dated episodes or specific events, incorporated with a spatiotemporal element. An example of episodic memory might be an event at a birthday party in which someone recalls ice-skating with friends and falling over on the ice. Meanwhile, semantic memory is necessary for the use and understanding of language, knowledge, and registering the cognitive aspects of the experience. For instance, there would be various semantic details of this ice-skating event, including the knowledge of ice, the act of ice-skating or birthday parties. Despite their ability to operate independently, more recent research has suggested that episodic and semantic memory exists within an intimate yet complex relationship with one another. Semantic knowledge is learnt from lived experiences (Williams et al., 2008), therefore, in line with the previous analogy, semantic knowledge from a personal experience would be represented as follows: the individual's birthday is in October; therefore, the weather is likely to have been cold and cloudy, and as the event took place in 2002, their primary school peers are likely to have been present.

Autobiographical memories can be of a general or more specific nature, for example, a person may more generally recall years they spent at university, but more specifically remember the event of a graduation ceremony. There are also differences in the perspective of an autobiographical memory with some memories being recalled from the point of view of the person rather than imagining him or herself from the view of another, almost as if they were watching a television programme. These differences in field and observer perspectives have been used to predict recall accuracy and to support the reconstructive nature of memory as we do not experience all events from an observer perspective. Whilst many episodic recollections are described from the observer perspective (Nigro & Neisser, 1983), other research has found field perspective memories to be more vivid, with detail deteriorating over time (Robinson

& Swanson, 1993). Ultimately, autobiographical memories are never a complete or veridical record of what has occurred and are subject to change, especially when hindsight and collaborative elaboration allows for new knowledge to inform the memory (McCormick, St-Laurent, Ty, Valiante, & McAndrews, 2013; Conway et al., 2009; Brewer, 1986).

1.2 The functions of autobiographical memory

Cognitive psychologists have been investigating autobiographical memory in greater detail in the last thirty years, and the following sections will discuss three main theoretical functions that have emerged within an experiential framework of autobiographical memory: the first of these to be discussed is the directive role, followed by the social and self functions. Whilst these functions have clear distinctions, they are not mutually exclusive and can interact closely within daily life.

1.2.1 The directive function

In having the ability to encode and store episodic and semantic information, we are then able to imagine potential scenarios based on the past and enabling us to 'pre-experience' future events (Michaelian, 2016; De Brigard et al., 2015). This autonoetic phenomenon is referred to as mental time travel and it is now accepted that episodic memory is the main driver of this experience (Michaelian, Perrin, & Sant'Anna, 2018). This view has been supported by neuroimaging research, in which both past and future thinking revealed strikingly similar patterns of activation, primarily within the posterior cingulate cortex, precuneus, prefrontal cortex, and hippocampus (Viard et al., 2011; Weiler, Suchan, & Daum, 2010; Schacter & Addis, 2007). These findings are indicative that the neural and cognitive mechanisms of past and future thinking are comparable.

People adapt to their surroundings based on past experiences and use this to guide their current and future behaviour (Baddeley, 1987). This can be achieved in a fairly indirect manner; in that it is often simply schematic knowledge that is applied to a problem. However, research has suggested that a more directive approach can be more effective by referring back to a specific recollection that holds more relevance to a current

scenario (Pillemer, 2003). For example, an individual who suffers from bouts of anxiety may be feeling particularly anxious about a task. If this situation is unfamiliar and has not been encountered before, the individual may harbour some reservation and self-doubt. However, they might find looking back at past events in which they attempted something new and consequently succeeded to be a useful exercise, which helps them feel motivated and more confident when considering new tasks. Recent studies have found that voluntary memories serve more directive functions compared to their involuntary counterparts (Rasmussen & Berntsen, 2011; Rasmussen, Johannessen, & Berntsen, 2014; Rasmussen et al., 2015).

Rasmussen et al. (2015) deemed involuntary memories as those that are brought to consciousness with no intentional preceding cue or retrieval attempt. Meanwhile, voluntary memories are specifically retrieved in a goal-directed and controlled manner. By definition, if one aims to be goal-directed and there is a reason for such a memory to be remembered, these are more likely to serve a directive function. For instance, a goal-directed retrieval search may be 'to think of a time in which I struggled to complete a piece of work', and this will much more likely inform intended future behaviour for completing further tasks. Conversely, a memory that enters the mind unconsciously is less likely to be able to trigger reminders of helpful behaviours. Furthermore, it has been found that in a romantic partnership, couple-related memories play an active role in relational outcomes by encouraging or indeed inhibiting the quality of the relationship (Philippe, Koestner and Lekes, 2012), which also likely informs both social and self functions.

1.2.2 The social function

Humans are inherently social creatures. In sharing memories with one another, people can converse about their similar or differing experiences, thus forming a basis upon which to establish, solidify and maintain relationships. From an evolutionary perspective discussing past events with others who were not involved, has the potential to build trust and intimacy, as well as pooling experiences (Neisser, 1982; Nelson, 1993). On the other hand, reminiscing with people who have collectively experienced the memories that are being shared can increase group bonding and intimacy (Bluck,

2003; Fivush, Haden, & Reese, 1996). The importance of social bonding in groups via shared remembering has been reinforced by findings in which social relationships have been negatively impacted by autobiographical memory impairments (Robinson & Swanson, 1990).

The transactive memory theory states that groups of people develop memory systems with which to encode, store and retrieve shared information between members (Wegner, 1987). Whilst each individual operates within their own self-memory system, they become connected and synchronised via communication between one another. These systems are supposedly highly strategised, with storage of information distributed between individuals, based on their expertise. In direct contrast, cognitive research has suggested that, due to disrupted and inhibited recall, collaborative remembering between acquainted or romantic couples often resulted in more false memories being produced compared to that of two strangers (French, Garry, & Mori, 2008). However, Harris et al. (2011) noted that the majority of this research did not take into account the nature of the stimuli provided, particularly when involving strangers. Thus, the authors investigated social influences on the shared memory of married couples. They found that whilst some couples did not appear to achieve higher scores on collaborative recall tasks, others demonstrated collaborative facilitation, often using group strategies such as cueing and repetition. These findings support the benefits of a shared reminiscence system, and also raise questions regarding possible strategies for people who once shared a transactive memory system and have since been impacted by memory impairment, in which one spouse has a form of amnesia or dementia.

1.2.3 The self function

People are who they are because of what they remember doing (Conway & Pleydell-Pearce, 2000). As such, the recollection of past events plays a key part in the formation, preservation and maintenance of a sense of self. The self, aside from its defining role in autobiographical memory, is in itself an intricate construct made up of many facets including self-awareness, self-esteem, self-knowledge, and self-perception. All of these components influence an individual's position in their social and cultural

environment. Conway & Pleydell-Pearce (2000) introduced the first established model of autobiographical memory, which states "memories are transitory mental constructions within a self-memory system." (Conway & Pleydell-Pearce, 2000, p. 261). Within this self-memory system, the working self and autobiographical knowledge base operate in a reciprocal relationship. This model and developments from other researchers will be discussed in section 1.4.

What is clear is that reviewing past experiences serves to establish and narrate previous versions or states of the self, as well as the current and prospective self (Conway, 2005). Interestingly, the prospective self is likely to have some association with the directive function of memory. Conway (2005) stated that the process of reviewing past experiences orientates people not only in the world that exists around them but also within their personal views and beliefs, wants and needs. This is considered a bidirectional reciprocal relationship; whilst an individual's self-views and beliefs inform their personal history and how it is framed, these same views and beliefs are in turn influenced by how and what people can recall (Wilson & Ross, 2003; Singer & Salovey, 1993). Ross (1989) suggested that the reconstruction of past personal characteristics involves a two-step process: firstly, that people retrieve recent characteristics that are more easily accessible and begin with a current self-assessment of their feelings. Following this, they implicitly conclude the stability of their own characteristics in order to construct a past version of this, which may be similar or different from the present view. This discrepancy depends on whether the individual believes their view may have changed over time. However, as a self-reassurance mechanism, people have a tendency to assume their past views are similar to their current views, in order to reinforce that their current views are indeed sound or stable. On the other hand, where change is expected, people are more inclined to make a distinctive assessment of past self-views and can exhibit shifts in identity over time (Wilson & Ross, 2003).

Wilson & Ross (2003) have also found this self-enhancement function to be true of autobiographical memory, in that people tend to report their past selves to be inferior to their current identity. Karney & Frye (2002) asked spouses to provide retrospective evaluations of their marriage and found that people tended to rate their marital satisfaction as lower in the past compared to the present. An explanation for this is that

they were trying to create the illusion that their current situation was more favourable, regardless of whether or not this was truly the case. However, the authors suggested that people are able to be more impartial about their past selves and are therefore likely to be making more accurate assessments of the earlier stages of their lives than in their current state.

Following this, Bluck et al. (2005) developed the Thinking About Life Experiences (TALE) questionnaire to investigate the extent to which people reflect on their answers and how these thoughts shed light on the three main functions of memory discussed in this chapter. They found that these three functions were more complex than first thought, and also acknowledged that these functions are likely to be three of many, but that they involve explicit memories that are able to be discussed to a larger degree. Prebble, Addis, & Tippett (2013) pointed out that research within this area has been fragmented in terms of theoretical and methodological approaches, and they subsequently proposed a model for autobiographical memory and sense of self shaped by current theory. This model suggests that selfhood operates on two dimensions: the subjective versus objective, and the present versus temporarily extended aspects of the self. Although these four components are connected, they exhibit different relationships with autobiographical memory. Although this model has taken steps towards bridging the gap between empirical and theoretical literature, it is still largely theory-driven.

Whilst the self, social, and directive roles have been largely agreed upon as the main functions of the self-memory system, Williams et al. (2008) proposed a fourth function that encompasses remembering as a method of regulating emotions. This is an aspect that was not taken into account in the TALE questionnaire, but it has been argued that this need for emotional regulation may simply form a part of the complex self and social functional systems (Pasupathi, 2003). Pillemer (2003) concluded that questioning which function holds the greatest importance is overly simplistic due to the clear interaction between them, as well as individual differences. Nonetheless, more research is required into the nature of the interaction between these functions, which in turn could inform psychotherapy techniques.

1.3 Memorable events

Some events appear to be much more memorable than others. Memories of great significance or emotion can seem extremely vivid, with a great amount of detail remembered. Notable examples of this are flashbulb memories, which refer to people's recollections of learning about significant public events, such as the terrorist attacks on the World Trade Center in 2001 (Brown & Kulik, 1982; Conway et al., 2009; Williams et al., 2008). Whilst some researchers believe that flashbulb memories involve special memory mechanisms, others believe that they are akin to other event memories with evidence of forgetting and distortion (Hirst et al., 2015).

Whilst it is important to look into studies of memories that are widely shared on a cultural basis, there has been some insight into memorable events on a more personal level. When people reminisce about their past with their sense of self in mind, what sort of memories do they recall? A 'self-defining moment' is something that one associates with a formative turning point or a significant event that strongly contributes to their sense of identity (Williams et al., 2008). Generally, self-defining memories are considered to fulfil the following criteria: the memory must involve emotional intensity, vividness, frequent rehearsal, linkage to similar memories, and connection to an unresolved conflict (Conway, Singer, & Tagini, 2004; Singer & Salovey, 1993.) Singer & Salovey (1993) proposed that everybody possesses a set of self-defining memories that are both important for identity and in the monitoring and achievement of personal goals, once again illustrating the interaction between both self and directive functions. What is clear is that memory plays a key role in the recognition of one's sense of self (Demiray & Janssen, 2014; Wilson & Ross, 2003) In view of this, one would expect individuals with memory impairments to dissociate from their identity to some degree. In one particular example, Schacter et al. (1996) discussed a case of a patient who suffered traumatic brain injury and as a result, was left with a severe amnesia. Inability to encode, store and retrieve memories resulted in a dissociated sense of self. These issues will be discussed in more depth later on in this chapter.

1.4 Theoretical models of autobiographical memory

It is not until fairly recently that models have been proposed which attempt to summarise the structure and organisation of autobiographical memories. Historically, these episodic recollections were identified as scripts that form an internal general knowledge structure, whereby semantic information has been extracted from similar past events (Williams et al., 2008). Schank & Abelson (1977) first hypothesised that through experiencing everyday life, people acquire and develop different scripts or schemas for different events. These scripts are viewed as goal-directed tools that take both time and causality into consideration. Schank & Abelson (1977) used an analogy of a restaurant to demonstrate the concept of scripts as follows: Roles include that of the customer, the waitress, the chef, and the cashier. Sequentially, you will sit down before eating, causally the waitress brings your food because you ordered it, and so on. The goal is that you satisfy your hunger. Any further details aside from the script, roles and end goal depend on the specific event, thus do not belong in the script.

Life events are, of course, at once routine and novel or unusual in nature. As such, they are likely to be remembered in different ways and to differing degrees. Typically, when asked to recall or recognise actions or objects from a scenario, those that were less routine and more atypical of the schema were more memorable (Nakamura et al., 1985). These findings support an extension of the initial script model known as the schema-plus-tag model (Nakamura et al., 1985), which states that specific events are represented with an instantiated script, relevant actions, and distinctive tags which correspond with unexpected detail. As a result, these features are highly memorable and facilitate retrieval of episodes. However, further research suggested that this model is oversimplified and that the different elements of a new experience are stored in a much more complex way (Conway, 2003). Schank (1982) revised their original script model after findings suggested that people tend to experience crossover, and consequently, confusion between scripts that share similarities (Bower, Black & Turner, 1979). Higher-level representations that involve more flexibility were likely to be more appropriate; thus, Schank (1982) proposed the dynamic memory model.

Memory is key in keeping people connected to their sense of self. With this function in mind, one of the most prominent models was put forward by Conway & Pleydell-

Pearce (2000) and was coined the Self-Memory System (SMS). The SMS proposes that autobiographical memory is accessed within a hierarchical structure of autobiographical knowledge, which interacts with the working self. This hierarchy includes abstract information, lifetime periods, general events, as well as event-specific knowledge. Within lifetime periods, the information retrieved tends to be of a more semantic nature. Knowledge at this level is more likely to overlap with different periods, for example, "Attending University of Westminster", and "First relationship with X" (Palombo, Sheldon, & Levine, 2018). General events, on the other hand, refer to events that are of a repetitive nature, such as "The family sing carols every Christmas". These general events are often linked thematically and are often informed by specifically goal-directed knowledge (Conway, 2001). The final level of event-specific knowledge refers to the finer episodic detail from personal recollections including temporal, spatial and perceptual details. It is these recollections that are actively studied for their vividness and form an essential part of autobiographical remembering.

Conway et al.'s (2004) revision of the SMS introduced the long-term self as a further feature of the memory model. The long-term self involves the communication of a base of autobiographical memories and the conceptual self. Findings for activity in relevant brain regions for memory retrieval show strong support for this model when considering the goal-oriented focuses of the working self (Conway et al. 1999). The updated SMS sees the working self as a key organiser of current experiences. Cognitive-affective systems in the prefrontal cortex, anterior cingulate cortex, hippocampus and amygdala are involved in processing of approach and avoidance goals (Davidson et al., 2003). Davidson et al. (2003) found that the prefrontal cortex is imperative in the anticipation of outcomes, with the anterior cingulate cortex aiding in mediation and prioritisation of attention. Meanwhile, the hippocampus is involved in the linkage of affect to specific contexts, and the amygdala plays a key role in evaluating threatening stimuli and generating defensive responses (Conway et al., 2004). Elaborations on the SMS were also proposed by Williams et al. (2008), who noted that the SMS failed to include issues of overgeneralised memory, particularly in emotionally disturbed patients. They highlighted that memory retrieval could be affected by rumination, functional avoidance and general capacity impairments.

Whilst the SMS model is based on accessing memory, other theories have focused more on the processes that support experiencing a memory (Sheldon et al., 2018). Component process models suggest that memory retrieval is dependent upon the weighting of different cognitive processes involved in autobiographical memory (Moscovitch, 1992; Renoult et al., 2012). Rubin's (2006) Basic Systems Model suggests that autobiographical memory relies primarily on systems that support the components of lived experience, such as perception, via sight and hearing, spatial representations, emotion, language, and narrative. The functioning of these systems directly determines the experience itself, and consequently, the cohesive memory representations (Rubin, 2006).

1.5 Assessing autobiographical memory

The study and assessment of autobiographical memory is particularly challenging for a number of reasons relating to the difficulties of capturing complex memories that are inherently reconstructive. Primarily, there is generally no objective record against which the accuracy of someone's personal recollections can be measured. As discussed in section 1.4, proposed models show autobiographical memory to involve many complex processes, which can be retrieved voluntarily or involuntarily. Furthermore, within laboratory studies, episodic memories are almost always recalled remotely from where they were experienced or encoded which can have a confounding impact on the retrieval process. However, finding robust methods to measure autobiographical memory is essential to understanding the underlying processes. This, in turn, is important because of the critical role that memory plays in day-to-day life, and the fact that it is commonly affected in an array of neurological disorders (Sheldon et al., 2018).

The main method used to compensate for lack of objective record is the use of future diaries, which provides a prospective measurement of autobiographical memory of both a voluntary and involuntary nature (Schlagman & Kvavilashvili, 2008). In diary studies, participants are instructed to keep a diary detailing everyday events, over a period of weeks or months. This provides a written or audio record of prospective true events, which are later tested for accuracy against false records in the form of

recognition tests (Barclay & Wellman, 1986; Brewer, 1988; Conway et al., 1996; Thompson, 1982; Wagenaar, 1986).

Similar methods to diary studies involve the photographing of events using devices such as SenseCam, in which photographs are taken of the participants' activities without their active input (Hodges & Wood, 2011; Doherty et al., 2012). Whilst diary studies do mediate issues regarding lack of researcher control during the encoding context, these data are still very heterogeneous as each diary recording is unique to each individual (Sheldon et al., 2018). In order to address this individual noise, other memory research has also assessed retrieval of culturally significant events such as the 9/11 terrorist attacks (Coman et al., 2009), and even creating staged events in order to be present at the time of encoding (Hashtroudi et al., 1990).

Whilst these methods have shed some light on encoding and retrieval accuracy, there are two methods most commonly used to assess autobiographical memory: cueing methods, which are used to understand the how memory is accessed, and interviews, which attempt to capture the experiential aspect. These methods each reflect the SMS and component process models of memory retrieval vs experience, discussed in section 1.4. Other methods include instructing participants to write events in a diary, as well as free recall of public and private events. For the purposes of this thesis, the following review will focus on these two main techniques.

1.5.1 Cueing methods

Francis Galton was the first to develop the cueing method. Galton (1879) created a list of cue words based on objects in his surroundings and used them to stimulate episodic memories. He measured the distribution of his own memories across the lifespan, as well as assessing latency. Crovitz & Schiffman (1974) and Rubin (1982) refined this technique, in which they provided participants with a list of cue words and instructed them to respond with the first autobiographical memory that came to mind. The Autobiographical Memory Questionnaire took this method slightly further, asking participants to date their memories and to provide a self-rating of their recollection

(Rubin et al., 2003). It was this method that exposed the non-uniform distribution of memories across the lifespan, which will be discussed in more detail in section 1.6.

The Autobiographical Memory Test (AMT) (Williams & Broadbent 1986; Williams & Scott, 1988) was designed to assess the latency of memories cued from emotional words. Clinical studies using the AMT have revealed differential patterns in memory specificity based on low mood. They demonstrated this specificity effect by exploring memories of parasuicidal (Williams & Broadbent, 1986) and depressive patients (Williams & Scott, 1988). The authors found that patients tended to recall memories quicker in response to negative cue words compared to positive words, and more so than healthy controls. Williams & Broadbent (1986) scored memories by level of specificity. Memories that took place over a broader or generic period, for example, "*I used to have fun at parties*" were determined as general memories. General memories were met with a single prompt for a more specific recollection. Specific memories were deemed to be those that included a description of an episodic recollection, and participants were asked to provide a date, day of the week or time of date, for example, "*I remember dancing at my 16th birthday*". This distinction was helpful for clinical work, but also provides useful insight on the theoretical basis of autobiographical memory.

Researchers who have studied voluntary memories retrieved via cueing methods have also referred to these as directly retrieved memories, which are triggered by internal and external context cues in a fairly automatic manner (Berntsen, 1996, 1998; Schlagman & Kvavilashvili, 2008). Meanwhile, studies using cue word methodologies such as the Crovitz-Schiffman technique (1974) have suggested that this direct retrieval is uncommon, and that the retrieval process involves a deliberate or generative reconstruction of an event or period (Haque & Conway, 2001; Conway et al., 2004; Eade et al., 2006). However, studies have shown that this direct, automatic retrieval does occur in word cueing of personal memories (Berntsen & Rubin, 2004; Conway, 1990). Uzer, Lee, & Brown (2012) explored these direct vs generative memory retrieval concepts using provided cues and found that participants self-reported directly memories were recalled much faster and more frequently than their generative counterparts. Uzer & Brown (2017) further developed their previous study by eliciting memories from personally individuated cues vs generic word cues, and

had participants report whether memories had come directly to mind or via generative approach. It was found that personal cues were more likely to elicit direct retrieval than generic cues. Furthermore, they observed that personal cues evoked more specific memories than generic cues. This is one of the few studies that has used personal cue words to elicit autobiographical memories and requires further exploration with regards to the importance of ownership in evoking personal memories. Although cues within this study were individuated and personal, these cues were not isolated to particular categories. Therefore, further work is required in order to investigate the nature and power of these cues.

Whilst previously mentioned cueing methods focus on the use of words to evoke autobiographical memories, non-verbal sensory cues are effective in evoking autobiographical remembering. Sensory cues known to be evocative of memories include odours (Larsson & Willander, 2009), objects (Kirk & Berntsen, 2018), locations and activities (Berntsen, 1996; Berntsen, 2009). However, one of the most salient cues of memory is music (Sheldon et al., 2020; Belfi, Karlan, & Tranel, 2016; Janata et al., 2009). These external sensory cues have been found to evoke more involuntary autobiographical memories (Berntsen, 1996; El Haj, Fasotti, & Allain, 2012; McDonald et al., 2015), with memories being evoked without explicit instruction to retrieve them (Belfi et al., 2016). These findings suggest that these cues may involve a less effortful, bottom-up search strategy. Multi-sensory cueing has also been found to activate a more substantial neural network than the more traditional verbal cueing techniques (Shams & Seitz, 2008), and therefore has greater implications for supporting individuals with cognitive difficulties (Kirk & Berntsen, 2018). This is discussed further in section 1.8 of this literature review.

1.5.2 Interview methods

Kopelman, Wilson, & Baddeley (1989) built on the AMT method and developed the first evidence-based/ clinically or widely accepted interview method for investigating autobiographical memory; the Autobiographical Memory Interview (AMI). The AMI is a semi-structured interview, which assesses the specificity of memory recollection across three main broad time periods: childhood, early adulthood, and the recency

period. The AMI is specifically targeted towards measuring atypical memory such as organic amnesia or dementia, in which there is a distinct impairment in recalling autobiographical knowledge. This method speaks to Tulving's distinction of semantic and episodic contributions to memory, by conducting separate interviews for each. The AMI requires contextual descriptions of memories, and thus scores the answers for richness and specificity on a 0-3 scale. Results showed that there was a notable temporal gradient in which early memories appeared to be spared of deficiencies.

The AMI is comprised of a personal semantic schedule and autobiographical incident scale (Kopelman, 1994). The personal semantic scale requires participants to recall two facts from each of the three time periods, for example, the date of a wedding or the name of a schoolteacher. The autobiographical incident scale essentially measures episodic remembering and involves participants recalling three incidents from each time period. These incidents are prompted where needed and scored in terms of richness and description of memory, as well as memory specificity. Kopelman (1994) found that whilst healthy controls showed an increased score of semantic knowledge and memories recalled over time, the amnesic group showed a decline, which was particularly drastic for recent memories. This tool addressed issues within the cue-word technique (Crovitz & Schiffman, 1974), in which the lifespan retrieval curve may simply be a reflection of participant bias to draw from particular periods, rather assessing their ability to recall. Arguably, this bias of preference may hold some importance of its own and play some part in why people tend to recall more memories from certain parts of the lifespan. This is discussed in more depth later in this chapter.

In 2002, the Autobiographical Interview was developed by Levine et al. (2002). This measure involves sampling participants' memories across five life periods, an extension of the three more general periods assessed by Kopelman (1994). Similarly, to the AMI, this measure distinguishes between episodic and non-episodic/semantic facets of memory. However, Levine et al. (2002) conducted a more structured interview in order to assess personal semantic memory. This tool avoids the likelihood of semantic and episodic information arising from the same narrative, which may constrain results to certain life periods. In their study, Levine et al. (2002) compared two groups of details. Internal details were identified as those that pertained directly to the main event discussed, whilst external details were mainly semantic information,

repetition, or events that extended beyond the internal incident. Main findings showed that older adults recalled significantly fewer internal memories than the younger group, and with probing, older adults recalled significantly more external details. Overall, the AMI appears to provide reliable and valid indices of episodic and semantic features of autobiographical memory. Most notably, the AMI discovered an age-related bias in favour of semantic details in memory recall. This suggests that semantic information is better preserved whilst episodic detail retrieval is affected.

The Test Episodique de Mémoire du Passé (TEMP) was developed by Piolino et al. (2003). Following on from previous measures, this test involves a semi-structured interview (Kopelman et al., 1989, 1994; Piolino et al., 2002), which assesses one's ability to recall specific memories from 5 life periods, similarly to the AI (Levine et al., 2002). The more novel aspect of this test is that it utilises the Remember/Know paradigm of recollection vs familiarity, to assess the qualitative nature of the autobiographical memories retrieved. A 'remember' response equates to a real sense of reliving and re-experiencing a memory, and can clearly recall contextual elements from the recollection, such as where they were or whom they were with. Whereas, a 'know' response reflects a feeling of familiarity with something, but little detail remembered. Participants rated their state of consciousness in line with the aforementioned paradigm. From this, Piolino et al. (2003) identified a clear distinction between episodic autobiographical amnesia, and a residual sense of remembering within Alzheimer's disease, semantic and frontotemporal dementia populations.

Whilst these paradigms have their strengths, they do not all necessarily account for the scaffolding that autobiographical memory can provide. A key reason for this issue may be due to the lack of autonomy and self-curation involved in the study of memory. Particularly with the cueing method, the cues are selected not only retrospectively from memory encoding, but they are selected by the experimenter which can impact on the retrieval search of participants. In situations where participants are given more choice in the words or items that are cueing memories, this introduces another dimension for memory accessibility, versus a preference for particular memories, and those that may be inherently more self-defining.

1.6 Autobiographical memory across the lifespan

Research on both cueing and interview settings has shown that memories appear to be unevenly distributed across the lifespan. Akin to this, when people reminisce the past, it is quite common for them to feel that they remember certain parts of their life more readily than others (Rubin & Schulkind, 1997; Rubin, Wetzler, & Nebes, 1986), one may expect their most recent memories be best remembered, and for this to decrease exponentially back in time. The cue-word technique for episodic memories has consistently found that as the age of a memory increases, the frequency of them decreases (Crovitz & Schiffman, 1974; Rubin, 1982). These results are to be expected and align with the nature of everyday forgetting (Nilsson, 2003). However, this does not appear to be the case for autobiographical memory.

There are three main temporal components of the lifespan retrieval curve (Rubin & Schulkind, 1997). The first and most expected feature cognitively speaking is a clear recency effect. This period reflects events that have been encoded most recently and therefore, are often the best and most remembered. This effect has been observed in many studies testing accuracy for item recall, where there is tendency to report the first and last items recorded (Ebbinghaus, 1913), even in free recall settings (Murdock, 1962; Kelley, Neath, & Surprenant, 2015).

The second most notable feature of lifespan retrieval is a period of infantile and childhood amnesia. Memories from 0-24 months are effectively lost and cannot be consciously recalled (Howe, 2013). This process of loss and rapid forgetting extends into childhood, from 3.5 years to 8 years old, although there is some discrepancy between individuals (Rubin, 2000). Sigmund Freud coined the term 'childhood amnesia' and proposed that memories are present at these early ages but suppressed from consciousness throughout the psychosexual process (Hayne & Jack, 2010). On the other hand, some arguments suggest that this deficiency is the direct result of undeveloped cognitive processes required to encode episodic information. However, research has shown that children are not only able to encode information from their surroundings but are also able to store this detail for a significant length of time (Howe & Courage, 1993). Therefore, the deficiency appears to lie with the retrieval process. Whilst the semantic and episodic components of memory develop in parallel through

childhood and adolescence, the knowledge base of younger children is underdeveloped (Howe, 2013). If concepts are not yet understood, for example, the concept of disgust does not develop until approximately 5 years old, memories associated with this will not be encoded, and is therefore irretrievable (Widen & Russell, 2013). There are a number of theories addressing childhood amnesia, which include language development, conceptual development and of course, neurobiological changes in which consolidation processes are still maturing.

Fragmented memories appear to mark the end of this amnesia period, which were reported to have occurred at 3.3 years of age, on average. This is earlier than fully formed first memories, which were recalled from around 4 years of age (Bruce et al., 2005). At this point, one may expect memories to increase in frequency exponentially as ageing occurs. Developmental changes in memory reveal differential patterns of memory recall across the lifespan. St. Jacques & Levine (2007) found that young adults recalled a greater number of episodic details in comparison to older adults, whereas older adults recalled more semantic detail, supporting previously mentioned findings. Notably following childhood and at the onset of early adulthood the reminiscence bump, a peculiar phenomenon occurs which has implications for the function of autobiographical memory and creates a focus of scientific interest that needs to be accounted for within the theoretical frameworks of memory.

1.6.1 An unusual peak of autobiographical memory

The most peculiar phenomenon of the lifespan retrieval curve is characterised by a clear, non-uniform rise in memory retrieval at approximately 10-30 years old. This peak entirely contradicts the standard forgetting curve and functions, in which the oldest memories are those more likely to be forgotten (See Munawar, Kuhn & Haque, 2018 for a detailed review). This peak is known as the reminiscence bump (Conway & Holmes, 2004).

Authors have suggested that this phenomenon is exclusive to older adults, as it refers to a specific and fixed period of time in which memories occurred, rather than the temporal distance of an experience (Jansari & Parkin, 1996). Romaniuk (1981)

described reminiscence as a lifelong activity but involving large segments of one's past. He described a transition between 35-45 years of age, marking the end of the reminiscence bump when a period of reflection begins. It is thought that this life review process leads to the reminiscence bump itself (Jansari & Parkin, 1996). Using younger participants to investigate this heightened reminiscence may result in a lack of distinction between the reminiscence bump and recency period (Franklin & Holding, 1977; Rubin, 1988).

The reminiscence bump was first witnessed with Galton's (1879) cue word technique, described in section 1.5.1. The cue word techniques that were developed from Galton's work also found this peak of recalled memories (Crovitz & Schiffman, 1974; Conway & Haque, 1999). Whilst the cue word technique has initially taken precedence in the literature, some researchers have also used free recall techniques (Janssen, Rubin, & Conway, 2012). Explicit instructions range from requesting participants to freely recall personal events (Fromholt & Larsen, 1991; Romaniuk & Romaniuk, 1982) or important memories (Berntsen & Rubin, 2002; Fitzgerald, 1988; Rubin & Berntsen, 2003). The ongoing contention regarding inconsistent methodologies will be discussed in more detail in Chapter 4. Ultimately, the location of this peak does appear to vary between studies and methodologies.

Aside from the increased accessibility of memories from this period, the reminiscence bump is also produced for people's favourite books, films, songs, and even football players (Holbrook & Schindler, 1989; Janssen et al., 2007; North & Hargreaves, 1995; Janssen, Rubin, & Conway, 2012). This technique has begun to hint at an element of participant autonomy regarding what cues their memories, but the concept of self-curating memory cues still remains relatively unexplored (Uzer & Brown, 2017).

1.6.2 Explanations for the reminiscence bump

There are a number of theoretical accounts to explain the reminiscence bump, and partially due to inconsistencies in methodological approach, there is still a great deal of contention amongst researchers. The main accounts of the reminiscence bump are

the cognitive account, the cognitive abilities or biological account, the narrative and identity account, and lastly, the cultural life script account.

The cognitive account argues that this peak in reminiscence results from a large increase in novel, first-time experiences which are often vivid, emotional and serve as important milestones to many, thus leading to effective encoding or enhanced recall (Benson, Jarvi, & Arai, 1992; Janssen, Chessa, & Murre, 2007; Janssen, Rubin & St Jacques, 2011). The cognitive abilities account is rooted in neurobiological evidence and addresses the synaptic pruning and brain maturation that occurs in adolescence and early adulthood. It is suggested that these changes lead to great improvements in the learning, processing and retention of information (Munawar et al., 2018).

The subsequent theories are the most relevant accounts to this thesis, as they each address life events and the role these play in our lives from different angles entirely. The cultural life script account, first proposed by Neugarten, Moore, & Lowe (1965), refers to a set of prototypical expected life events in a specific order. This account views life scripts as various in which different cultural age norms fit, such as moving home, graduating from university, or meeting your partner. These checkpoints are viewed as rigid within each life script, and autobiographical memories are thought to align within them. This account puts less focus on the personal element of memory, and more on the cultural milestones of semantic detail, i.e. graduation, marriage, becoming a parent (Berntsen & Rubin, 2004). Although there are claims that these life scripts are not a part of shared semantic knowledge (Janssen & Haque, 2018). This account was built specifically to address the reminiscence bump that occurred when requesting 'important memories' as a cue for retrieval (Koppel & Berntsen, 2015).

The final account to be discussed is one which appears to be the most convincing, when considering not only the core functions of memory, but also well-established theories of memory organisation such as the SMS, discussed in section 1.4 (Conway & Pleydell-Pearce, 2000). Autobiographical memory is inherently self-referring or self-defining in nature (Singer & Salovey, 1993). The identity account suggests that memories parallel changes in identity development, personal goals and various notable events during different lifetime periods, thus the reminiscence period is one of identity formation (Holmes & Conway, 1999). Further research by Rathbone, Moulin and

Conway (2008) have supported this phenomenon, in which individuals were asked to generate self-images through creating self-cued "I am…" statements. They found that participants' memories from the statements clustered around the time when that particular self-image emerged. Whilst this finding suggests that experiences have shaped self-image, the previously mentioned life script account argues that these prototypical life events such as university, marriage or parenthood come to mind more readily when probed (Berntsen & Rubin, 2004). It would appear that these so-called 'prototypical milestones' play a key role in the formation and overall concept of the self. Cultural milestones such as graduation, marriage, and becoming a parent, would also be deemed as 'turning points' or 'self-defining' for many people (Singer & Salovey, 1993; Conway & Pleydell-Pearce, 2000). Therefore, it may well be that there are different but inter-related mechanisms at play when it comes to autobiographical events vs life script events (Munawar et al., 2018). That is to say, do we remember memories from this particular period because there are many powerful self-defining and important memories? Or do the prototypical life events dictated by the life script provide cues for memory retrieval? There remains to be some debate in the literature as to why this phenomenon occurs so consistently, largely due to the difficulty of testing these proposals directly. However, it is possible that these explanations may not be mutually exclusive.

1.7 When autobiographical memory fails

Memory is crucial in our everyday functioning. However, there are a rapidly growing number of people who experience a range of memory impairments that drastically affect their lives. Even without pathological memory loss, ageing is inevitable and with it comes a natural cognitive decline. A decline in processing speed and working memory has been reported to begin as early as 20-30 years old (Salthouse, 2009). Changes on a genetic and cellular level can impact the overall structure of the brain (Cabeza et al., 2018). Generally, it has been found that healthy ageing is associated with a reduction in white and grey matter volume, and changes to the prefrontal, medial temporal, and parietal cortices (Fjell et al., 2014; Ramanoël et al., 2018). The affected areas are primarily involved in episodic and working memory (Nyberg et al, 2012), as well as attention (Geerligs et al., 2014). This decline in cognitive ability varies case by case, both in terms of the areas of processing that are affected, and in the rate at which

this occurs (Christensen, 2001). Overall, episodic memory performance is one of the main components of cognition that changes the most throughout ageing (Salthouse, 2016), primarily with memory recall rather than recognition (Hertzog & Jopp, 2010).

There are a small number of individuals who are deemed to have optimal ageing. These people are also known as 'super-agers' and have shown distinctive markers in avoiding the expected age-related decline (Harrison et al., 2012). In one study, a group of super-agers were found to perform at or above average on delayed recall tasks and maintained this performance after 18 months (Gefen et al., 2014). Neurobiologically, they showed a much less pronounced pattern of atrophy in the cerebral cortex, and fewer signs of Alzheimer-related pathology related to their cognitive reserve (Harrison et al., 2015).

Memory and cognition are processes that can be affected at any age, for a number of different reasons. A review by Rabinowitz & Levin (2014) found that 65% of participants who had suffered a traumatic brain injury experienced a long-lasting deficit in memory function. Encephalitis, an inflammation of the brain, can also cause amnesias in which people are unable to form new memories or retrieve past recollections to a certain point (Cermak, 1983). This can differ from person to person, depending on where inflammation has occurred. A case study of CR, an amnesic patient who suffered a severe case of encephalitis at 44 years old, was left with significant damage to her medial temporal lobe, inferior frontal lobe, and other major pathways (Loveday & Conway, 2011). This led to severe amnesia for her entire adult life, including the birth and development of her children. She did, however, show significantly less amnesia when recalling memories from her childhood and adolescence. Another case study very well known within the neuropsychology community is Clive Wearing, a musician who contracted herpesviral encephalitis (Wearing, *The Telegraph*, 2005). This caused severe damage to his hippocampus, resulting in a severe amnesia and inability to form new long-term memories. Despite recalling no memory of musical pieces, he remained able to remember and sight-read complex compositions (Sacks, *The New Yorker*, 2007).

Perhaps the most prominent and well-known term surrounding memory loss is dementia, an umbrella term of symptoms surrounding memory loss, primarily among

the ageing population. There are currently 850,000 people living with dementia in the UK, and this number is set to rise to over 1.6 million by 2040 (Alzheimer's Society, 2020). Some older adults experience a substantial decline which leads to more severe and pathological memory loss. Early and relatively isolated cognitive complaints are often a marker of mild cognitive impairment (MCI) (Apostolova & Cummings, 2008). This diagnosis encapsulates a set of symptoms in which people usually over the age of 65 years start experiencing cognitive difficulties such as forgetting recent events and vocabulary. These issues can extend to wider executive function such as planning, problem-solving and a reduced attention span. Despite these impairments, people with MCI are distinguished from those with dementia by their preserved ability to partake in daily activities without requiring assistance (Gauthier et al., 2006).

However, MCI has been found to exist as a precursor to Alzheimer's disease in some cases (Grundman et al., 2004). Studies have shown that autobiographical memories of MCI individuals, as measured by the Advanced Autobiographical Memory Inventory, were impaired in the richness of episodic detail, whilst semantic memories were unaffected (Urbanowitsch et al., 2013). However, semantic memories were found to be affected in those entering the moderate stages of some dementias. It is at this more pathological stage that individuals will experience difficultly in recollecting their past. Autobiographical memory defects have been found to be very frequent in patients with Alzheimer's disease particularly in reference to episodic detail, as well as a lack of recency effect in memories recalled compared to participants with no cognitive impairment (Urbanowitsch et al., 2013). These findings support the hypothesis that episodic and semantic memory systems are associated with the functioning of distinct neuronal systems and that the development of Alzheimer's disease involves a dissociation between episodic and semantic knowledge.

Based on research by Jetten et al. (2010), losing the ability to remember the past would suggest a subsequent disconnect from one's identity. However, the extent to which this occurs appears to be an ongoing debate within the literature. Early studies in the field have suggested a loss of sense of self, with decreased access to memories that shape self-consciousness, self-knowledge and self-images (Cohen & Eisdorfer, 1986). More recent work has found a loss in correspondence and coherence between past memories and current goals and beliefs (El Haj, Antoine & Kapogiannis, 2015). Jetten et al.

(2010) found that people experiencing some form of identity or memory loss reported that their life satisfaction had decreased. Particularly, the loss of memory appeared to be a precursor to the loss of identity, which ultimately resulted in lower satisfaction.

On the other hand, Caddell & Clare (2011) found that dementia patients self-reported their overall sense of identity to be relatively unaffected by their memory loss. They derived four main themes surrounding participants' views on their current identity, future effects on identity, the effect of dementia on lifestyle, and relationships. However, the majority of participants were able to identify aspects that had changed prior to the onset of dementia. Overall, participants reported feeling unsure about what the future held for the state of their identity. When considering the concept of mental-time travel, in which the ability to imagine future events involving similar processes to looking back to the past, this uncertainty is to be expected. However, the deterioration of other cognitive function may affect their ability to judge how much one's sense of self has changed. If individuals with dementia are only aware of their current state, they may not know to see it as much different. Ultimately, it is likely that this flux of similarity with past identity and change is a result of the complex nature of the self. Overall, there is a clear lack of empirical evidence in this area and raises questions as to whether identity can be understood with current methods.

1.8 Support for memory impairments

Despite dementia growing increasingly prevalent across many cultures, there is a scarcity of empirical research on how best to support the inherent autobiographical memory deficits. Reminiscence therapy is one of the primary techniques used with dementia patients and involves using tangible prompts and stimuli such as music, photographs and household objects to encourage discussion and re-connect with their past and sense of identity (Woods et al., 2018). These prompts are selected in a general manner, based on what was popular during an individual's youth and reminiscence bump period. The prompts used are chosen because they are inherently quite representative and reminiscent of a time. Even in everyday life, the practice of reminiscence with cherished objects has helped facilitate conversations about the past and improving mood (Sherman, 1991). These findings suggest that such tangible objects could be used to explicitly cue memories from the past to help further the

understanding of the nature of memory. Furthermore, it is unclear whether items that are simply recognisable, such as in reminiscence therapy, would evoke the same reaction to items more carefully curated for an individual.

Music has been utilised in research with clinical populations, with a primary focus on music accompanying memory tasks. El Haj, Postal and Allain (2012) investigated autobiographical performance of 12 Alzheimer's disease patients following three conditions: exposure to Vivaldi's *Four Seasons* opus vs exposure to their own chosen music vs silence. They found that recall was higher during the *Four Seasons* condition, with both music conditions resulting in higher performance than silence; in addition, the chosen music condition retrieved more emotionally positive memories. Following this, El Haj, Fasotti & Allain (2012) compared the autobiographical content remembered in young adults, older adults and Alzheimer's disease patients when exposed to their own chosen music vs silence. It was found that the music condition evoked more specific autobiographical memories, with more emotional content and, in support of Janata et al. (2007), and the rate of retrieval was greater with less executive processing required. The authors, therefore, suggested music-evoked memories possess the features of involuntary memories, which is crucial considering these findings include data from clinical groups. Further studies have revealed that the patients also produced more self-defining memories than autobiographical episodes or personal-semantics when exposed to their own music (El Haj et al., 2015), as well as an improvement of music-evoked autobiographical narrations of Alzheimer's disease patients (El Haj et al., 2013). These results provide strong support for the notion that music exposure may have a positive impact on autobiographical memory recall despite neurolinguistic limitations.

What we have seen is that autobiographical memory is vital to the functioning of our sense of identity, yet research primarily focuses on eliciting memories through experimenter-provided cues. There are a number of different things that can facilitate autobiographical remembering and some interesting parts of the lifespan that appear to be more accessible even in older age groups. However, there appears to be a disconnect between the theoretical and empirical basis of autobiographical memory and the application that this knowledge can serve.

1.9 The current thesis

Autobiographical memory is absolutely vital for social interaction and bonding, as well as mental time travel in order to learn from our past and direct our future experiences. However, the root of these functions is the inherent connection with our sense of self. There are, therefore, strong implications for both the ageing population and particularly for people living with diagnosed memory impairments. With these disruptions to the memory system, it is imperative that we identify ways in which to support it. Evoking memory provides an opportunity to explore the underlying cognitive mechanisms and structure of autobiographical memory, and to better understand how and why some life periods are so much more potent than others. The findings from this research aimed to provide empirical evidence to guide practices that currently support vulnerable groups who have been displaced or removed from their identity in some way. Furthermore, this thesis explored the importance of autonomy and ownership in cueing memory and understanding the mechanisms involved in autobiographical remembering.

This thesis considered the following research questions:

1. Do self-selected stimuli cue memories from the reminiscence bump?
2. Is the reminiscence bump present when different stimuli are used in the form of word cues to evoke autobiographical memories?
3. Does the reminiscence bump for chosen stimuli word-cued autobiographical memories differ from provided stimuli word cues?
4. Do different stimuli represent a different set of functions or scaffolding for memories to others?
5. What is the nature of memories evoked from sensory stimuli, i.e. memories of a person, place, event, or emotional responses?
6. Can a free autobiographical recall methodology be applied in a real setting to encourage autobiographical remembering in people with memory impairments?

2. Study 1: What songs would you take to a desert island? A naturalistic investigation of music and memory

2.1 Introduction

"As you listen to people's life stories and their accompanying tracks, despite envisaging yourself on an uninhabited island, you've never felt less alone in your life." (Alderton, 2014, "*Castaway cares: my Desert Island Discs addiction*").

Desert Island Discs (DID) is a biographical radio programme broadcast on BBC Radio 4. It was created and originally presented by Roy Plomley in 1942. Guests from various walks of life and often well known in their field are invited to imagine themselves cast away on a desert island and are asked what eight musical recordings they would take with them, as well as tangible objects in the form of a book and luxury item. However, some questions are brought to mind, such as why listeners tune in to listen to other people talk about their lives through their musical preference. A large part of what makes music so special is that it tends to take people back in time. From an evolutionary perspective, we are inherently social creatures and enjoy hearing about the narratives of others (Alea & Bluck, 2003). This provides a rationale that there is much to be learnt from a format such as DID, to inform the current literature regarding the nature and evocation of autobiographical memory.

The first study of this thesis explored the free recall of music in a non-research setting - a popular and long-standing BBC UK radio show in which guests are asked to choose eight pieces of music if they were isolated on a desert island. With a wide demographic of guests, these archived episodes include a heterogeneous sample of many ages, cultural backgrounds, and musical genres. This study investigated the association of self-selected music with significant age periods across the lifespan, and the extent to which these musical preferences are based on personal memories and identity.

A number of episodes were transcribed and assessed in order to investigate the following research questions:

1. The presence of a reminiscence bump in a non-empirical research setting in relation to selected music
2. The association of selected music with different memory and non-memory-related reasons

2.1.1 Music and memory

Listening to just a handful of episodes of DID demonstrates on an observational level the intrinsic association between music, emotion and memory. It is firstly important to distinguish between the various forms of musical-related memory, and which will be focused on within this chapter.

A key distinction to be established is that of memories *for* music and memories associated *with* music (Loveday & Lamont, 2020). Music is in and of itself highly memorable, and memory for music refers to the ability to recognise, name a song, or recite some of its contents. The auditory features of music include but are not limited to pitch, timbre, dynamics, duration, tempo, and rhythm (Hubbard, 2013), and these features often interact with cognitive domains such as memory (Hubbard, 2010), and in some cases, is well preserved despite other impaired memory function (Baird & Samson, 2009). Research has shown that when exposed to popular music, participants were able to recall song titles and lyrics effectively, particularly when reacting to an auditory cue. Furthermore, this effect was particularly prominent for songs that were popular during their reminiscence bump period (Bartlett & Snelus, 1980). This concept, as well as a number of other phenomena involved in music-related memory literature is discussed in greater detail in Chapter 5.

Many individuals have an intuitive understanding of what it means to "hear a tune in your head" (Zatorre & Halpern, 2005). This form of involuntary and repetitive musical imagery is commonly termed an "earworm" in the literature (Liikkanen, 2009; Williams, 2015; Williamson et al., 2012), and has been described as the "introspective

persistence of a musical experience in the absence of direct sensory instigation of that experience." (Williamson et al., 2012, p. 260). Earworms and memory for music have been distinguished from episodic and semantic memory retrieval (Halpern & Bartlett, 2011). However, whilst earworms can be triggered by recent musical exposure, they can also be elicited by other memory associations with the music in question (Jakubowski et al., 2016).

When we listen to or simply think of our favourite musical pieces, so often there is an evoked nostalgia of past events of our lives, where we were, and particularly the people we shared these times with, illustrated by the "Darling, they're playing our tune" theory of emotion (Davies, 1978). Baumgartner (1992) conducted a study in which 73 undergraduate students were asked to recall songs that they associated with a personal experience, and then to select the most salient song and discuss the song content as well as the evoked memory. Results showed that the vast majority of participants were able to identify autobiographical memories associated with songs. Of these participants, a range of emotional content was reported, with 84% associating their music choices with positive experiences. It is important to note here that, despite some contention in the literature (Conway, 2005; Koppel & Rubin, 2016), emotional valence does not always show a positive effect with regards to evoked memories. Whilst Rubin and colleagues have argued that emotions are primarily positive, other findings have shown that people do also retrieve memories with negative context (Conway, 2005). Regardless, music certainly provides an ability to influence and regulate mood (Saarikallio, 2011).

There is a small body of research that has explored this relationship further by honing in on nostalgia, a concept that is particularly apparent in anecdotal instances, but this has remained relatively unexplored until recently. Schulkind, Hennis, & Rubin (1999) first explored the long-term memory for popular music in 18 undergraduate students and 18 older adults. Participants listened to short excerpts of popular music from the 20th century and were asked to provide details regarding the name, age, popularity, and lyrical content of each song, as well as providing an emotionality and preference rating. Results showed that older adults rated songs to be more emotional and recalled more semantic detail of music from their youth. Whilst these findings support the notion that music and emotion are linked, they did not find a large number of specific

autobiographical memories were evoked. Participants were not explicitly instructed to retrieve memories from their lives, and this distinct lack of episodic detail presents a methodological issue.

Janata et al. (2007) conducted a similar study with a novel approach that looked more closely at the concept they introduced as music-evoked autobiographical memories (MEAMs). Similarly to Schulkind et al. (1999), 329 undergraduates were played excerpts of popular music that dated back to childhood and were asked to rate emotionality and familiarity. However, in this instance they were also asked to provide information on any memories evoked. They found that 30% of all song presentations evoked autobiographical memories which ranged from general to specific, and the majority of these evoked a positive emotional response. Barrett et al. (2010) also explored this relationship using random song excerpts and found the autobiographical salience of specific songs to be the main predictor of music-evoked nostalgia.

These studies implemented a different approach to evoking autobiographical memories that is unlike the more conventional procedures that directly encourage retrieval of a memory, often via word cueing techniques (Crovitz & Schiffman, 1974). In these instances, it appears that music acts as its own cue to retrieve more specific MEAMs, involving a much less active and effortful search (Janata et al., 2007; El Haj et al., 2012).

2.1.2 Music and emotion

The strength of music as a cue for autobiographical memories is in part why it triggers such potent emotional responses in people. However, music in and of itself also has the power to create and convey emotion, which is translated to us via pitch, tempo, rhythm, timbre, and dynamics.

"*Music is the shorthand of emotion.*" –Leo Tolstoy

"*Why waste money on psychotherapy when you can listen to the B Minor Mass?*" – Michael Torke

These quotations regarding the relationship of music and emotion are likely to resonate with many. However, whilst Tolstoy suggests that music conveys emotion of the listener, Torke instead suggests that music influences these emotions. Nonetheless, it is clear that hearing just a select few notes of a piece of music can trigger an array of emotional responses in the listener. Research shows that music appears to activate nearly every neural structure in the brain, including (but not exclusive to the cerebellum, auditory cortex, parahippocampal gyrus and amygdala (Blood & Zatorre, 2001). Listening to pleasurable music has been found to result in activation of specific neuronal pathways, with anticipation associated with caudate activity, and a peak emotional response correlating with activation in the nucleus accumbens, a region of the dopamine reward pathway which is also activated in response to food, sex, and drugs (Blood & Zatorre, 2001; Menon & Levitin, 2005; Salimpoor et al., 2011). Furthermore, self-report data has also revealed that in a free recall setting, participants described emotions felt during strong experiences of music to be primarily positive (Juslin & Laukka, 2004), and most often provoked were chills down the spine, laughter, tears, and a lump in the throat (Sloboda, 1991).

How much does music set the tone for our emotions, or how much does it encapsulate and bind to the emotions that we are feeling during a given time? Regardless of the direction of such a relationship it is apparent in anecdotal and empirical evidence that there is a strong link between, music and memory, and emotion, and that emotional responses are so often present in autobiographical remembering.

2.1.3 Neural underpinnings of music and memory

In addition to the behavioural research regarding MEAMs and associated emotional valence, there have been a number of neuroimaging studies addressing the neural basis of this relationship. Clive Wearing is a professional musician and conductor who was afflicted with encephalitis in his forties, resulting in severe brain damage in his hippocampus and, consequentially, chronic anterograde and retrograde amnesia. Despite remembering little from his past and being unable to form new memories, his musical ability in playing and conducting has been remarkably well preserved (Baddeley, 1987). Baird & Samson (2009) have found that whilst musical memory

may not be completely preserved in all individuals with memory impairments, isolated aspects of musical memory can be. They observed that dementia patients struggled to recognise and learn new music; however, they were able to play or sing right up until the later stages of the disease. Here we are seeing a familiar distinction of voluntary vs automatic memories, where more involuntary and automatic examples such as playing and music-evoked nostalgia remain. Much of the literature looking at dementia and the notion that memory is non-unitary has found that musical memory may be distinct from other forms.

Jacobsen et al. (2015) investigated the extent to which musical memory is independent from other memory systems and provided evidence for a potential "musical memory region" that appears to be preserved in Alzheimer's disease. They found that when participants were played excerpts of older known music compared to recently known or unknown, there was activation in the caudal anterior cingulate gyrus and ventral pre supplementary area. Follow-up research showed that these very areas show the least atrophy in patients with Alzheimer's disease. Jacobsen et al. have thus put forward the argument that, despite other areas such as the temporal lobes having a large involvement in explicit musical memory constructs, they are not necessarily essential in the long-term storage process of musical memory. Further to this, Janata (2009) theorised that the medial prefrontal cortex (MPFC) is likely to play an integral role in the relationship of music, memory and emotion. Multiple brain imaging studies assessing this triad have found consistent activity in this region (Svoboda et al., 2006; Janata et al., 2002; Zatorre & Krumhansl, 2002), and similarly to that of Jacobsen et al., this region has shown lower cortical atrophy in Alzheimer's disease (Thompson et al., 2003). Janata (2009) used fMRI whilst eliciting autobiographical memories using 30-second excerpts of popular music and found that the activity of dorsal regions of the MPFC correlated with autobiographical salience. Furthermore, they found response rates in the MPFC to be faster in correspondence to the signature moments of the music being played, all of which suggest this region associates music-evoked memories with the emotional salience triggered by familiar songs from our past.

2.1.4 Music and the reminiscence bump

With such a strong link to our personal narratives and sense of self, it is unsurprising that music plays such a key role in people's lives. There is evidence to suggest that, aside from the voluntary recall of musical memory, music can trigger emotions and memories from particular life periods more readily than other periods. A large-scale study was conducted in which nearly 4000 people were asked for their most salient memory associated with The Beatles (Morrison & Conway, 2016). These details could include a song, album, event or even a personal encounter. Simply mentioning these details resulted in people gravitating towards memories from their adolescence, despite the age range spanning 18-87 years. Memories were mostly of positive emotional valence, and men and women were found to report comparable levels of emotion associated with the memories recalled. As previously discussed, this reminiscence bump is an established phenomenon in the literature when recalling autobiographical memories, whereby memories between 10-30 years appear to be more accessible (Conway & Haque, 1999). In earlier studies, the reminiscence bump was identified using basic word-cueing techniques to evoke autobiographical memories, wherein people would recall memories across the lifespan, with a tendency to cluster around adolescence and early adulthood. However, the reminiscence bump is also exhibited when preference is requested. Studies have found that people's favourite songs, films and others (Holbrook & Schindler, 1989; Janata et al., 2007) tend to evoke memories of events that occurred during this period.

Krumhansl & Zupnick (2013) investigated the personal memories of young adults and their association with popular music across 5.5 decades in order to assess whether music recognition and preference would display a reminiscence bump. They also measured participants' quality judgment and emotional reactions to the excerpts. Based on the release date of these songs, they found not only the usual and expected reminiscence bump for all measures, but made a new discovery they called the cascading reminiscence bump. That is, the same peak was found for the parental generation, located during the 1980s. Krumhansl and Zupnick argued that these findings exhibited the function of music in social bonding, particularly as self-report data showed that participants did indeed listen to their preferred songs with their

parental figures. Arguably, this methodology may still present some limitations, as the age of a person at the release date of music does not necessarily equate to when the participant heard the music, nor when it was most personal or evocative for them. In a sizeable follow-up study with 1910 participants of all ages, Krumhansl (2017) found that the cascading reminiscence bump effect might actually be what she referred to as a "decade effect". In this study, she found that the most preferred music dated from the 1940s, 1960s, and 1980s, and argued that this may be the result of changes in technology and musical style evolving, and these were periods of great cultural and political change. Despite this, the surveys still reflected social bonding in that people are likely to listen to music with others, and that this is subject to change throughout the lifespan, in line with important attachments.

Rathbone, O'Connor, & Moulin (2017) conducted a similar study in which participants aged over 40 years were presented with a group of top-grossing songs and films, and instructed to select the five that they felt were most personally significant. The authors compared the lifespan distributions of the participants' ages both when these songs were released (AaR), and the age that the songs were most important to them (AaI), and found the reminiscence bump effect in both instances. They also found that personally significant songs were most likely to be associated with episodic memories, whereas non-significant songs were not. These findings support the theory that the reminiscence bump is at least in part consistent with the formation of identity and selfhood during this particular period.

Current findings, both of a behavioural and neurological nature, have raised new questions regarding the techniques used to cue and measure autobiographical memory. Firstly, the participant sample of most studies in this realm tends to be of one extreme or the other in terms of age. That is, studies focus on the memories of undergraduate students, or older adults over 65 years of both healthy and clinical samples. There appears to be a scarcity of research observing people during mid-adulthood. Whilst some memory retrieval research has utilised the free recall method (Schlagman et al., 2009), structured recall approaches have taken precedence, particularly with regards to music reminiscence. Thirdly, the majority of studies assessing MEAMs or music preference across the lifespan have selected the stimuli for the participants in order to accurately date memories. In most cases, the selected stimuli are limited to popular

music genres to allow for recognition. However, considering the personal connection of MEAMs evoked both by chosen and non-chosen stimuli and the wide range of genres available – the DID facts and figures webpage revealed that guests' top chosen tracks and artists are all of a classical nature – it is possible that this methodology is limiting and potentially skewing the data. Allowing people the choice to select their own cues may well give rise to new implications of the use of music in therapeutic settings for people with memory impairment.

Further to this, there is currently contradictory literature with regards to whether the reminiscence bump is associated with accessibility or preference (Munawar et al., 2018). As a result of maintaining control over the cue that participants are receiving, there are limitations arising regarding data that could potentially address this issue. The nature of autobiographical memories evoked via the use of music ought to be explored further by analysing the content of reasons why people have made their choices.

Loveday & Conway (in prep.) carried out a study assessing musical preference and reminiscence in musicians vs non-musicians. Their study implemented a novel, free-recall technique, in which participants were asked to select 10 songs that had great meaning or significance to them, to provide a short explanation for their choices, and the age at which this was important to them. Consistent with previous research, people's favourite tended to be from during their reminiscence bump, peaking during the 15-19 year age period. Furthermore, they discovered that musicians showed a more prominent reminiscence bump than non-musicians, producing more self-defining memories relating to their identity as a musician. This provides support for the selfhood account theory of the reminiscence period. Loveday & Conway (in prep.) also asked participants to provide a reason for their song choices, and found that musicians were significantly more likely to choose songs for their lyrics, and because they were self-defining. Non-musicians were reminded of general memories significantly more than musicians, but overall participants provided a range of memory, sensory and affective-related reasons. Regardless of these differences, these

results show that preferred music can be selected for a plethora of reasons that relate to personal narrative.

2.1.5 Desert Island Discs

DID has been presented by Plomley (presenter 1942-1985), Michael Parkinson (1985-1988), Sue Lawley (1988-2006), Kirsty Young (2006-2018) and Lauren Laverne (2018 - present) and celebrated its 75th anniversary in January 2017. At face value, it involves a simple premise in which people talk about their lives whilst discussing music that they like, but after listening to a handful of episodes it is clear that there is far more at work here.

An article written by Dolly Alderton in 2014 discussed how DID offers a unique form of education to listeners. As well as exposing people to different sounds and genres that may in turn impact their own lives, the musical element of the program also allows listeners to delve into the identity of the guests in a way that a standard interview does not achieve. This unpredictability makes for a much more telling and intimate listening experience, which provides some insight as to what sets DID apart from other formats. The show appeals to the masses because it is a natural human trait to be inquisitive about other people's lives; we are a very social species, and music appears to offer a special medium with which to share and bond with one another. It becomes clear that with each musical choice, there is almost always an emotional aspect, memory, defining moment, and often another person attached to the core. Many guests have expressed difficulty in narrowing down their choices to just eight, because it is evident that if one were cast away on a desert island, one of the most effective methods of bringing things of great importance with them is via music.

In a social context, music contributes not only to the process of sense of self, but a sense of identifying with others (Frith, 1996). They suggested that this process begins not with a social group listening to music that articulates its beliefs, but music itself that has an unspoken understanding of both group and individual dynamics. When it comes to a programme such as DID, it cannot be denied that each guest must take a third member of the conversation into consideration when choosing their music: the

audience. Cohen & Duberley (2013) discussed the presentation of the self in DID and referred to Erving Goffman's (1959) work on human social interaction and consequentially, impression. He uses dramaturgical imagery to explore how individuals reveal parts of themselves to convey a certain image to others, which in turn is shaped by all parties involved. Cohen & Duberley apply these ideas to the DID setting: "Goffman's idea that the self is constructed in negotiation with others … can be seen as fundamental to the Desert Island Discs format, particularly as the programme has evolved since its early years." (p. 168). Kirsty Young, one of the show's presenters, describes the phenomenon as a "triangulated conversation – castaway, host and listener sitting around the table in a no-holds-barred dialogue…"

Whilst the audience is physically absent, they remain a critical part of the interaction. The guest may be partaking in dialogue with the presenter, but in reality, their musical choices, stories, and by default, a part of their selfhood, are being heard by tens of thousands of listeners. This is sure to have at least partial impact on how each guest presents themselves, their choices and their associated memories and emotions. In this unique scenario, it is not known whether guests would produce the same reasons and memories shown in empirical research when discussing their chosen music.

2.1.6 Current study

The current study aimed to investigate how and why people select their musical choices in a non-research setting. It explored the degree to which these songs remind them of their past, and where these memories occur throughout the lifespan. Specifically, it considered whether the reminiscence bump is present in a semi-structured free recall with guests who are notable public figures. Further, this study investigated the reasons behind people's musical preferences with the view of investigating the nature of autobiographical memory by using a coding mechanism developed from previous theoretical studies of autobiographical memory.

2.2 Methods

2.2.1 Design

Two aspects were assessed in this study:

a) The presence of a reminiscence bump across the lifespan – this was indicated by participant-generated ages of descriptions of specific memories that were included as a reason for choosing songs, deemed Age at Importance (AaI).

b) The reasons why people selected their songs.

a) AaI for each song (that was reported or identifiable) was allocated into ten 10-year age brackets. The dependent variable was the number of songs reported with an AaI.

b) Reported reasons for choosing songs were retrospectively allocated into four reason categories for the purposes of this study: general memories, specific memories, musical qualities, and emotional responses. Each level was comprised of sub-categories, illustrated in Table 1. The dependent variable was the number of times a reason was provided per song choice.

2.2.2 Secondary data of interviews guests

Data were obtained from the Desert Island Discs Archives (DIDA) from the BBC website. Episodes were selected via quota/stratified sampling, to ensure that demographic representation of age, sex, occupation and date of broadcast was maintained. Furthermore, guests aged 30 years and below were excluded to avoid potential merging of reminiscence bump and recency effect in younger participants.

Interview guests were invited by the BBC to participate in a live (circa 1960s) or pre-recorded interview, which was then broadcast at a later date. Most recorded episodes have been archived on the BBC Radio 4 website and are available to the general public to listen or download (see Appendix 1 for full list of interview guests).

The interview episodes analysed in this study included interview guests of 31 females ($M = 63.3$ years, $SD = 16.10$) and 24 males ($M = 55.4$ years, $SD = 13.98$). The youngest participant was 35 years and the eldest aged 95 years, with the majority of guests over aged 50 and over (69.1% of sample).

2.2.3 Materials

All interviews were accessed publicly from the British Broadcasting Corporation (BBC) Desert Island Discs Archives (DIDA), accessed at the following URL: http://www.bbc.co.uk/programmes/b006qnmr

2.2.4 Procedure

2.2.4.1 Desert Island Discs

Desert Island Discs (DID) interviews have been conducted over a 75-year period. Interviews prior to 1960 were broadcast live, whilst those succeeding were recorded prior to the broadcast date. The duration of each episode is approximately 43 minutes, though sections in which guests introduce and discuss each musical track can last from 10 seconds to 3 minutes.

2.2.4.2 Transcripts: AaI and reason coding mechanism

A total of 55 interviews were evaluated to establish a representative participant sample, with each interview containing 8 musical tracks, making a total of 440 choices made. Of these 55 interviews, 40 were transcribed to allow for the inter-rater agreement statistic to be administered. The remaining 15 episodes were coded by ear. Interviews were not transcribed in their entirety: the interview portions concerning reasons for choosing songs were transcribed and scored were limited to the information provided by the participant/interviewee upon being instructed to introduce their next musical choice by the interviewer - data between these portions of the interview were disregarded (see Appendix 2 for example transcript & coding).

In each case of song choices, assessments were made the age at which their song choice was important to them. These data were allocated into 10-year age brackets as well as broader lifetime periods (Childhood 0-14 years, Reminiscence Bump 15-29 years, Early Adult 30-45 years, and Older Adult 45 years+).

Due to the naturalistic and unstructured style from which this secondary data was generated, it was not always possible to specify the AaI. In some instances, participants did not explicitly state or describe a specific event or time period in which the song held importance. In other cases, ambiguous descriptions were provided, "*Now, the first piece of music is a song that I had when I was a child. It was very interesting for me that this very young artist, still in his thirties I think, recaptured that song and, in listening to it, made me go back to my childhood. I love it.*" – (Wangari Maathai), some of which were decipherable using other interview content or via online search engines: "*My next piece of music is actually Amazing Grace, and when I first arrived at Sherborne, I didn't know about priests, and all I could see was all these girls in a hall with a man dressed in black with a white collar, and as far as I was concerned, he was shouting. So it sent chills up my spine, this.*" – (Camila Batmanghelidjh).

The second key area that was being assessed was the reasons that people presented for their song choices. Responses included a broad range of reasons and explanations (see Table 1 below). At this study sought out to investigate the memory elements involved in song choices, the framework of the implemented coding mechanism was built from

previously established mechanisms from the literature (Levine, 2002; Kopelman, Wilson, & Baddeley, 1989; Williams & Broadbent, 1986). Each response was assigned one code maximum per category of 'general memory' (of a person, place, or period of time'), 'specific memory' (event/first-time/self-defining/culture-defining), musical/sensory quality (musical structure, music lyrics, music vocals); and emotional responses. In order to refrain from double coding reason content, participants who described more than one reason from the above categories, for example, both a general memory of a person and a period of time: "*When I used to go up to London in those early days, he was in the company at the Old Vic and he played Hamlet there, which I think was the first theatrical event that really got through to me. And I don't know how many times I saw him do Hamlet, but… many, many times.*" – (Josephine Barstow), this song choice would be scored according to the first or most prominent reason provided. Inter-rater agreement statistics were carried out in order to control for this.

Table 1: Coding criteria of reasons provided for song choices in Study 1

Reason	Description	Example/s
General memory		
Person	Mention of another person and/or presence	"*My mother… died quite recently at 105… of course my mum absolutely loved that, so I've chosen a nice noisy version.*"
Place	Mention of a particular location, geographical or identifiable physical space	"*It's something that serves to remind me of South Africa and there's just an atmosphere… which reminds me of those early days.*"
Period	Mention of a wider life period or memory outside of episodic duration, or described period made up of multiple/repeated events	"*Miriam Makeba… especially during the apartheid years, was singing freedom songs and encouraging us in Africa to continue struggling*".

Self-defining memory (generic)	Mention of memory referring to highly significant events which provide people with a better understanding of both themselves or their identity and others in the world	*I wouldn't normally choose one of mine but Blood Brothers was a wonderful experience of mine. I got very involved in it and found out so much about myself playing Mrs. Johnston."*
Culture-defining memory (generic)	Mention of general time that defines a particular culture or era during a given period or shared memory	*It was during the time when punk rock was just emerging … too young to go to the night clubs but old enough to be excited about it.*

Specific memory

Episodic event	Mention/recollection of a definitive episodic event	*"…we sang the Verdi Requiem. After the Sanctus in this beautiful theatre, Giulini was conducting, everybody was concentration to the very end."*
First-time	Mention/recollection of a novel episodic event	*"Aretha started singing in church, and that was the first place where I really responded to music."*
Self-defining moment	Mention of moment referring to highly significant events which provide people with a better understanding of both themselves or their identity and others in the world	*"Meeting him [Britten] at 15 or 16, in a way, changed my life."*
Culture-defining moment	Mention of moment that defines a particular culture or era during a given time or shared event/memory	*"This marked a turning point in pop music; I think the great renaissance rock and roll of the sixties and early seventies…"*

Music quality

Structure	Mention of particular musical quality or elements, e.g. melody, dynamics, timbre, tone.	"*...Because of the melody being so delicate, and I thought these huge voices and this delicate melody which is so sad would be like the sea.*"
Lyrics	Mention of lyrical features of music	"*I love him as a lyricist… so I went with probably one of my favourite songs every written.*"
Vocals	Mention of vocal features of music	"*Bryn Terfel is a very big man with a huge voice … he's got immense control, he'll control down his voice and yet all the power is there.*"
Emotional response	Mention of emotional detail either within the memory provided or a current reaction as a result of stimulus/reminiscence	"*Well I think Billie Holiday is one of those stars, indescribable stars. Her voice describes the pain and the joys in her life, and I think it touches all of us.*"

2.2.4.3 Further data collection

The populated database also included demographic information such as age, sex, and profession of the interviewee. Other data measured included the decade in which the interview was broadcast, artist popularity of each chosen disc, the genre of the interviewee's favourite track ('Castaway's favourite'), and the position within the eight selected discs in which the Castaway's favourite was introduced.

2.3 Results

2.3.1 Inter-rater reliability

Twenty transcripts were scored and compared by three raters: AW, SK, and LR. The Cohen's Kappa statistic was administered to determine the level of agreement between the three raters on the AaI and reasons given for eight musical choices of ten participants, respectively. The inter-rater reliability for raters AW and SK was found to be: $\kappa = .771$ ($p < .05$), 95% Cl. The inter-rater reliability for raters AW and LR was found to be $\kappa = .804$ ($p < .05$), 95% Cl. These values were deemed to be significant, thus AW scored all further interviews independently by ear.

2.3.2 AaI: Age at Importance across the lifespan

Ages of participant at the release date of songs was not considered during this part of analysis, and instead, specific memories provided were used to plot Age at Importance (AaI) into 10-year age brackets. AaI was identified for 181 out of 440 discs.

16 songs from this dataset were identified as being self-defining moments, but due to the low count in most age brackets, statistical analyses were not conducted. Nonetheless, it was observed that 50% of self-defining memories occurred during the 11-20 year age period.

The distribution of AaI was compared with the expected distribution of these ages. While all individuals were able to select songs from the first four age brackets (1-40 years), only a proportion were able to choose songs from the later age brackets. For example, while a 95-year-old guest could select songs with AaI in any of the age brackets, a 35-year old would be restricted to the first four. Therefore, a chi-square analysis was carried out to observe differences in the observed versus expected number of AaI. The expected distribution was based on the null hypothesis that song choices would be evenly distributed across the lifespan to date. This was calculated for each individual (years lived in each decade/age x number of dateable songs).

The chi-squared analysis showed that the observed distribution of AaI of songs was not significantly different from the expected value [X^2 (9, $N = 362$) = 14.201, $p = .115$]. However, when directly comparing the age bracket distribution of observed values, song choices were found to be distributed significantly differently across the lifespan [X^2 (9, $N = 181$) = 158.834, $p < .001$], and it was observed that people tended to choose songs that were most important to them during their reminiscence bump (Figure 1).
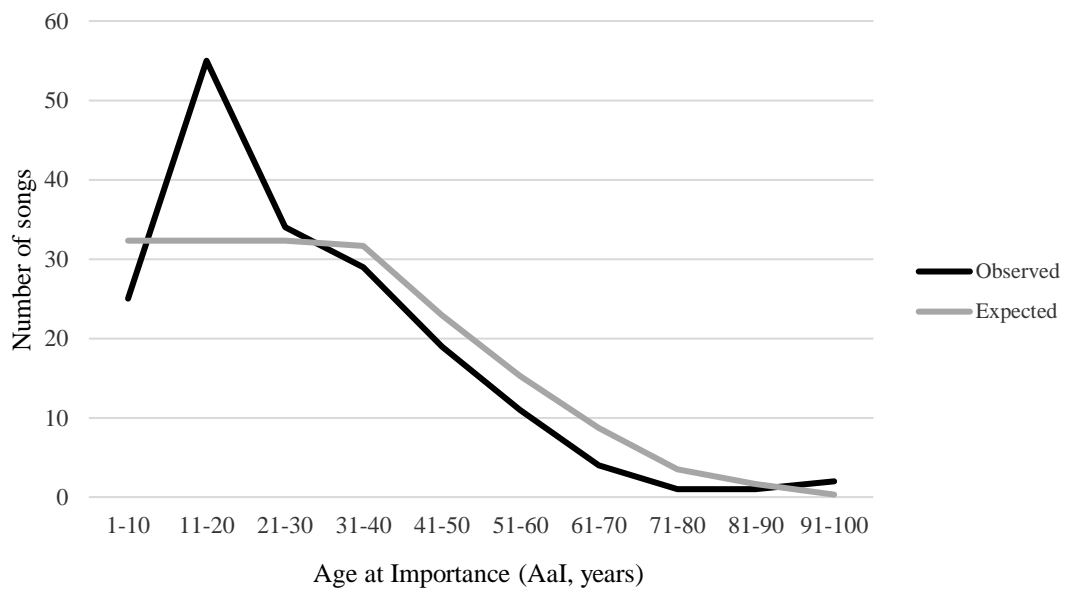
Figure 1: AaI of song choices across the lifespan in Study 1

2.3.3 Reasons for song choices

The reasons provided by interviewees for their eighth disc choices covered a range of different elements, including general memories, specific memories, musical quality, and emotional content. These have been displayed in overall and sub-categories within Table 2.

Due to small mean values, reason elements were combined into the four most described overarching categories for further statistical analysis (Table 3).

Table 2: Mean number of reasons provided for choosing songs in Study 1

Reason			
Overall category	Sub-category	Mean	*S.D.*
General memory	Person	1.71	*1.40*
	Place	0.47	*0.74*
	Period	1.55	*1.34*
	Self-defining	0.25	*0.62*
	Culture-defining	0.16	*0.42*
Specific memory	Event	1.07	*1.10*
	First-time	0.64	*1.13*
	Self-defining	0.33	*0.58*
	Culture-defining	0.09	*0.29*
Musical composition	Structure	1.16	*1.34*
	Lyrics	0.62	*0.93*
	Vocals	0.60	*0.81*
Emotional response		1.91	*1.62*

Reasons regarding generic self- and culture-defining memories were excluded due to low frequencies. Furthermore, due to the skewness of the data, non-parametric tests were carried out, and a Friedman's test revealed a significant difference between the reasons for choosing songs [$\chi^2(3) = 25.800$, $p < .001$].

Table 3: Mean frequency and standard deviation of overarching reason categories for choosing music in Study 1

Reason	Mean	*S.D.*
General memory	3.73	*2.03*
Specific memory	2.13	*1.74*
Musical composition	2.38	*1.64*
Emotional response	1.91	*1.62*

Post hoc analysis with Wilcoxon signed-rank tests was conducted with a Bonferroni correction applied, resulting in a significance level set at $p < 0.0083$. Analyses confirmed that general memories were described significantly more than specific memories [$Z = -3.681$, $p < .001$], musical composition [$Z = -2.946$, $p = .003$], and emotional response [$Z = -4.291$, $p < .001$].

There were no significant differences between specific memories, musical composition and emotional response reasons respectively [$Z = -.801$, $p = .423$; $Z = -.634$, $p = .526$; $Z = -1.415$, $p = .157$].

2.4 Discussion

2.4.1 Interpretation of findings

The hypotheses of this study were as follows: firstly, it was expected that the sample as a whole would choose songs that were important to them during the reminiscence bump period more than other age periods. Of all identifiable ages at which songs held most importance, 30.39% of them occurred in the 11-20 year age bracket, followed by 18.78% occurring in the 21-30 year bracket, totaling at 49.17% of all songs holding importance during the reminiscence period. A key finding is that despite the naturalistic setting and free recall "methodology" that occurs within DID, these results provide support of the robustness and consistency of the reminiscence bump phenomenon with regards to preference of chosen musical stimuli. Although interview guests aged less than 35 years were excluded from this study, there were 25.5% guests aged 35-45 years. Based on previous research, the reminiscence bump is thought to be present mainly in older adults, and that people below this age range may in fact be exhibiting the recency effect where the reminiscence bump is thought to be (Romaniuk & Romaniuk, 1981). Thus, this may be contributing to an earlier reminiscence bump effect, peaking in the 11-20 year bracket as opposed to the 21-30 year bracket. Allocation of AaI into smaller age-bins may have been more beneficial to identifying the exact location of the reminiscence bump in this sample compared to previous literature (Munawar et al., 2018). However, this was not carried out due to the small number of counts.

It was also expected that, based on the findings of Loveday & Conway (2016), that participants would provide a wide range of reasons for choosing their eight songs including being reminded of general and specific memories, and sensory details of the music itself. Once again, this was found to be the case across the entire sample. Overall, general memories were described significantly more as reasons for choosing songs, with 36.74% of the sample discussing being reminded of a person, place, or period of time. Of these general memories, 46.0% were describing memories of a person or group of people. This is a key finding and suggests that music has the ability to sufficiently represent a connection with another person. Taking into consideration

the premise of DID, which involves the guest being castaway in isolation and removed from their social circles, it is an important finding that people are very likely to choose music that makes them feel close to others when they are physically removed from them. This supports the social bonding theory of music and reflects findings of Krumhansl & Zupnick (2013) of generational reminiscence bumps and sharing listening experiences. Furthermore, this has implications for the use of musical reminiscence in vulnerable groups who are displaced from their memory systems. Some guests also chose songs because they reminded them of more specific moments in their lives, some of which were associated with first-time novel events, whilst others were of a self-defining or culture-defining nature.

These findings support the notion that music is consistent in evoking autobiographical memories, very often with an emotional response associated (Schulkind et al., 1999; Janata et al., 2007; Barrett et al., 2010). This is seen to be occurring despite the absence of music as an auditory cue (Loveday & Conway, 2016), which reinforces the notion that music can act as a cue to retrieve MEAMs in a much less conscious and effortful way (Janata et al., 2007). Similarly to Loveday & Conway (2016), participants also chose songs due to sensory details associated with the structure, lyrics and even vocals present in the music. These are features of music that have been found to evoke strong emotional responses (Kim et al., 2010).

Ultimately, in a naturalistic setting where people are not being deliberately instructed to recall certain details, they produce similar patterns to empirical findings (Munawar et al., 2018). The analysis of reasons for choosing music has contributed to the argument of accessibility vs preference for the presence of a reminiscence bump. Findings from this study suggest that this peak of important memories is not just the result of memories being most accessible, but that musical preferences also evoke memories from this period more (Rathbone et al., 2017).

Thirdly, it was found that that 50% of all songs that represented self-defining moments or memories were most important during the 11-20 year age bracket. This is a relatively low frequency with which to perform analyses and consequently draw any robust conclusions, but nonetheless it is in an interesting finding that could potentially provide support for the selfhood theory of the reminiscence bump. Furthermore,

despite the naturalistic element of DID, people discussed that music holds importance to them because it is associated with their sense of self and key points in their lives that form part of their identity.

2.4.2 Limitations

The current study has a number of limitations. Firstly, it is challenging to identify AaI in many cases because guests were not asked to deliberately recall memories. The counterargument to this is that this is a naturalistic and unique dataset, containing rich accounts of celebrity participants and examined in one of few music-based free recall settings. However, unlike studies such as Loveday & Conway (2016), interviews and primary data collection took place prior to the study. The interviews that were analysed ranged from being scripted to a more casual and conversational approach, guided by interviewer research as well as the musical choices themselves. The lack of empirical methodology compromised the ability to extensively date evoked memories, and therefore the lifespan retrieval curve could not be assessed in greater detail. 38.64% of all discs were successfully dated with AaI. It was not clarified whether or not non-aged songs were because age of importance was not a factor, or if it was simply unidentifiable. Despite this, these findings have provided a rationale to explore similar work with established methodologies.

It is important to consider that each individual may exhibit their own personal reminiscence bump during slightly different life periods to others. Whilst some participants may peak during the expected 10-30 year age bracket, others may exhibit an earlier reminiscence bump, as seen with musicians in Loveday & Conway (2016). For example, John Lee Hooker selected music, which he identified greatly with his own musical career and genre. However, all of these songs were aged as being most important during an early adult life period post 10-30 years, as it was during this time that his culture of music was in its prime. Individual differences like these, and the concept of choosing your own selections, are key concepts that should inform future work in this area.

On Desert Island Discs, some guests discuss stories that are directly related to their chosen music throughout the whole duration of the episode. For this study, transcripts were recorded during the explicit discussion of each disc, and not the entire episode. Whilst this allowed an element of standardisation across the sample, it failed to take into consideration other subject matter discussed during the interview that was often directly related to the preceding or succeeding songs. This study may have benefitted from considering larger parts of each episode, in order to gain further insight into the Considering other portions of the interview may give rise to the robustness of the reminiscence bump observed.

A main limitation of this study was the implementation of the coding mechanism to explore the reasons for song choice. As discussed, responses were vast and often included autobiographical memories of a specific and general nature, as well as emotional responses and reference to sensory features of the music. However, explanations for each disc were assigned one code maximum per category, wherein an explanation that included a general memory of a person and of a period of time, would be assigned only one of these features, to avoid double coding responses. However, often in autobiographical remembering these 'general memory' features often arise simultaneously. For example, a person may be reminded of spending time with friends during their university years in London. This features a general memory of a period of time, with people, in a place. Similarly, someone may describe a first-time memory that was also a self-defining moment. The current scoring mechanism would disregard memory features that are in fact present. In the case of comparing mean frequencies of overarching memory categories, such as general memories vs specific memories, these scores would not need to be totaled, thus avoiding double counts. Thus, findings from this study should encourage the development of such coding mechanisms to capture the complexity of autobiographical remembering.

2.4.3 Implications & further research

A key aspect of this study that should be refined is the method of drawing out reasons for choosing music, and whether these are only present in self-selected conditions. Past research assessing memories associated with music or MEAMs has employed a

methodology in which music is selected for the participant, but this study has given a degree of insight into what happens when people choose for themselves. Even in cases where participants are able to choose preferred songs from a selection as seen in Rathbone et al. (2017) and Krumhansl & Zupnick (2013), this remains to be a provided pool of stimuli that is often of the pop music genre in order to accurately age data. It is clear from the current study that allowing autonomy of participants still produces consistent results with regards to the lifespan retrieval curve, and preference can be considered in a more authentic manner.

This study is one of the first to analyse why people are choosing their preferred music, which has been found to be important for an array of reasons, particularly as it appears to facilitate social bonding. The results of this study give rise to the nature and retrieval of autobiographical memories during within a naturalistic free recall environment, and show that music is an extremely evocative tool. Regardless of whether it is used via word cueing or as audible excerpts, it has the ability to trigger a variety of memories and emotional responses in people. These findings have a variety of real life applications in terms of the use of both music therapy, but particularly reminiscence therapy to aid people with memory difficulties and those with memory impairments due to traumatic brain injury and various forms of dementia, as well as individuals experiencing displacement. Future research should seek to employ and explore the benefits of a free recall cueing method in a more empirical setting, with more rigid and explicit instructions.

It is still not clear whether these findings are unique to music. There are a number of other sensory stimuli that are known to evoke memories, but they have not yet been investigated in this way. As discussed previously, reminiscence therapy makes use of music as well as other tangible objects to improve psychological well-being, with a scarcity of research on the autobiographical content that may be evoked when discussing or interacting with these stimuli. Preferences for household objects and pictures may evoke memories of a similar nature, and from a similar time. There is certainly potential to explore avenues of application of these tools in evoking memory, but further research on the use of sensory stimuli in an empirical setting is required.

2.4.4 Conclusions

This study along with current research suggests that music is a powerful tool in evoking autobiographical memories in people, and that preferred music results in a robust reminiscence bump, even in a naturalistic free recall setting, and appears to be occurring slightly earlier than seen in other cueing techniques. Music appears to make people feel connected to others, and findings support the idea that music plays a key role in social bonding. People's preferred music also seemed to be associated with their identity and sense of self, particularly during the reminiscence bump period which provides support for the identity theory of this phenomenon. But whether or not these findings are truly unique to music remains to be seen. Desert Island Discs has provided a view into how and why people connect themselves to auditory stimuli and use them to reminisce. These findings have real life application with regards to reminiscence therapy practices. Further work is required in order to investigate the power of sensory stimuli such as music, objects, and pictures in an experimental setting, as well as considering the importance of choice and ownership in memory research methodologies.

3. Study 2: Sensory stimuli, autobiographical memory and emotional valence: a pilot study

3.1 Introduction

In line with previous work (Zimprich, 2018; Rathbone et al., 2017; Belfi et al., 2016; El Haj et al., 2012), Study 1 further supported findings that music is very powerful in autobiographical memories. Furthermore, music choices appear to be particularly concentrated in the so-called reminiscence period. Other studies have found a similar pattern of preferences for books, films, and footballers. However, there is a scarcity of research on whether this effect persists for other more tangible stimuli, such as those typically used in therapeutic settings. The second study of this thesis aimed to explore whether self-selected tangible stimuli, specifically objects and pictures, would serve as cues in evoking similar responses to those seen with music in Study 1, both in terms of memory retrieval and reasons for making these choices.

Whilst Study 1 shed light on the evocative nature of music, the non-empirical setting did not allow for the control of some extraneous variables. Therefore, this study has extended the Desert Island Disc methodology into a more controlled experimental design. This provided an opportunity to re-examine music reminiscence under a more classic experimental procedure. Furthermore, it aimed to make direct comparisons with other tangible stimuli that may be experienced every day, which has been explored far less in previous literature. This knowledge has provided useful insight into the cognitive mechanisms of cued recognition, which is important for those developing real-life applications of reminiscence therapy.

This study aimed to address whether an allocated sensory stimulus type would affect the following:

1. The temporal distribution of age when first encountering preferred stimuli as previously seen with music and other memory cueing techniques.
2. The reasons that people chose their preferred stimuli.
3. The emotional valence of memories associated with their preferred stimuli.

3.1.1 Application of sensory cues

Reminiscence therapy is a popular technique used with older adults, particularly patients experiencing dementia-like symptoms. It is defined as the use of life histories to improve psychological well-being, and often involves the use of objects to stimulate conversation and memory recollection (Woods et al., 2018). Woods et al. (2018) and Cotelli et al. (2012) conducted meta-analyses of reminiscence therapy studies with dementia patients, focusing on the impact of general wellbeing and the effects on patient-caregiver relationships. Generally, these studies have shown improvements in self-esteem, mood, and cognition. However, there is little investigation into the cognitive mechanisms that are involved when reminiscing with different stimuli. This recurring limitation has led to questions as to how or why improvements are occurring, or which types of stimuli may be particularly effective under different circumstances. Therefore, further research is required in order to better understand the nature of memory in cognitive decline, which will in turn provide more empirical evidence for clinical application.

Overall, current reminiscence techniques are not heavily theory-driven with regards to autobiographical memory and the way that memories tend to be distributed across the lifespan. As noted in Chapter 2, a number of studies suggest that some parts of the lifespan may be more easily accessible via different sensory cueing routes. Thus fur, findings have supported the notion that some parts of the lifespan may be more easily accessible than others, but questions remain about whether this effect carries across to other types of objects and tangible stimuli used in reminiscence therapy.

3.1.2 Sensory cues and memory

One sensory stimulus that has attracted attention in memory research is the sense of smell, and there have been a number of studies to show that odours can evoke highly emotional autobiographical memories (Herz & Cupchik, 1992; Chu & Downes, 2000). When comparing these olfactory cues to other stimuli, such as visual, tactile and verbal, the emotional strength of memories tends to be higher (Herz, 2004). Some of these investigations have also highlighted that simple word-odour labels are much less

effective than true odour cues (Willander & Larsson, 2006). This has suggested that interacting with the physical presence of stimuli may be far more beneficial within applied settings, rather than simply discussing them. Herz (2004) compared autobiographical memories relating to a campfire, freshly cut grass, and popcorn, all evoked by different cue modalities: olfactory, visual, and auditory representations. When asked to deliberately retrieve autobiographical memories denoting a person, place or event, olfactory cues evoked far more emotional autobiographical memories, and also evoked memories that felt more vivid. These findings have been supported by neuroscientific evidence of specific neural circuits associated with retrieval of olfactory-imprinted memories (Jin, Pokala, & Bargmann, 2016).

While odours may be particularly evocative, they are of limited use in older people, especially those with Alzheimer's Disease, who tend to have very poor sense of smell (Kotecha et al., 2018). This may be why reminiscence therapy practices tend to focus instead on tangible objects. In 1987, Edward Casey coined the term "reminiscentia" to describe objects that possess the special ability to arouse the activity of reminiscence, including photographs, letters, souvenirs, and objects that remain available in perception. Sherman (1991) conducted a study regarding cherished objects as inducers of reminiscence, asking 100 older adults aged 60-102 years to list the kinds of objects that they feel result in reminiscence more than others. They were also asked to list and describe personal possessions or objects that are special to them, or any that they cherish more than other objects, and lastly asked to provide a brief explanation as to why they were significant. It was found that all but four participants were able to identify at least one object that caused them to reminisce. It was particularly noteworthy that all of the cherished objects that first appeared in their original memorabilia list evoked autobiographical memories and were cherished due to this reason. Sherman also found a positive relationship between memorabilia and mood.

Similar to previous studies investigating musical memory and nostalgia (Schulkind et al., 1999), Sherman's (1991) work has some limitations. Explanations for object choice were allocated into 'memories', 'associational context', 'experiences', 'personal values', and some other categories. However, papers discussing the content and nature of autobiographical memories show that these features often arise simultaneously, thus there may be some deeper findings regarding 'reminiscentia' that

are being concealed. Nonetheless, this study does confirm that for some individuals, cherished items seem to serve a reconstructive function whereby memories were evoked and consequently provided an opportunity for life periods to be rebuilt. Price, Arnould, & Cursai (2000) also found that cherished possessions play an important role in older consumers' reminiscence and life review. These studies of reminiscence of tangible objects have highlighted a really significant point surrounding the importance of ownership. The theme of autonomy and ownership is rarely considered in other autobiographical memory research, including those that directly assess application for memory support (Cotelli et al., 2012). Study 1 has also shown that chosen music evokes a range of personal memories and emotions for individuals, providing a route into exploring the nature of autobiographical memory more deeply.

Episodic memory recall has been shown to benefit greatly from the presence of explicit retrieval cues (Lehmer & Bäuml, 2018). This can range across many different prompts, such as being around the same people, or located in the same place that a memory was encoded (Wagenaar, 1986). These cues can provide a context that enables retrieval. This view is supported from a neural perspective, in which episodic memory appears to rely on the increased activation of sensory information from the encoding stage, to contribute to later recollective experience (Waldhauser, Braun, & Hanslmayr, 2016). Within the self-memory system model of memory, this would suggest that sensory cues are able to activate memories readily between different levels of knowledge structures and lifetime periods (Conway & Pleydell-Pearce, 2000), which are intrinsically primed for activation (Conway & Loveday, 2015).

With this in mind, some studies have focused specifically on the use of sensory stimuli as purposeful cues for autobiographical remembering. Rubin, Groth, & Goldsmith (1984) compared memories that were evoked by olfactory, photographs, and verbal cues. They found memories to be distributed in a similar fashion to one another. However, further research has shown olfactory cues to evoke primarily childhood memories, primarily 6-10 years (Chu & Downes, 2000; Willander & Larrson, 2006). Willander and Larsson (2006) also found verbal and picture cues to evoke a reminiscence bump at 11-20 years.

Further to this, there is recent evidence to suggest that photographs from past events can have a positive effect on autobiographical recall for people with a range of memory difficulties. Loveday & Conway (2011) worked with an amnesic patient CR, by instructing her to record autobiographical events by writing in a diary and wearing a camera with SenseCam technology that would document her daily activity by taking regular and automatic photographs. CR was able to recall significantly more new episodic detail after reviewing the SenseCam photographs compared to looking at her diary of the same event. The researchers highlighted the importance of perspective when acknowledging these findings, stating that the stimulus reflecting the individual's perspective was a key reason for the memory recall, as opposed to photos taken of the individual. Woodberry et al. (2015) conducted a similar experiment with 6 participants with Alzheimer's disease. Findings supported that of Loveday & Conway (2011), with significantly more details being recalled when cued with SenseCam photographs in two thirds of the sample. Those that showed an improvement in autobiographical memory stated that they found the experience enjoyable. This suggests that these photographs not only provided effective cues, but also did so in a way that was accessible and enjoyable for many users. This is something that few memory retrieval methodologies have benefitted from.

Current literature suggests that tangible objects and music both serve as powerful cues for episodic memory retrieval, and there is some evidence to suggest that such cues may have benefits for people experiencing memory problems. However, there is a surprising lack of research that looks into how these cues play a role in the memory system, and why they evoke these memories. Very few studies have systematically compared different types of cues in terms of the nature of memories they evoke, and which life periods these cues provide insight on. Further to this, the role of ownership and the nature of chosen-cued memories have not been explored. In order to understand the use of tangible cues in accessing a system built on self-knowledge, an investigation of self-related cues is necessary to consider. Data from Desert Island Discs demonstrated that even in casual conversations, allowing people to openly discuss their preferred music can invite exploration of personal narrative. It raises the question as to whether this is also experienced in a more standardised experiment, where people are asked more explicitly why things are important to them.

These techniques have the potential to provide insight into the neuropsychology of individuals with both typical and atypical aging. There are promising findings with regards to evoking memory with tangible, non-linguistic cues such as music and photographs in free recall settings, and how these stimuli can be used to measure autobiographical memory. This knowledge in turn, has the scope to inform the nature of various memory impairments and how they are best supported, combatting the inconclusive and inadequate state of current therapeutic approaches. This influence will have an even greater outreach for supporting memory in a clinical setting, where memory is key to the methodology.

3.1.3 Current study

The current study trialed a methodology based on the concept of Desert Island Discs in Study 1, by asking participants to select ten items of a randomly allocated stimulus - music, objects, or pictures - that they deemed significant to them, and were instructed to report specific age data for when these choices were first encountered to allow a more accurate analysis of preferred stimuli across the lifespan. This pilot methodology also allowed for an assessment of wording of instructions in an experimental context, including the order of questions to participants, and consequently the responses that were collected.

The participant age group of 40-50 years was used in this study for a number of reasons. Firstly, this demographic is one that is typically neglected in AM studies, which instead tend to focus on undergraduate students, or older adults and individuals living with dementia. Secondly, this study sample were unlikely to have experienced cognitive decline to a degree that significantly affected their memory retrieval, and therefore were likely to be relatively homogenous in terms of memory function. Lastly, this demographic was deemed to be more recruitable for this online pilot study.

3.2 Methods

3.2.1 Design

The independent variable for this study was *Stimulus condition*, which refers to type of sensory device that the participant that may evoke a specific reaction. This between-subjects variable had three levels: Music ($N = 9$), Objects ($N = 9$), and Pictures ($N = 10$).

This study aimed to investigate the effects of stimulus on the following:

a) The presence of a reminiscence bump across the lifespan – this dependent variable was indicated participant-generated Age(s) at First Encounter (AaFE) of each stimulus selection
b) The reasons provided for choosing stimuli
c) The emotional valence of memories associated with chosen stimuli

3.2.2 Participants

Twenty-eight subjects aged between 40 and 50 years-old were recruited for this study. Firstly, this age group were more easily recruited via online data collection. Secondly, their responses were unlikely to be affected by any memory problems. Lastly, this study aimed to control for the typical uneven lifespan distribution, and therefore recruitment was limited to a 10-year age bracket. One of the main purposes of this study was to pilot a novel methodology based on the procedure in Study 1 and assess responses in order to refine a methodology aimed towards older adults, who form the target participant group later in is thesis. Therefore, they were omitted from the demographic for this study.

Participants included 19 females (range: 40-50 years $M = 44.32$, $SD = 3.35$) and 9 males (range: 41-49 years, $M = 45.00$, $SD = 2.55$). They were recruited via opportunity sampling and were accessed predominantly through word of mouth and sharing the

questionnaire on social media, such as Facebook and Twitter (See Appendix 3 for Ethics Committee approval letter).

3.2.3 Materials

An online questionnaire was constructed using Qualtrics software. There were 5 main sections of this study. Please refer to Figure 2 for a running order of the questionnaire. The first page displayed a brief overview of the study, with basic instructions: "*For many people, stimuli such as music, images and objects can trigger a variety of feelings and memories. You are being invited to participate in a research study that helps us to understand this better. This is part of a wider project that aims to develop ways to support people with dementia and other memory impairments. In this questionnaire, you will be asked to identify things that have particular significance to you and briefly explain why. - The study will require you to complete a questionnaire on 10 pieces of music, objects, OR photographs that you can remember and to briefly state when these songs/items were most relevant to you and why. This questionnaire should take approximately 20-25 minutes to complete. Please read all instructions carefully.*" (See Appendix 4 for the original form).

The second page required participants to tick a box to confirm they understood that these study procedures are not designed to detect cognitive abnormalities. The next page requested simple demographic data, age and gender. At this point in the questionnaire, a randomisation function within Qualtrics software was used, and participants were automatically directed to one of three questionnaire routes, corresponding to an individual stimulus condition: music, objects, or pictures. Due to the predicted length of the study (20-30 minutes) and to prevent respondent fatigue effects, participants were only allocated one of three conditions.

On the next section of the questionnaire, participants were given the following instruction: "*Please name 10 [pieces of music or other recorded sound, objects, picture or still images] that you feel hold importance or significance to you. These [pieces, objects, pictures] should be something that has existed or something that you have personally [heard, held, seen]. You may well feel there are more than 10 or that*

your choices may change if you were to think about it again another day but that is fine. Please just select the 10 that come to your mind right now. Where possible, please explain very briefly why you have made that choice. If you remember the age you were when you listened most to this piece of music, please write this down too."

Participants were asked three questions associated with each choice:

1. Explanation: *Why did you choose this [stimulus]?*
2. Age: *When (approximately did you first encounter this [stimulus]?*
3. A) Emotional valence: *If you have any memories associated with this [stimulus], are they generally… - Likert scale - very negative, negative, neither positive nor negative, positive, very positive, mixed.*
   B) Emotional strength: *If you responded with 'mixed', how would you rate the strength of these mixed emotions? - Likert scale - overall quite weak, overall medium strength, overall quite strong*

After the final stimulus choice questions were answered, participants were taken to the fifth and final section, in which they were thanked for taking part in the study. Here, participants were given the option to provide feedback to the researcher and enter their email address to receive a summary of the findings before submitting their data.
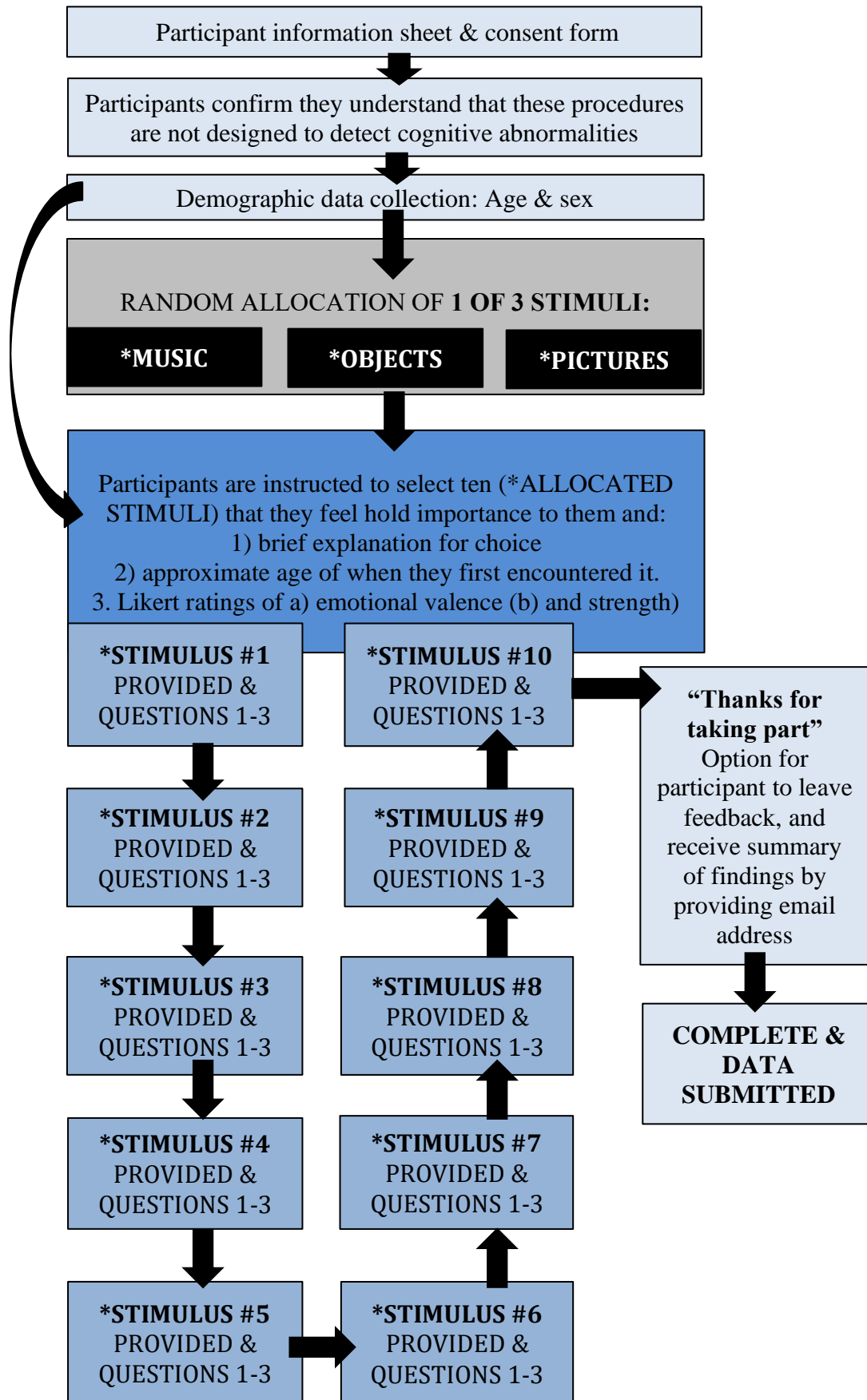
Figure 2: Flow-chart to demonstrate the procedure in Study 2

3.2.4 Procedure

3.2.4.1 Qualtrics questionnaire

Having first read the information sheet and completed the consent form, participants were randomly allocated (by the online questionnaire platform) to a stimulus condition and were given the instruction to name 10 stimuli within their condition (pieces of music, objects, or still images e.g., photographs or pictures) that they felt held importance or significance to them. They were not required to have owned the objects or pictures, but that they must have at some point seen or held them. They were also informed to select the choices that came to them at the present, and to disregard the thought that their choices may be different at another time.

Subjects responded to three questions for each of the 10 choices of their allocated stimulus: Firstly, a brief explanation as to why they made this choice, secondly, their approximate age at the time they first encountered this stimulus. Thirdly, participants were asked to rate the emotional valence of any memories associated with their choice on a 6-point Likert scale ('very negative', 'negative', 'neither positive or negative', 'positive', 'very positive', and 'mixed'). This rating was not required to be completed for non-specific memories. In the event that participants responded with 'mixed' emotions, they were asked to rate the strength of these mixed emotions on a further 3-point Likert-scale ('overall quite weak', 'overall medium strength', and 'overall quite strong'). It is important to note the three questions were provided after each individual choice was given, and thus repeated for the further nine selections.

3.2.4.2 Scoring & coding

In each case, assessments were made on the age at which their stimulus choices were first encountered. These data were allocated into 10-year age brackets.

The second aspect that was assessed was the reasons participants gave for their stimulus choices and these are summarised in Table 4. Limitations of the coding technique used in Study 1 were addressed within this methodology. Each response was assigned an unlimited number of codes from each category of: 'general memories',

'specific memories', 'sensory details', and 'emotional response'. For example: "*It was my <u>nan's</u> engagement ring and it holds memories of <u>childhood</u>, dressing up in her clothes and jewellery.*" (Participant #4) - This response includes both a general memory of a person and a period of time. In this study, both details were scored as '1'.

However, when conducting analyses that specifically compared overarching reason categories such as 'general memories' vs 'specific memories', the quoted example above would only be counted once (i.e., the code would be totaled as '1' 'general memory'). This was implemented to prevent double coding of responses, but to also allow the richness of all autobiographical detail to be captured.

As this study introduced more stimulus types with objects and pictures, the coding category for stimulus properties was developed further to account for stimulus-led reasons. Study 1 identified musical qualities such as 'structure', 'lyrics', and 'vocals' as reported reasons for choosing songs. For this study, one overarching category termed 'stimulus composition' was created to capture such reasons.

Table 4: Coding criteria of reasons provided for each stimulus choice in Study 2

Reason code	Description	Example/s
General memory		
Person	Mention of another person and/or presence	"*I look so happy and innocent and I like it that I'm in my Dad's welly boots and like to think that he was watching with love.*" - Picture
Place	Mention of a particular location, geographical or identifiable physical space	"*Really loved Beatles from age 15. Visited location [Abbey Road] in late 1980's.*" - Picture
Period	Mention of a wider life period or memory outside of episodic duration, or includes multiple/repeated events	"*Has memories of childhood, running along the beach.*" - Picture

Self-defining memory (generic)	Mention of a general time that defines oneself/identity	*"It was one of those songs wherein you feel the artist has described your feeling exactly. The lyrics are mournful and sung in minor tones; this appealed to teenage me… It inspired me to write poetry and songs."* - Music
Culture-defining memory (generic)	Mention of a general time that defines a particular culture or era during a given period	*"Famous and iconic."* - Picture
First-time memory (generic)	Mention of a general time that involved a novel experience	*"My first car - the independence it gave me."* - Object

Specific memory

Episodic event	Mention/recollection of a definitive episodic event	*"I remember listening to this album on repeat one afternoon at a friend's house… He boyfriend was over and I was playing chaperone."* - Music
First-time	Mention/recollection of a novel episodic event	*"First single I bought."* - Music
Self-defining	Mention of memory and/or moment that defines oneself/identity, or made a considerable impact	*"Hearing this track made everything make sense. Hard to explain but my thought on hearing it for the first time was "THIS is what it's all about". It switched something in my brain."* - Music

Stimulus composition

Structure	Mention of particular quality or sensory elements of stimulus, e.g. melody, or dynamics of music, composition of picture or object	*"I remain a massive shoegaze fan, and this assault of white noise is just bliss…"* - Music *"Because I love to lay on it, smell it."* - Object
Music lyrics	Mention of lyrical features of music	*"The lyrics are mournful…"* - Music
Music vocals	Mention of vocal features of music	*"What a voice. It's on my list of songs to be played at my funeral."* - Music
Emotional response	Mention of emotional detail either within the memory provided or current reaction	*"There was something quite magical about being able to share that experience…"* - Picture

3.3 Results

Eight of the questionnaires were only partially completed, in which participants selected and dated between 1 and 6 of their allocated stimuli condition). 77.78% of music questionnaires, 66.67% of object questionnaires, and 70.00% of picture questionnaires were fully completed. In terms of sex, males showed a 77.88% completion rate, whilst females showed a 68.42% completion rate

3.3.1 Temporal location of age at first encounters with chosen stimuli

The 10 stimulus (music, object or picture) choices of each participant were allocated into 10-year age brackets established by the age associated with the stimuli (Table 5)). Whilst participants were instructed to state an age explicitly, not all entries were completed. In total, 77% stimuli (215 out of 280 total cases) were associated with age.

For music, the highest frequency of reported age was during the reminiscence period at 11-20 years. On the other hand, objects showed a much earlier peak, beginning at 1-10 years and reducing throughout adolescence and into adulthood. Pictures showed a different pattern yet again, with a peak in adulthood at 31-40 years, and a slightly elevated frequency in the earliest years (1-10 years) (Figure 3).
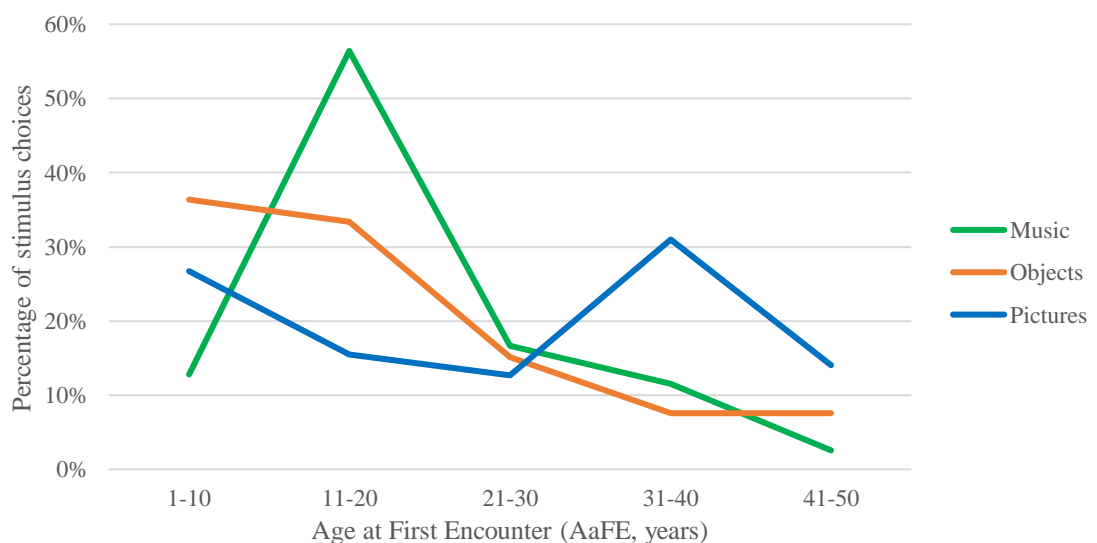
Figure 3: Percentage distribution of AaFE of chosen stimuli across the lifespan in Study 2

A chi-square test of independence showed that the distributions of AaFE for different stimuli were significantly different from one another [χ^2 (8, $N = 215$) = 45.599, $p <$ .001].

Table 5: Count & percentage frequencies of AaFE for stimuli in Study 2

Stimulus	Age Period (years)				
	1-10	11-20	21-30	31-40	41-50
Music	10.00	44.00	13.00	9.00	2.00
	12.82%	*56.41%*	*16.67%*	*11.54%*	*2.56%*
Objects	24.00	22.00	10.00	5.00	5.00
	36.36%	*33.33%*	*15.15%*	*7.58%*	*7.58%*
Pictures	19.00	11.00	9.00	22.00	10.00
	26.76%	*15.49%*	*12.68%*	*30.99%*	*14.08%*

3.3.2 Reasons for stimulus choices

People chose their stimuli for a number of different reasons, which included general and specific memories, emotional responses and composition. (Table 6).

Table 6: Mean number of times each reason was given for choices of music, objects and pictures in Study 2

Reason		Stimulus					
Overall category	Sub-category	Music		Objects		Pictures	
		Mean	*S.D.*	Mean	*S.D.*	Mean	*S.D.*
General memory	Person	4.33	*3.12*	4.11	*3.72*	4.30	*3.53*
	Place	1.78	*2.05*	1.22	*0.97*	2.30	*1.95*
	Period	2.78	*2.22*	2.44	*1.13*	1.50	*0.85*
Specific memory	Event	4.44	*1.81*	3.78	*3.93*	3.70	*2.45*
	First-time	1.11	*0.93*	0.56	*0.73*	0.30	*0.48*
	Defining	0.22	*0.44*	0.33	*0.71*	0.40	*0.97*
Composition		4.33	*3.12*	4.11	*3.72*	4.30	*3.53*
Emotional response		1.78	*2.05*	1.22	*0.97*	2.30	*1.95*

Due to small mean values, reasons for choosing stimuli were combined into the four most described overarching categories for further statistical analysis (Figure 4).

The broader reason categories of responses were analysed for their differences. A two-way ANOVA with Greenhouse-Geisser correction revealed a significant main effect of reason for choice [F (1.828, 45.693) = 47.224, $p < .001$, $\eta_p^2 = .654$]. There was no main effect of stimulus [F (2, 25) = .335, $p = .718$, $\eta_p^2 = .026$], or interaction between stimulus and reason [F (3.655, 45.693) = .049, $p = .993$, $\eta_p^2 = .004$].

Further analyses revealed that general memories were described significantly more than specific events, emotional response, and stimulus composition ($p = .003$). These broader categories accounted for multiple specific reasons given by participants. Table 8 shows the mean number of times these were reported. Post-hoc analysis also revealed that memories of specific events, and memories of people, were described significantly more than other reasons ($p < .001$).
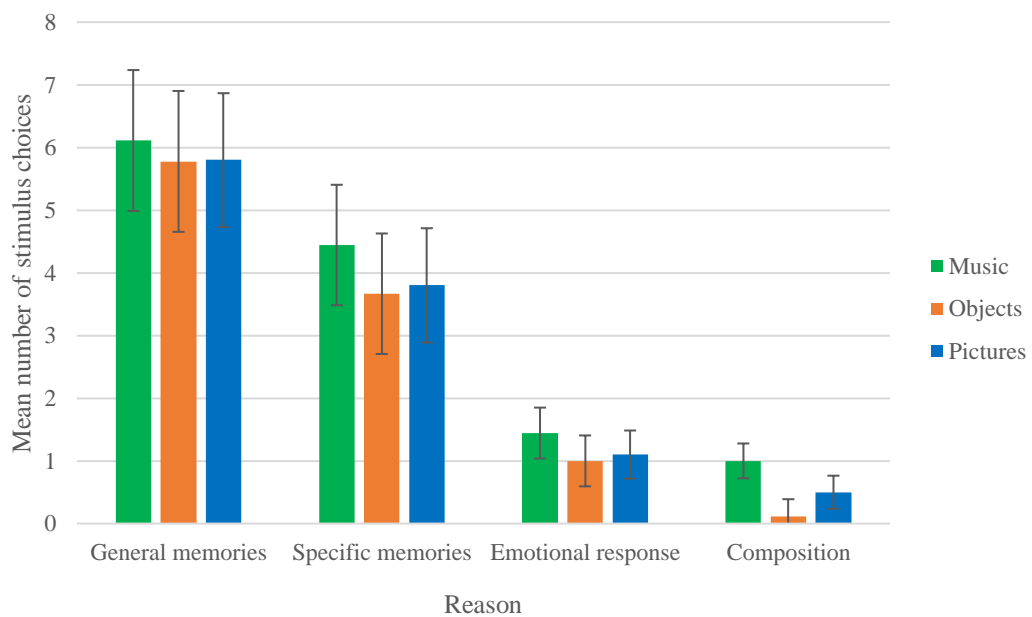
Figure 4: Mean number of times a stimulus was associates with memories, emotion and stimulus composition in Study 2

3.3.2 Emotional valence

Lastly, analyses were conducted to examine the effect of stimulus type on the means of emotional valence ratings, associated with any memories described. Due to low counts for reports of negative, neutral and mixed emotional valence, analyses were conducted only on the positive emotional valence ratings (Table 7).

A Kruskal Wallis test was carried out to determine whether there was a difference between stimuli in evoking feelings of positive emotional valence. Analysis showed no significant difference of positive emotional valence between stimuli [$\chi^2(2) = 3.065$, $p = .216$].

Table 7: Mean number of reports of emotional valence for each stimulus type in Study 2

Emotional valence	Stimulus					
	Music		Objects		Pictures	
	Mean	*S.D.*	Mean	*S.D.*	Mean	*S.D.*
Positive	7.00	*2.40*	4.89	*2.09*	6.10	*3.25*
Neutral	0.11	*0.33*	0.33	*0.71*	0.90	*1.60*
Negative	0.56	*1.01*	1.00	*1.32*	0.10	*3.16*
Mixed	1.00	*1.41*	1.44	*2.19*	0.80	*1.32*

Whilst participants mainly reported choosing stimuli with positive emotional valence, some stimuli were also reported to be associated with mixed, negative and neutral emotion. Despite low report counts from participants, it is interesting to note that nearly 20% of all stimuli evoked memories with negative and mixed emotions, and that 50% of these negative and mixed emotions were associated with objects.

3.4 Discussion

3.4.1 Interpretation of findings

There were a number of hypotheses and research questions to be addressed in this study. Firstly, it was expected that participants who selected music would be most likely to have first encountered these songs during their reminiscence period. Indeed, this was found to be the case: of all ages reported for important songs, nearly 60% of were first encountered during 11-20 years, followed by over 15% within 21-30 years. Overall, this signifies that nearly 75% of all prominent songs were first present during people's reminiscence period. This result is consistent with the findings of Study 1 and provides further support of the robustness of the reminiscence bump with regards to preference of musical stimuli within an experimental setting.

A primary research question surrounded the memories attached to important objects and pictures in people's lives, and whether they would reflect the reminiscence bump and general lifespan retrieval seen with music and other stimuli (Janssen et al., 2007; Conway & Loveday, 2016). In contrast to music, it was found that important objects tended to be those that were first encountered earlier in life, with 36% relating to the early childhood years, and 33% occurring between 11 and 20 years, suggesting that the reminiscence bump for objects is earlier than music.

Pictures showed yet another pattern of distribution, in which over 25% of all choices first occurred during the 1-10 year age period. However, chosen pictures were encountered the most during mid-adulthood years, peaking at 31-40 years with 30% of choices. This initial pattern bears some resemblance to the cascading reminiscence effect described by Krumhansl & Zupnick (2013) and may be related to heightened memory from particular life periods shared with others. This is certainly something that requires further exploration. Alternatively, this finding could be a recency effect, as photos depicting a physical snapshot of a point in time may results in a top-down approach of memory retrieval. The narrative search, referring to the method in which one retrieves memories, is likely to be influenced by the cueing technique, as reported in Munawar et al.'s (2018) systematic review.

Based on the findings from Study 1, it was expected that participants would report reasons and memories for choosing their significant music, objects and pictures, that could be categorized similarly to Study 1. This was borne out by the data, which revealed a range of general and specific memories, sensory features and emotional reasons for all types of stimuli. These findings suggest that, while the age distribution may differ for various stimuli, the reasons for choices are very consistent across music, objects and pictures. This implies that when people are asked to choose things that are important to them, they regularly make choices that are associated with significant life memories. These sensory tools, even the mere concept of them, i.e. cued by word format, provide a conduit to memories and as such are very important. These findings ultimately suggest that these things are likely to be valuable in reminiscence therapy and may allow a more versatile view into different periods of the lifespan.

The data also showed some interesting descriptive, observable differences. However, due to small sample size and means, these data could not be analysed. Overall, general memories were described significantly more during the reason section of the study, particularly in which people recalled memories of people and relationships. This was consistent across music and tangible stimuli, which is an interesting finding. This suggests that regardless of the age periods evoked, these sensory cues can serve as valuable tools with which people identify themselves and those around them, from a variety of life periods.

Finally, this study considered the emotional valence associated with people's choices. In Study 1, emotional content could only be assessed in a broader way, by looking at the qualitative content of reasons reported for their choices. However, the modifications in the current study allowed emotions to be studied more explicitly. It appeared that participants were significantly more likely to describe having positive emotions associated with choices rather than neutral, negative, or mixed feelings, largely due to a small amount of data in other categories, supporting the notion that revisited memories tend to be, but are not always, positive (Rubin & Berntsen, 2003).

3.4.2 Limitations

Whilst these findings shed new light on the nature and qualities of popular reminiscence tools, further questions have been raised regarding the methodology. This study attempted to reflect the scenario seen in Study 1 with Desert Island Discs by asking participants to choose music, pictures or objects that are significant to them. In doing this, the natural progression involved requesting the reasons for making each choice. As seen in Table 6 and in line with previous research (Sherman, 1991), participants chose things that evoked memories, but also because of physical properties and emotions attached. However, in order to collect and plot age data, the participants required an instruction that was universal and standardized for each item, including cases in which a memory had not been discussed. Thus, participants were asked to report the age at which they first encountered each of their stimuli. Whilst past findings have shown an association between when music was first heard and when it was most important, we cannot assume that the two always correlate. Therefore, while the current study suggests a different lifespan pattern for each stimulus type, it is possible that first encounters do not properly reflect the age at which they are most important or evoke the strongest memories. Therefore, it is still not clear whether important objects evoke memories from childhood more readily, or if they are simply encountered earlier than other stimuli. In the case of photos, which were popular choices in the pictures category, people may be likely to report the age they saw the physical copies as opposed to correlating with any memory of the event. Ultimately, although it has been established that these stimuli can evoke memories, research needs to be carried out that deliberately cues these memories in order to identify patterns in lifespan retrieval.

Another potential issue regarding the methodology is the order of questioning which potentially leads participants to enter a narrative search 'rut' or cycle. When participants are asked to select their 10 choices, the questionnaire allows them to enter all of the relevant data regarding name, reason, age, and emotional valence of one option, before moving onto the next. With this procedure it is very possible that this process encourages participants to think deeply about that period, which then directly

cues the next object/song/picture, which in turn causes them to return to certain life periods, hence skewing the lifespan data.

The 40-50 year age range of participants was selected because of the likelihood that the reminiscence bump would be consistent and easily identifiable, if present. However, this mid adulthood period may still include amplified recency effect. However, this study's ultimate aim was to pilot a new methodology and lead to a refined procedure for an older adult sample. Further to this, the size of the sample is fairly small, with some participants producing incomplete questionnaires thus missing data. Nevertheless, as a pilot study it provided an excellent opportunity to test the concepts and because of the number of choices made by each participant, it still offered an opportunity to examine rich, in-depth qualitative connections between memories and possessions using a novel free recall approach.

3.4.3 Implications & further research

This study provided a valuable insight into what things are important to people and how those relate to memories and feelings. It also prompted new questions, both of which can be addressed in follow-up work. For example, how a refined version of this methodology might deliver with a more representative population of older adult, and whether this narrative search 'rut' may remain with the re-ordering of instructions. There remains to be a great deal of contention in the literature regarding the consequences of using different methodologies to examine the reminiscence bump (Munawar et al., 2018), see also Chapter 1 and Chapter 4.

Finally, research has varied in whether reminiscence cues are provided or offered as fixed choices by the experimenter as opposed to being freely chosen. This raises important questions around the impact of ownership and freedom of choice in aging populations, which itself requires further exploration. Whilst we have seen that self-selected stimuli can result in a range of reasons and ages of reminiscence, the current study does not consider how this might compare with stimuli provided by another person, which are currently the most widely used in experiments.

3.4.4 Conclusions

This study along with other contemporary research suggests that music and tangible stimuli provide a robust tool in evoking autobiographical memories in people. Music remains unique in evoking a reminiscence bump across multiple different methodologies, showing promise in a theoretical and practical setting. Nevertheless, objects and pictures appear to produce different lifespan curves, at least in terms of the age at which important objects and pictures were first encountered. All stimuli appear to be chosen for their ability to evoke memories, but also because of the emotions they hold and for more sensory reasons. However, connections to people remain to be the most prominent reason, which is very important from a practical point of view. The next stage of this thesis aims to refine this novel methodology in order to provide a clearer view on the impact of tangible stimuli. The focus will move away from age of first encounters and towards more explicit cueing of memories, in order to better understand the nature of the connection between autobiographical memories and tangible stimuli. It will also consider whether choosing your own stimuli to serve as cues is more effective in evoking memories than having them provided.

4. Study 3: The importance of ownership and sensory stimuli in evoking autobiographical memories with a healthy older sample

4.1 Introduction

As the previous study demonstrated, chosen music remains to be consistent in evoking a reminiscence bump. On the other hand, important tangible stimuli tended to be encountered and evoked memories from different life periods. All stimuli tended to be chosen for a wide variety of reasons, but largely connected people to others, and evoke a range of emotions. However, it remains unclear as to whether these findings are a result of methodological issues creating skewed lifespan retrieval curves and encouraging cyclical reminiscence. This is a microcosm of an ongoing issue within autobiographical memory research.

The third study of this thesis aimed to further explore the lifespan retrieval curves of different types of stimuli in a healthy older sample. In order to address the potential confound of instruction approach in Study 2, some amendments were made to the methodology. In order to address whether Age at First Encounter was an accurate measure of lifespan retrieval, participants were asked to report the memory that came to mind in response to the cues. Participants completed this recall task after all cues had been established to avoid experimenter-led narrative search cycles. Furthermore, this study considered an additional variable - ownership of cues.

This study aimed to investigate the effect that choice condition (self-selected vs experimenter-provided) and stimulus condition (music vs objects vs pictures vs clothing) had on the following:

1. The number of specific memories evoked.
2. The temporal location of specific memories across the lifespan.
3. The main features and reasons of memories evoked.
4. The rehearsal frequency of specific memories evoked.
5. The emotional valence of the specific memories evoked.

4.1.1 Contention with cueing methodology

Koppel & Berntsen (2015) published a review that looked at the different ways in which autobiographical memory and the reminiscence bump are assessed within the literature. They stated that the temporal location of the bump is subject to variation depending on whether memories are retrieved via the cue word method (8.7-22.5 years), or the importance memories method (15.1-27.9 years). The word cueing method refers to Galton's discovery discussed in chapter 1, which was further developed by Crovitz & Schiffman (1974) and used predominantly in the 1970s and 1980s (Munawar et al., 2018), i.e., providing a list of cue words to participants and asking them to produce autobiographical memories. On the other hand, the important memories method includes instructions wherein participants are asked to recall particularly notable memories, such as "those that hold the most importance" or the most vivid memories that come to mind.

One immediate flaw of this stance lies in the vague inclusion criteria of the important memories method. Koppel & Berntsen (2015) mention in the article that they "*...also include in this category cases which participants were asked to simply freely recall autobiographical memories, with no explicit instruction that these memories should be important.*" (p. 3). This by definition is potentially problematic, as free recall cannot be assumed to result in only important memories. Even if this were the case, it could be argued that people's inclination to speak about personally significant events is an interesting occurrence in itself that requires further exploration.

This observation and assumption that there are discrepancies in current cueing techniques also suggests that the reminiscence bump should not be a static phenomenon, occurring strictly at one period in the lifespan. This is something that not all accounts of the reminiscence bump agree with, and thus requires further exploration. For example, the identity formation or self-narrative account established by Conway & Pleydell-Pearce (2000) suggests that memories from 10-30 years are more accessible as they are very self-defining, formative years for individuals. With individual differences considered, different life narratives are likely to result in different retrieval curves. For example, secondary data analysed in Study 1 included

interview guest and musician John Lee Hooker, whose Desert Island Discs choices were mainly released in later adulthood. Whilst he appeared to be influenced during his youth, a great deal of his self-defining genre did not rise in prominence until much later on in life.

A systematic review conducted by Munawar et al. (2018) discussed results from 68 studies and concluded that the temporal location of the bump is between 10-30 years of age. Word cueing methods produce a bump at 5-30 years, whilst life script studies peak at 6-39 years. It was discussed that the slightly different temporal locations being reported may be down to varying methods, possibly resulting in different memory types altogether, which has been raised in previous work and commentaries (Koppel & Berntsen, 2015; Janssen, 2015). Whilst Rubin et al. (1986) observed a recency effect with their participants using the methodology outlined above, Pillemer et al. (1986) on the other hand found a primacy effect when memories were dated as they were evoked.

Essentially, a different cueing method appears to result in a different retrieval method in participants, which in turn displays in a different incidence of memories. However, this does not determine whether recent memories truly are better retained than those that are older (Williams et al., 2008). Furthermore, a key limitation of dating memories as opposed to the participant at the time of the memory as described in the above studies, is that the reminiscence bump can be disguised in individuals of different ages. For instance, a memory with an age of 30 years will be experienced at different times per participant. A 70-year-old individual would be 40 years of age, whilst a 55-year-old would have been 25 years old. The exact age during this memory of the 55-year-old would be more relevant for these studies than the age of the memory itself. Regarding the accuracy of memory, this certainly appears to align with the nature of everyday forgetting and typical cognitive decline, with older memories deteriorating in vividness over time (Cohen & Faulkner, 1988; LePort et al., 2015).

Koppel & Berntsen (2015) classify the important memories technique as anything that uses an instruction such as: queries for important memories from participants' lives, vivid memories, and free recall of autobiographical memories with no explicit instruction that they should be important. This already forms quite an ambiguous argument, and it could be said that regardless of the wording, people are more naturally

inclined to retrieve important memories because they are perhaps more rehearsed, thus more easily accessible. It is suggested that these techniques differ based on the retrieval strategies involved. Whilst the word cue method holds no bias in yielding memories across the lifespan, it is suggested that requesting important memories focuses on the most significant memories of one's life. This may result in a restricted search and an employment of life scripts to retrieve memories. This technique results in a larger reminiscence bump, whilst word cueing produces a larger recency effect, and overall, the two methods produce bumps in slightly different locations. These findings raise questions as to whether researchers should consider these curves to be one entity or two separate phenomena.

Janssen (2015) discussed that studies observing distributions of public events, favourite books, movies, records, and football players lie outside of the autobiographical memory domain. He argued that studies exploring the reminiscence bump should not only clarify which manifestation they are trying to explain, and whether or not their results accounts for the wider context, i.e. outside autobiographical memory domain. What is clear is that there is a lack of consistency in research on the reminiscence bump. Many authors have highlighted the need for a more explicit measure of self to identify the nature of self-defining memories across the lifespan, thus contributing to reminiscence bump theories. Overall, the reminiscence period remains to be a highly debated topic in the literature. Ultimately, further research should aim to establish more consistency in this area, by considering all cueing methodologies when establishing more effective versions.

4.1.2 Current study

The current study investigated two main independent factors: The importance of different sensory stimuli, and the potential impact of choice in the cues that were used. That is, whether stimuli provide a tool to access different parts of the lifespan, and the importance of if these stimuli have been chosen by the person rather than just provided to them. This study aims to achieve this by implementing a refined methodology from Study 2, as well as considering the differences in other existing methodologies in the literature.

4.2 Methods

4.2.1 Design

There were two key independent factors within this study: i. *Stimulus condition*, which refers to a device that may evoke a specific reaction. This between-subjects variable had four levels: Music ($N = 10$), Objects ($N = 10$), Pictures ($N = 10$), and Clothing ($N = 10$). ii. *Choice*, which refers to whether freedom to select stimuli has been granted or not. This within-subjects variable has two levels: Self-selected and Experimenter-provided.

This study investigated the effects of stimulus (Music vs Objects vs Pictures vs Clothing), and choice (Self-selected vs Experimenter-provided) on the following:

a) The number of specific memories evoked
b) The presence of a reminiscence bump of specific memories across the lifespan
c) The reasons within evoked memories
d) The rehearsal frequency of specific memories evoked
e) The emotional valence of specific memories evoked

4.2.2 Participants

40 subjects aged between 65 to 88 years ($M = 72.10$, $SD = 5.12$) were recruited for this study. Participants were screened retrospectively for cognitive impairment using the Mini Mental State Examination (MMSE; Folstein, Folstein, & McHugh, 1975), within the Addenbrooke's Cognitive Examination - revised (Mioshi et al, 2006). Scores between 24-30 were considered to indicate no cognitive impairment as advised by Tombaugh & McIntyre (1992), thus participants scoring 24 and above were included in the study. One participant was excluded retrospectively despite achieving an MMSE score of 27, as they had reported experiencing some ongoing amnesia and confusion due to medication, all of which was recorded during demographic data collection.

Participants included 24 females ($M = 69.63$, $SD = 4.53$) and 16 males ($M = 74.50$, $SD = 6.70$). They were recruited via opportunity sampling and were accessed predominantly through attending Age UK meetings ($N = 11$) and word of mouth ($N = 29$).

4.2.3 Materials

4.2.3.1 Appointments

Participants were visited on two separate occasions to complete the full questionnaire; the majority of subjects were visited at their home ($n=33$), whilst a small number visited an off-site location, at the university site ($n=6$) or at Age UK social centres ($n=1$). Appointments were organised between 1-7 days apart from one another, to ensure that the purposes of the study were still memorable to the participant, as well as some of their own past responses.

4.2.3.2 Participant information & demographic data

Participants were provided with an information sheet outlining the background of the study, and a consent form, which indicated that some procedures detect cognitive abnormalities, as well as an option to be contacted regarding follow-up work. Subjects were asked to provide demographic data, including date of birth, main occupation (prior to retirement), a record of medical history and any potential memory problems they may be aware of, and regular medication. The detection of cognitive abnormalities via ACE-r was clarified with participants, who were then able to opt in to have their General Practitioner informed in the event of any flagged deficits.

4.2.3.3 Addenbrooke's Cognitive Examination - revised

The Addenbrooke's Cognitive Examination-revised (Mioshi et al., 2006) was administered in a post-study screening session, as a way of ensuring that participants with any undiagnosed memory impairments could be allocated into a separate group to the healthy controls. The ACE-r was used to identify particular areas of abnormality, and not as a diagnostic tool; MMSE cut-off scores were applied to screen ability.

4.2.3.4 Experimenter-provided stimuli database

Self-selected stimulus cues were produced from participants' choices. These selections were entered into a database and in turn, utilised for the experimenter-provided cues. In order to build this database, self-selected cues were collected during the first visit in half of the sample. These experimenter-provided cues were allocated to further participants via age-matching.

4.2.3.5 Main questionnaire/memory cueing

A questionnaire was constructed using Microsoft Word (see Appendix 8). The data of the first 14 participants were collected on physical copy, where responses were scribed on behalf of the participants. 8 versions of the questionnaire were distributed throughout the sample in order to account for both the stimulus (between-subjects) and ownership (within-subjects) conditions, where the within-subjects condition was counterbalanced. Analysis regarding the effect of counterbalancing is included in Appendix 10. Refer to Figure 5 for a flow chart of the full study procedure.

The first page of the main questionnaire introduced the participants to a scenario that they were asked to imagine themselves in as they were answering the questions to follow. The scenario was as follows: "I *want you to imagine that you have been told you must move to a new, unfamiliar location. Have you heard of Desert Island Discs? It is a radio program where people get asked to imagine themselves cast away on a desert island, so I want you to imagine it is a little bit like that, as I ask you these next questions. You will be away from all of your friends and family at this new location but will have all of the amenities and essential things that you would need to live."*

Participants were asked to "*Please name (pieces of music, objects, pictures, or items of clothing) that you would take with you. You may well feel that there are more than 10 or that your choices may change if you were to think about it again another day but that is fine. Please just select the 10 that come to your mind right now.*"

After providing the relevant information, participants were taken through a memory cueing task, in which their 10 self-selected stimuli or 10 experimenter-provided stimuli

were verbally repeated back to them as a word cue. Example: *"Your first [stimulus] is 'Let it Be by The Beatles."* Here the questionnaire stated: "*I want you to think of a specific event that happened to you which it reminds you of. The event could have happened at any point of your life from when you were small to last week, but please do not include memories from the last week.*"

For all specific memories described, participants were asked to report their approximate age when the memory occurred. Lastly, they were asked questions regarding the rehearsal frequency and emotional valence and strength of the memory.
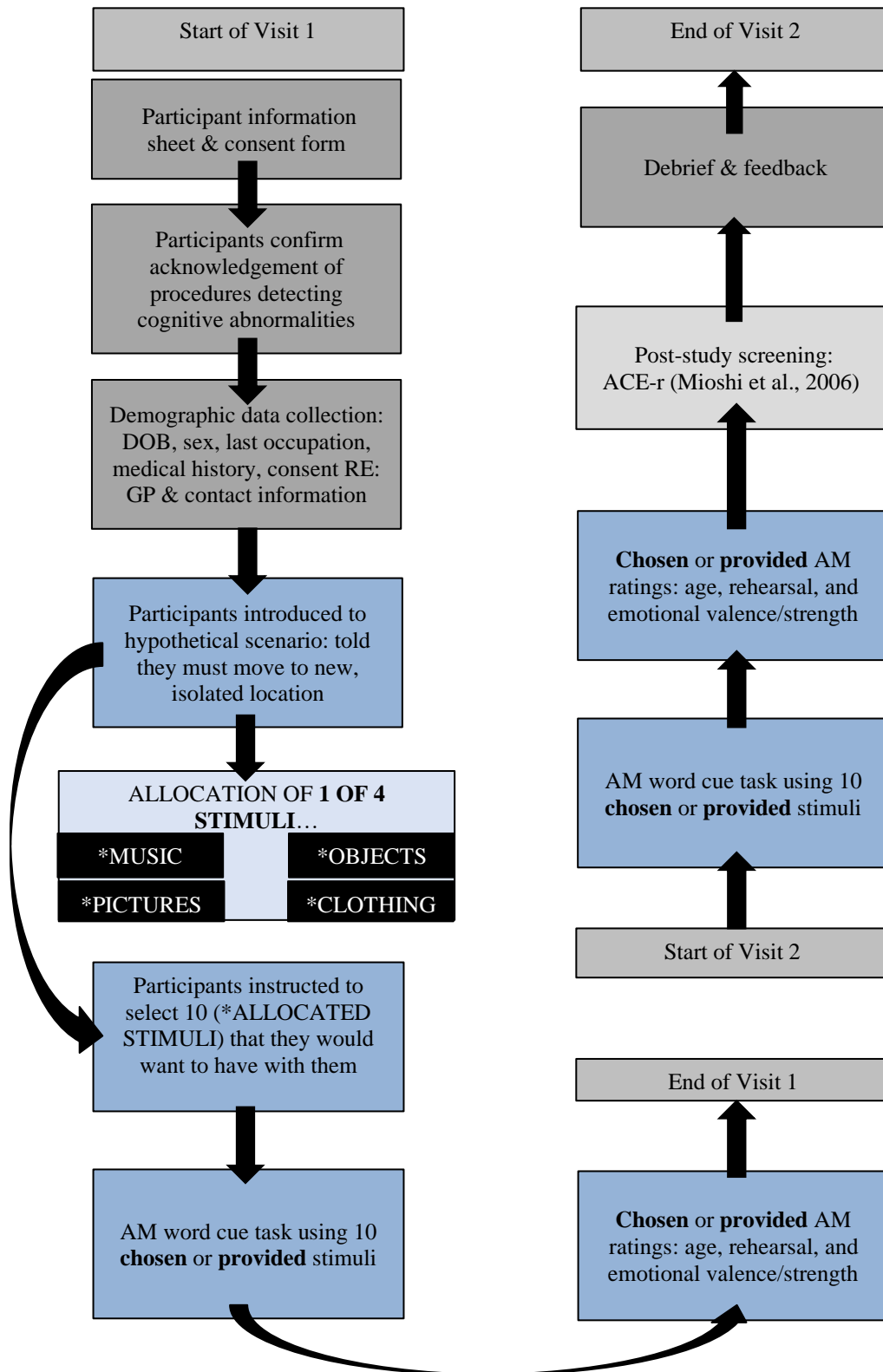
Figure 5: A flow-chart to demonstrate procedure in Study 3

4.2.4 Procedure

4.2.4.1 Questionnaire

Participants were randomly assigned 1 of 4 stimuli for the basis of the questionnaire: music ($N = 10$), objects ($N = 10$), pictures/still images ($N = 10$), or clothing ($N = 10$). These stimuli were chosen for their distinctive sensory features and their use in reminiscence therapy practices.

Participants were randomly allocated their assigned stimulus before any visits were made using a random number generator (1 = Music, 2 = Objects, 3 = Pictures, 4 = Clothing). As detailed in 4.2.1.1, participants attended two appointments in order to complete the study, which will be referred to as Visit 1 and Visit 2.

During Visit 1, participants were provided with a hypothetical scenario to imagine themselves in, in which they were isolated from the outside world. Following this, they were given the instruction to name 10 pieces of music, objects, pictures, or clothing that they would want to have with them in this isolated place. Similarly to study 2, they were not required to have owned their choices but must have at some point seen or held them. At this point, participants were not asked to disclose any detail about their selections, regarding reasons or associated memories. They were not allowed to amend their selections once they were made. Subjects were then told that their choices would be read back to them randomly, as verbal word cues. Half of the sample received their own selections as word cues first, whereas the remainder received a provided list of other participant choices. Experimenter-provided cues were age-matched with other participant-selected cues.

Participants were told they would be asked to think of a specific memory or moment that each stimulus made them think of in that moment. They were initially provided with an example of a word cue and a memory that involved episodic content, as opposed to describing a more general life period. Where participants described a general memory or no memory, they would be prompted once to encourage a more specific memory. Details regarding prompting and specificity of memory were recorded at this point.

Next, participants responded to four questions for any of the 10 selections (chosen or provided) that evoked a specific memory, of which they were given a brief summary. Firstly, they were asked their approximate age when the memory in question occurred. Secondly, how often they rehearse the memory on a 3-point Likert scale (Not At All, Every Now and Then, and Very Often). Thirdly, participants were asked to rate the emotional valence of this memory on a 6-point Likert scale (Very Negative, Negative, Neither positive or negative, Positive, Very Positive, and Mixed) - in the event that participants responded with 'Mixed' emotions, they were asked to rate the strength of these mixed emotions on a further 3-point Likert-scale (Overall quite weak, Overall medium strength, and Overall quite strong). It is important to note these questions were provided after each individual choice was given, and thus repeated for any future selections.

4.2.4.2 Scoring & coding

In each case where a specific memory was successfully produced, participants later reported the age they were during said memory. These ages were allocated into 10-year age brackets to produce lifespan retrieval curves.

The second aspect that was being assessed was memory specificity. Developing on limitations of coding in the previous studies, amendments were made to the methodology in order to strengthen both age data and reason data including memories. Owned and provided stimuli were used to cue memories, which were allocated one code: Prompted General memories, Prompted Specific memories, and Unprompted Specific memories. Descriptions of each type of memory with examples are displayed in Table 8.

Cases in which immediate responses featured general memories or no memories were not recorded until a final response was given after prompting. For stimuli that failed to evoke any memory, data were not allocated into any of the three categories.

Table 8: Coding criteria for memory specificity in Study 3

Memory specificity	Description	Example/s
Prompted General	Mention of a person, place, period of time, or memory that does not relate to one specific moment or event – prompted after failure to produce a specific memory upon first instruction	"*Being out in the garden again. *prompt* No specific time, just the times over the years and spending time in the garden doing what I love.*" – Participant describing memory associated with an object
Prompted Specific	Mention of specific episodic event – prompted after failure to produce a specific memory upon first instruction	"*We've been to Thailand… so it reminds me of being there.* *prompt* *John Gray's Sea Canoe, we went out on a big boat and saw sea monkeys.*" – Participant describing a memory associated with an item of clothing
Unprompted Specific	Mention of specific episodic event immediately upon first instruction	"*It was the first dance at our wedding… I left the album at home on the day and had to have someone go back and get it*." – Participant describing a memory associated with a piece of music

The third aspect of the study assessed the content or nature of autobiographical memories. Past work in this thesis has analysed this content in terms of reasons given, which include references to self-defining moments and memories of people. In this study, autobiographical content was coded for a range of different features. Both general and specific memories were assigned a maximum of one code: details of these with examples are displayed in Table 4 n Study 2 Methods.

4.3 Results

Nine participants selected 8 or less of their allocated stimulus choice during the self-selected condition, across music (1 participant, 4 missing stimuli), objects (3 participants, 19 missed stimuli), pictures (2 participants, 6 missing stimuli), and clothing (3 participants, 17 missing stimuli). In terms of sex, males showed a 75% completion rate, whilst females showed a 79.17% completion rate.

For all specific memories produced, participants also reported frequency of rehearsal. Due to the number of levels of between and within-subjects conditions included in this study, as well as many participants noting a difficulty in accurately assessing rehearsal with the 3-point scale, no further analyses were conducted on this.

4.3.1 Number of memories evoked

Participants were asked to report a memory after being provided with each cue, and overall, all stimuli evoked a total of 618 memories, with a mean of 15.45 (*S.D.* = 4.22) memories per person. These memories included general and specific recollections. 52.1% of all self-selected cues evoked a memory, compared to 47.9% of experimenter-provided cues. The means are provided in Table 9.

Table 9: Mean number of specific memories produced by music across choice and cue conditions in Study 4

Stimulus condition	Choice condition			
	Self-selected		Experimenter-provided	
	Mean	*S.D.*	Mean	*S.D.*
Music	7.20	*1.81*	2.90	*2.85*
Objects	5.30	*3.43*	4.90	*1.37*
Pictures	6.30	*2.40*	5.20	*1.93*
Clothing	5.00	*2.80*	3.40	*2.80*

A two-way ANOVA with Greenhouse-Geisser correction was carried out to assess whether there was a significant difference between mean specific memories evoked by music, objects, pictures and clothing. Analysis revealed a non-significant main

effect of stimulus condition [F (1, 36) = .934, p = .434, η_p^2 = .234], but a significant main effect of choice condition [F (1, 36) = 17.869, p < .00, η_p^2 = .984], and significant interaction of choice and stimulus condition [F (3, 36) = 3.798, p = .018, η_p^2 = .771]. Post-hoc analyses for multiple comparisons showed that self-selected music and clothing evoked more significantly more memories than experimenter-provided music [F (1, 9) = 20.269, p = .001] and clothing [F (1, 9) = 6.698, p = .029]. Conversely, there was no significant difference in the number of specific memories evoked by self-selected and experimenter-provided objects [F (1, 9) = .141, p = .716] and pictures [F (1, 9) = 1.914, p = .200].

4.3.2 Temporal location of specific memories

4.3.2.1 Location of all specific memories

The twenty stimuli per participant evoked 402 specific memories. Ages reported during specific memories were allocated into 10-year age brackets. The distribution of specific memories was compared with the expected distribution. Similarly to the previous studies in this thesis, while all individuals were able to select songs from the first six age brackets (1-60 years), only a proportion were able to choose songs from the later age brackets. Therefore, a chi-square analysis was carried out to observe differences in the observed versus expected number of specific memories. The expected distribution was based on the null hypothesis that specific memories would be evenly distributed across the lifespan to date. This was calculated for each individual (years lived in each decade/age x number of dateable songs). Chi-square analysis showed that the expected distribution of specific memories was significantly different to the observed distribution [X^2 (8, $N = 801$) = 35.252, $p < .001$] (Figure 6).

Specific memories occurred most often during the 61-70 year age period of recency, followed by the 11-20 year reminiscence period (Figure 6). A chi-square goodness-of-fit test revealed that the observed distribution across the 10-year age brackets was significantly different from one another [X^2 (8, $N = 402$) = 102.045, $p < .001$].
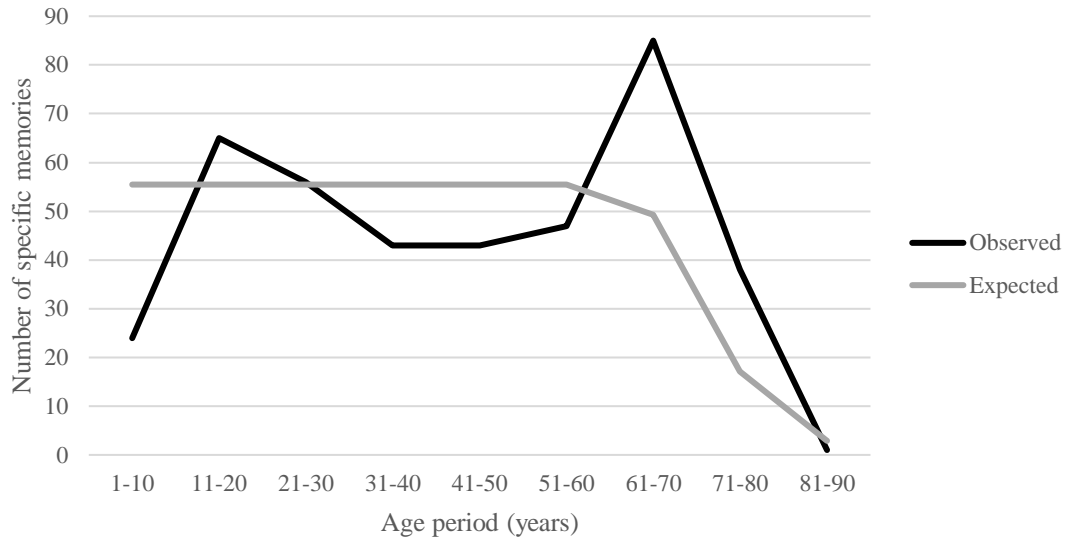
Figure 6: Expected vs observed distribution of specific memories cued by all stimuli and choice conditions in Study 3

4.3.2.2 Location of memories evoked by self-selected vs experimenter-provided cues

Self-selected stimuli evoked a total of 238 specific memories, whilst experimenter-provided stimuli cued 164 specific memories. Self-selected cues tended to evoke memories from the recency period (61-70 years), while experimenter-provided cues evoked a reminiscence bump at 11-20 years (Figure 7).

A chi-square test of independence was carried out to compare the distribution of memories evoked by self-selected vs experimenter-provided cues at two points: the reminiscence bump (11-20 years) and recency period (61-70 years). It was found that the self-selected cues evoked significantly more memories in the recency period, and vice versa, the experimenter-provided cues evoked significantly more memories in the reminiscence bump [X^2 (1, $N = 150$) = 5.543, $p = .0.19$].
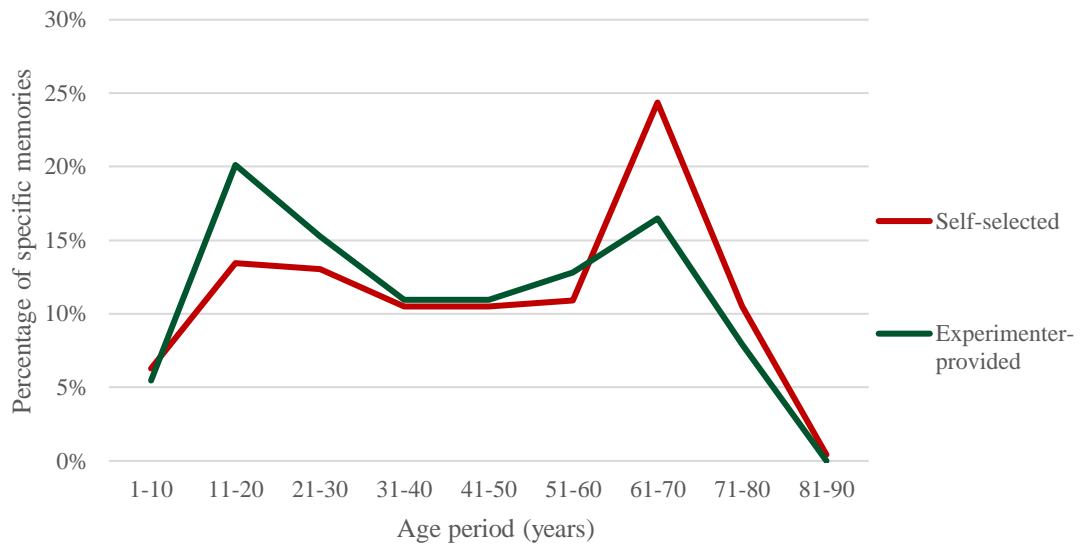
Figure 7: Percentage count of specific memories evoked by self-selected vs experimenter-provided cues in Study 3

4.3.2.3 Location of memories evoked by different stimulus conditions

Analysis was then conducted on the comparison of stimulus-evoked lifespan retrieval curves in both self-selected and experimenter-provided stimuli.

Due to low counts when comparing the distribution of specific memories within choice and stimulus conditions, the following data were not analyzed statistically (Figure 8).

Music showed a consistent reminiscence bump peaking at 11-20 years, regardless of whether memories were cued by self-selected or experimenter-provided stimuli. Self-selected objects showed a gentle peak at 31-40 years but tended to evoke specific memories much more evenly across the lifespan compared to other stimulus conditions. Self-selected pictures and clothing cued a large number of recent memories during 61-70 years, and self-selected clothing also displayed a gentle reminiscence bump at 21-30 years. All experimenter-provide stimuli appeared to produce a reminiscence bump, peaking at 11-20 and 21-30 years respectively.
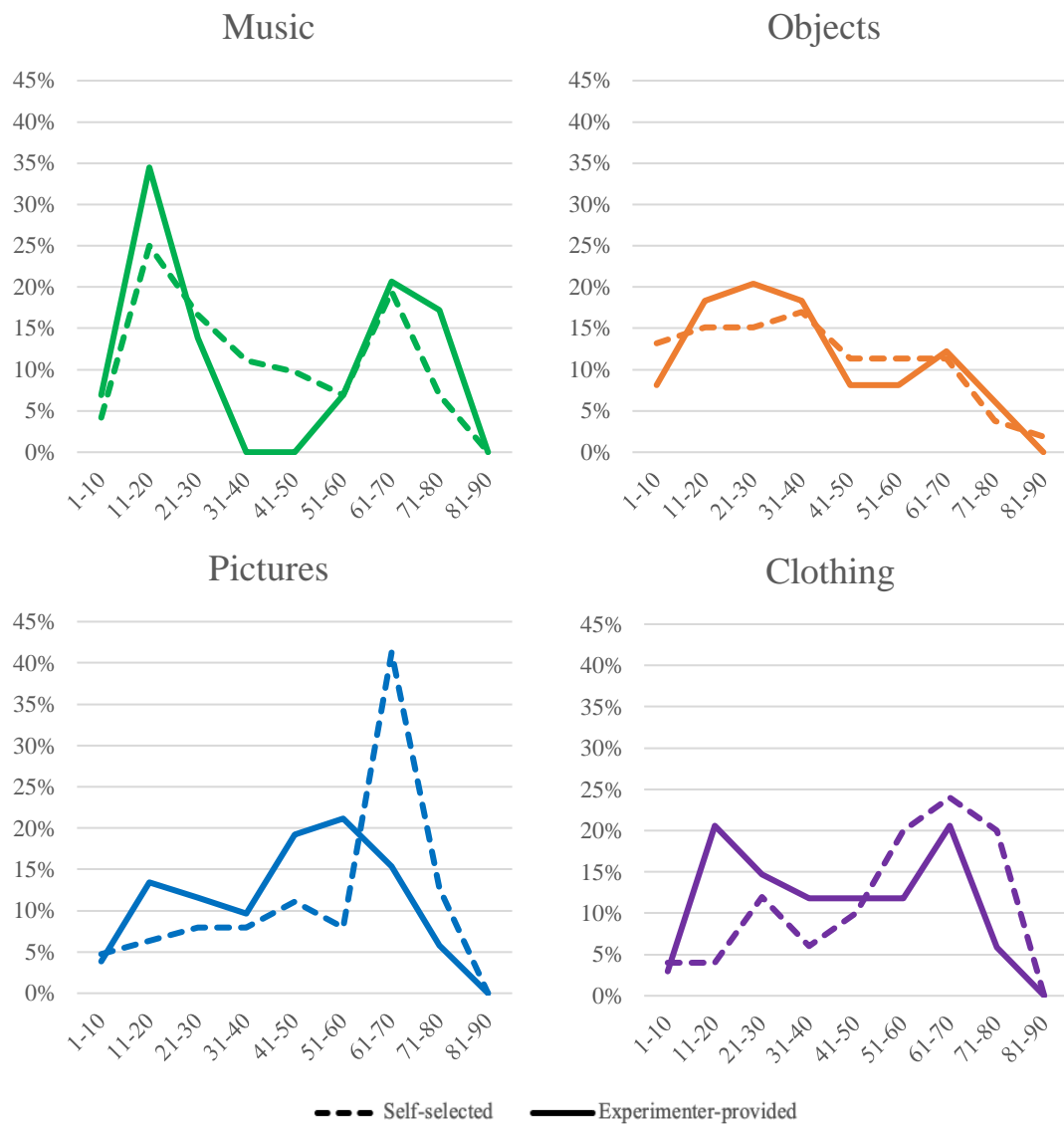
Figure 8: Percentage count of specific memories evoked by self-selected vs experimenter cues of music, objects, pictures and clothing in Study 3

4.3.3 Reasons within evoked memories

80 cued responses were scored and compared by two raters: AW and RH. The Cohen's Kappa statistic was administered to determine the level of agreement between the two raters on the contextual reasons given for twenty cued responses of four participants, respectively. The inter-rater reliability for raters AW and RH was found to be: $\kappa = .767$ ($p < .05$), 95% Cl. These values were deemed to be great enough, thus AW scored all further responses independently.

4.3.3.1 Reasons within all memories

Participants produced memories that included specific reason elements. In line with Studies 1 & 2, these included memories of people, places, periods of time as well as specific self-defining events, emotional responses and compositional/artistic factors (Table 10).

Table 10: Mean number of memory reasons reported in Study 3

	Memory reason							
	Person	Place	Event	Self- defining	Period	Comp- osition	Emotion	Artist
Mean	6.60	3.00	2.58	2.28	1.98	1.43	0.80	0.45
S.D.	*0.60*	*0.35*	*0.34*	*0.31*	*0.28*	*0.25*	*0.20*	*0.13*

A one-way ANOVA analysis with a Greenhouse-Geisser correction showed that participants described certain memory and reason elements significantly more than others [F (3.806, 148.432) = 30.379, p < .001, η_p^2 = .438]. Overall, participants described a person significantly more than all other reasons (p < .001).

4.3.3.2 Reasons for memories evoked by different stimulus conditions

A mixed-measures ANOVA with Greenhouse-Geisser was conducted to investigate the effect of stimulus type on memory reasons produced during the cueing procedure. Results showed a significant interaction of stimulus and reason [F (10.378, 124.538) = 3.005, p = .002, η_p^2 = .200], a significant main effect of reason [F (3.459, 124.538) = 24.095, p < .001, η_p^2 = .401], and no main effect of stimulus [F (3, 36) = 2.661, p = .063, η_p^2 = .181] (Table 11).

A Bonferroni post-hoc test revealed that there were no significant differences of reason elements being reported between all stimuli (p = 1.000), regardless of choice condition. Therefore, differences between stimuli were not investigated further.

Table 11: Mean number of memory reasons reported across stimulus conditions in Study 3

Stimulus condition		Person	Place	Self-defining	Event	Composition	Period
Music	Mean	6.00	2.00	3.50	3.10	1.40	3.40
	S.D.	4.67	1.76	2.07	2.56	2.22	2.12
Objects	Mean	6.20	2.20	2.50	3.40	0.40	2.20
	S.D.	2.90	1.55	2.27	3.72	0.52	1.81
Pictures	Mean	9.30	5.10	2.30	1.50	1.50	0.80
	S.D.	3.34	2.08	2.06	1.58	1.43	1.03
Clothing	Mean	4.70	2.60	0.90	2.60	2.30	1.50
	S.D.	2.67	2.46	1.10	2.17	2.11	1.35

4.3.3.3 Reasons for memories evoked by self-selected vs experimenter-provided cues

Reasons within memories were then assessed to observe a possible difference in self-selected vs experimenter-provided cues (Table 12).

A two-way ANOVA showed a significant interaction of choice and reason [F (3.896, 151.940) = 4.459, p = .002, η_p^2 = .103], and a significant main effect of choice [F (1, 39) = 18.292, p < .001, η_p^2 = .319] and reason individually [F (3.490, 136.106) = 20.876, p < .001, η_p^2 = .349].

Post-hoc analyses revealed that choice condition had a significant effect on the number of reports of a person (p = .010), self-defining memory (p < .001), composition element (p = .006), and period of time (p = .042) as overarching reasons. Chosen stimuli evoked significantly more descriptions of people, self-defining memories, and composition factors. Meanwhile, provided stimuli evoked memories of general periods.

Table 12: Mean number of memory reasons reported across choice conditions in Study 3

Memory reason	Choice condition			
	Self-selected		Experimenter-provided	
	Mean	*S.D.*	Mean	*S.D.*
Person	3.80	*2.57*	2.75	*1.86*
Place	1.70	*1.52*	1.28	*1.36*
Self-defining	1.63	*1.58*	0.68	*0.92*
Event	1.23	*1.78*	1.43	*1.47*
Composition	1.05	*1.55*	0.35	*0.58*
Period	0.75	*1.03*	1.23	*1.29*

4.3.4 Emotional valence of specific memories

Lastly, analyses were conducted to examine the effect of choice condition on the means of emotional valence ratings for specific memories evoked.

As seen in Study 2, participants mainly reported memories with a positive emotional valence significantly more than any other emotion. Therefore, due to low reports of negative, neutral and mixed emotional valence, these were removed from analysis.

A two-way ANOVA with Greenhouse-Geisser correction was carried out to determine whether there was a significant difference between the number of specific memories with positive emotional valence evoked by different choice and stimulus conditions (Table 13).

Analysis revealed a non-significant main effect of stimulus condition [F (3, 36) = 2.038, p = .126, η_p^2 = .145], but a significant main effect of choice condition [F (1, 36) = 16.540, p < .001, η_p^2 = .315] and significant interaction of stimulus and choice condition [F (3, 36) = 3.104, p = .039, η_p^2 = .206]. Overall, self-selected cues evoke significantly more memories of positive emotional valence than experimenter-provided cues.

Table 13: Mean number of positive emotional valence ratings of specific memories across choice and stimulus conditions in Study 3

Stimulus condition	Choice condition			
	Self-selected		Experimenter-provided	
	Mean	*S.D.*	Mean	*S.D.*
Music	5.80	*1.99*	2.10	*1.91*
Objects	4.20	*3.10*	3.40	*1.60*
Pictures	5.30	*2.21*	4.50	*1.35*
Clothing	3.60	*2.31*	2.40	*1.90*

One-way ANOVA tests showed no significant difference between chosen stimulus types in evoking memories of positive emotional valence [$F_{(3, 36)} = 1.580, p = .211$]. Conversely, with experimenter-provided cues, there was a significant difference in the number of positive memories produced across stimuli [$F_{(3, 36)} = 4.151, p = .013$].

A series of paired samples t-tests were conducted to assess whether the choice condition of each stimulus had a significant effect on the positive emotional valence rating of memories. Analysis revealed that self-selected music and clothing evoked significantly more memories of a positive emotional valence than experimenter-provided music[$t_{(9)} = 4.192, p = .002$] and clothing [$t_{(9)} = 2.414, p = .039$]. However, this effect was not significant for objects [$t_{(9)} = .751, p = .472$] or pictures [$t_{(9)} = 1.018, p = .335$].

4.4 Discussion

4.4.1 Number of evoked memories

A key research question was whether self-selected stimuli would evoke more specific memories than their experimenter-provided counterparts. Whilst the distribution of specific memories across the lifespan showed similar patterns across both choice conditions, what was clear from analysis was a difference in overall specificity of memories evoked. As hypothesised, chosen stimuli evoked significantly more specific memories than provided stimuli, with many of these being unprompted. In these cases, it suggests that this autonomous decision allowed people to evoke memories in a more involuntary manner and involved less cognitive effort to retrieve them. This may be that the memories evoked are more intrinsic to the identity and self-memory system. Another possible explanation is that with the process of initially choosing self-selected stimuli, participants were already primed to retrieve memories, albeit in an involuntary way. Consequently, experimenter-provided stimuli evoked more general memories than self-selected stimuli. Whilst the cues continue to be somewhat evocative, it appears that when people are left without free choice about what those cues are, the stimuli do not interact with the self-memory system in the same way, and instead gives way to a more generic, loose link to the self.

In terms of stimulus differences, music and clothing were the two conditions in which choice condition affected number of specific memories most drastically. Objects and pictures produced fewer specific memories when provided, but when given other people's choices (akin to word cueing), participants were able to retrieve a specific memory fairly well. Objects and pictures in fact still produced more overall specific memories than general memories with provided stimuli, albeit non-significantly.

A large portion of this study's findings relate back to the instruction and the nature of the stimulus, and how these features interact. Music, for example, is not an ambiguous medium. People tend to recognise the name of a song or artist, or not, which naturally dictates the narrative search that follows. With more tangible stimuli, it can be difficult to provide a sufficient descriptive word cue without interacting with them in person. Of course, despite the fact that the name of a song is much more specific than the

description of someone's favourite red trousers, it is still possible that songs may cue stronger memories when the music is actually heard. The question of whether memories are cued differently depending on whether they are physically present is an important question which is not addressed in this study and largely disregarded in other reminiscence bump research. While it is important to address this, it is clear that even talking about music and objects are evoking discussions of a general and specific recollection, which may be useful to support autobiographical remembering, particularly in displaced groups who often have limited contact with their memory scaffolding.

4.4.2 Specific memory retrieval across the lifespan

It was hypothesised that, if in fact the reminiscence bump was associated with preference, self-selected stimulus cues would evoke more autobiographical memories between 10-30 years than experimenter-provided stimulus cues. Overall, the activity of word cueing specific memories with a range of stimuli resulted in the typical reminiscence bump at 11-20 years, and a recency effect at 61-70 years. When this was broken down to compare self-selected and experimenter-provided cued memories, lifespan retrieval was exaggerated and peaked at different age periods.

Contrary to the hypothesis, experimenter-provided stimuli evoked an overall stronger reminiscence bump than self-selected stimuli, whilst self-selected stimuli evoked a stronger recency effect. These findings point to a number of possible explanations. Firstly, that having the autonomy for what to reminisce with is not all that important in evoking specific memories from this time period. However, this then requires us to distinguish between 'accessibility of memories' and 'preference of memories'. Referring to the theory of word cue method vs important memories method producing different curves, it appears that the provided stimulus curve is the product of the word-cue method (Koppel & Berntsen, 2015). In these studies, a very generic word cue is delivered to the participant, which involves associating a brief title. This allows a broader narrative search compared to the very specific cues used in the study reported here. A particular red jacket chosen by someone for themselves is likely to be a more ambiguous word cue for another and may induce a broader narrative search.

The same could be said of self-selected stimuli, which were equally used to cue memories. However, self-selected stimuli went through an initial selection process before being used as a formal cue. For many people, being asked, "What would you take to a place of isolation?" might be similar to asking them what is important to them, thus making this akin to the important memories cueing technique. However, it is important to note that this instruction has the potential, and was confirmed by some participants, to initiate more practical thinking. For example, when participants in the clothing condition were asked to choose things, they often reported during the debrief, "I took this instruction as, 'what do I have physically in my wardrobe now? What would I need?' so I was thinking more in the here and now." Participants were told that they could select anything that they had come across during their lives, even if they did not own it. Regardless, the present was very prominent in their discussions, which likely resulted in a strong recency effect for self-selected stimuli overall. This suggests then that they are not simply thinking about what has been important to them in their life.

Self-selected pictures also resulted in a strong recency effect, perhaps because individuals wished to capture the memories of people as they are presently. In terms of provided pictures, being given a generic description of a picture (which were often photographs) allowed a much less interrupted narrative search, thus allowing them to access memories in a way that was much closer to the more common 'word cue' method. The recency effect could be put down simply to the fact that participants had no preparation time to consider their choices or memories, and instead to choose things that came to mind naturally. A further explanation relates to the fact that the nature, use and accessibility of photographs have changed a great deal over time, therefore, people are far more likely to have more recent photos. However, this could be said of other stimuli involved in this study, particularly music. Interestingly, music does now show this same recency effect.

Picture descriptions provided to participants appeared to evoke no recency effect whatsoever. Descriptions of photographs tended to involve elements such as "black & white photo of bride and groom" and "graduation photo", which would naturally evoke memories of big family events, often of the self or children. This finding may be consistent with Krumhansl's observation of a cascading reminiscence bump

(Krumhansl & Zupnick, 2013), also noticed in Chapter 3. Generally, pictures evoked the most specific memories out of all stimulus types. The majority of self-selected pictures were photographs depicting a physical space and specific event, which then often led to cueing the event in question. This finding implicates photographs for facilitating a more immediate retrieval of specific memories, with plenty of further contextual elements present within the stimulus itself.

It was also hypothesised that music would produce a robust reminiscence bump as seen previously in Chapters 2 and 3, and in the literature (Loveday & Conway, in prep.; Rathbone et al., 2017). Indeed, the reminiscence bump was found to be very robust peaking at 11-20 years and was particularly prominent for chosen music. With regards to instruction ambiguity, choosing music is a lot more universally linked to the idea of "importance", even if this word is not used explicitly. Music is far more specific than the other sensory stimuli in this study, and that rarely serves a merely practical function, rather an emotional one (Rentfrow, 2012). Music was almost entirely responsible for the main effect of chosen stimuli on the overall reminiscence bump. This further solidifies the robustness of the musical reminiscence bump, regardless of instruction.

Objects that were chosen by participants evoked memories quite broadly across the lifespan. Similarly to clothing, there may have been a more practical selection process involved for objects. Nonetheless, it is an interesting observation to see this broader choice from childhood in particular, which is similar to what was seen in chapter 3 for age at first encounter of stimuli.

Overall, these findings suggest that different sensory stimuli may in fact produce entirely different retrieval curves, and should these results be replicated, it may suggest that different tools can be used to access different parts of the lifespan more readily. This is a novel finding which has important practical application for the tools widely used in reminiscence therapy, and how these might be shaped to optimise effects for individuals. Nevertheless, the nature of the instructions is still an important consideration for the theoretical implications of this study and the overall aims of this thesis. Wording seems to have more of an impact on clothing choices and memories than the other stimulus conditions.

4.4.3 Reasons within evoked memories

It was loosely hypothesised that self-selected stimuli would evoke memories of a more personal nature than experimenter-provided stimuli. Results showed that participants tended to particularly choose things that evoke memories of people and this was also true for provided stimuli, albeit at lower frequencies. This strengthens the claim that these stimuli provide an extended medium for people to represent relationships, social bonding and the social function of autobiographical memory. The only type of memory to increase in frequency with provided stimuli were those that included the description of a 'time period' – this is therefore a large contributor to the significant increase of overall general memories evoked by provided stimuli. The coding mechanism refined throughout this thesis provides a useful but crude view into the nature of memories evoked. In future research, this methodology would benefit from some degree of thematic analysis to identify more elements that may currently not be taken into consideration.

4.4.4 Memory rehearsal

Due to participants experiencing difficulty in accurately or appropriately reporting their rehearsal for specific memories provided, and due to low counts per item, no statistical analysis was performed on this variable. It was hypothesised that self-selected stimuli would evoke more rehearsed memories than experimenter-provided stimuli. Theoretically speaking, memories that are rehearsed more hold a stronger link to the self-narrative. Frequent rehearsal is one of three key features of self-defining memories as theorised by Singer et al. (2012), as they are more relevant to our lives and directive behaviour. Nevertheless, most specific memories tended to not be intentionally rehearsed often at all, which was evident from the counts across both choice conditions. Participants reported that they found this question to be "quite bizarre" as it suggested an active effort to rehearse memories, which was something they did not relate to. It appears that 'rehearsal' is a term that means something different to memory researchers and the general public, which suggests that perhaps this is not the optimal method to ask people about memories that are integral to their self, or to assess how often memories are thought about.

4.4.5 Emotional valence

Overall, people described memories of primarily positive emotional valence. This is consistent with study 2, as well as previous findings in the literature (Rubin & Berntsen, 2003). Whilst some participants did produce memories with a negative or mixed emotion attached, these counts were too small to derive any meaningful conclusions. However, the fact that individuals choose to include mixed or negative stimuli within their curated list is an interesting observation, nonetheless. This may give rise to the role of autobiographical memory in emotional regulation (Raes et al., 2003), and particularly the role of redemption memories in revisiting the development of difficult past events (McAdams, Reynolds & Lewis, 2001). With regards to results on the positive emotional valence ratings, it was found that self-selected music and clothing evoked more positive emotional memories than their experimenter-provided counterparts. In line with the findings on memory specificity, self-selected music and clothing both produced far more specific memories than experimenter-provided. This may suggest that music and clothing may be deemed as having more personal features that are perhaps preserved when instructing memory cueing, compared to generic object and picture descriptions.

4.4.6 Limitations

One of the key and ongoing questions within this thesis is related to be the initial instruction of how the list of self-selected cue words is curated. Whilst the provided cue word list technique is derived from previously established methodologies (Crovitz & Schiffman, 1974), asking participants to produce their own cue list with the concepts of 'importance' or 'preference' in mind is a novel approach to this type of autobiographical memory research. This methodology has been developed primarily from a non-research setting of a radio interview programme, and ultimately presents a number of challenges.

What appears to be occurring, is that while the instruction for personal curation is being delivered in the same way for every stimulus it is being interpreted in a different way by participants. When considering a stimulus such as music, the instruction of

'choosing things to take to an isolated place' appears to leave little room for purpose other than personal significance. Music serves a range of purposes across different cultures, but generally speaking for Western society, its main reported uses include enjoyment, entertainment, emotional processing, and a medium of social bonding (Hargreaves & North, 1999). The same could be said of pictures, but as discussed previously, this can result in a default curation of family photographs which may not be representative of all still images. This assumption in itself is important and suggests that certain types of picture cue appear to be more naturally evocative than others. However, with regards to application, this may present difficulties on an individual basis.

Ultimately, the stimuli that are chosen will represent a wide spectrum of functions, some regarded as 'important', which may allude to Koppel & Berntsen's (2015) description of the important memories cue method (explained further in section 4.1.1). On the other hand, some stimuli are being chosen for more everyday purposes. For example, objects and clothing often serve a practical function and it is this that may be at the forefront when curating one's list of stimuli. Ultimately, this means that the instructions are prone to different interpretations depending on whether it is an object, picture, item of clothing or piece of music.

This spectrum of instruction interpretation also impacts the provided word cue list, as participants' chosen curations were also used as age-matched provided cues for other individuals. Provided cues, as the term suggests, are given to participants in order to cue memories. Participants did not have any previous interaction with these cues prior to hearing them. Some of these provided cues will be immediately recognisable for their concrete nature, such as music. Generally speaking, a song title and artist will either be recognisable or not. Meanwhile, provided object, picture and clothing cues are largely generic in word form. There are some exceptions to this, such as objects or clothing that are culturally recognised, for instance, the cane, the Mona Lisa, and a rara skirt. On the other hand, a description such as 'blue vase', 'wedding photograph', and 'red skirt' will not elicit the same retrieval search. More generic cue words likely involve a more effortful search, whilst more recognisable cues will be more easily associated with autobiographical knowledge. Some cues will not communicate with the autobiographical knowledge base at all.

All self-selected sensory stimuli are curated with intention. Even in cases where people chose things for practical purposes only, they knew to list choices that they could picture in their mind, i.e. concrete, non-abstract selections. At some point, these choices may have then been used as a provided cue list for somebody else. Whilst this interpretation of instruction may be confounding in some ways, it actually gives rise to how much cueing instruction and technique matters. A concern here is that different interpretations have led to different choices and different types of memory search, which reflects problems with the different techniques used across the literature. From a theoretical point of view, this discussion suggests that using abstract tools with which to explore autobiographical memory is not wholly indicative of the nature of memory, and that involving the participant in the selection of their own memory cues can lead to higher specificity of autobiographical memories, and retrieval from different parts of the lifespan. This methodology may involve processes that enhance access to the autobiographical knowledge base.

4.4.7 Implications and further research

Music has proven to be very consistent in evoking memories from the reminiscence bump period, both when discussed by interview guests in Study 1, to reports of first encounters and explicitly cued memories in this study. Music therefore provides a reliable source to further explore contention in cueing methodologies, and to understand more deeply the nature of memories associated with it when delivered in different modalities. With regards to other stimuli, it would be interesting to see how the physical presence of these sensory cues might affect autobiographical remembering, as opposed to the labelling cue technique used in this study. More has been unveiled regarding the uses of these stimuli to better understand memory cueing, that are often used in reminiscence settings for memory impairments (Cotelli et al., 2012). With this considered, the thesis will now attempt to address two different paths. Firstly, to further disentangle the literature of music and autobiographical memory cueing, and secondly, to explore how this developing methodology might be implemented towards more applied settings for supporting memory and identity.

4.4.8 Conclusions

This study has further supported the notion that music produces a robust reminiscence bump, whether it is self-selected or provided to participants as a cue. It has shed light on how different choice and stimulus cueing conditions can evoke memories from different life periods and raised questions regarding the narrative searches used and potential application for clinical groups.

5. Study 4: Assessing the importance of ownership and cueing technique in musically evoked autobiographical memories

5.1 Introduction

A common thread throughout the literature and studies presented in this thesis, is that music is an extremely powerful medium for evoking memories, particularly those that occur during late adolescence and early adulthood. However, it has also become clear that current research is inherently riddled with methodological inconsistencies, using a variety of techniques interchangeably and to measure and define the reminiscence bump. As we have seen in this thesis, while the reminiscence bump was initially defined as increased memory for experiences between the ages of 10 and 30, later studies have found the same phenomenon when it comes to people preferences. While these studies often draw similar conclusions, the variation in methodologies make it difficult to draw firm conclusions about the underlying reasons for a reminiscence bump.

The fourth study of this thesis aimed to address these problems by experimentally isolating the most common confounding variables in the reminiscence bump literature. Despite an extensive body of research on this phenomenon, this study is the first to systematically explore whether the reminiscence bump was influenced by the way in which cues were both chosen and presented. This study focused purely on music, as this has provided consistent results for lifespan retrieval and memory features, both in the discussed literature and the previous studies in this thesis. Participants were asked to select ten pieces of music they would like to have in isolation. Half of participants selected these choices freely, whilst the remainder were required to select from a fixed prepared list of songs. They were asked to report the memory that came to mind in response to the cues, which were delivered via verbally or audio excerpt, and report further information on specific memories. This study also included nostalgia ratings and defining memories as new self-report variables to provide some insight on musical preferences and explanations for the reminiscence bump.

This study aimed to investigate the effect that choice condition and cue modality had on the following:

1. The temporal location of the reminiscence bump.
2. The frequency of specific memories evoked.
3. How nostalgic music was rated to be.
4. The frequency and temporal location of self-defining and relationship-defining memories.

5.1.1 Contention in cueing methods

As discussed in Chapters 1 & 3, the reminiscence bump was first described as heightened recall of memories occurring between the ages of 10-30 years (Rubin et al., 1986). The majority of the research on which these conclusions are drawn, have involved asking people to produce memories in response to word cues or through retrieving important memories (Koppel & Berntsen, 2015). These findings have consistently implicated this period of the lifespan to be the most accessible in terms of memory retrieval. However, a range of more recent studies have found this effect to occur when asking for people to identify their preferences. When participants are asked to name their favourite books, films, and music records, these choices reflect things that were first encountered during their reminiscence bump (Janssen et al., 2007). Similarly, participants have shown a preference towards footballers who reached their peak when participants were in adolescence (Janssen et al., 2012). This finding has also been reflected in market research, in which people showed a preference for nostalgic-based advertising that focused on their own reminiscence bump period (Ju et al., 2016). So, it appears that multiple methods that span from memory-based tests to people's preferences are demonstrating this effect. However, it is unclear whether this is because preference is simply reflecting heightened memory, or whether the two processes independently reflect the development of the self. More recent studies of song preferences have extended the notion of a musical reminiscence bump (Rathbone et al., 2017; Krumhansl & Zupnick, 2013). But are these songs better preferred because they cause us to remember certain events and life periods?

Essentially, while all of these studies support the notion of a reminiscence bump, there are confounds between recall, familiarity and preference of songs, as well as the relationship between music and personal narrative. Whilst these phenomena are closely interrelated, they are separate concepts that are continually used interchangeably. For example, when an individual is given a memory test for music, to what extent might this be influenced by taste and preference? Likewise, when an individual is asked to select their preferred music, in what way might this be driven by their ability to remember the song and/or the strength of personal memories that are associated with the song?

5.1.2 The reminiscence bump: memory for music

The earliest reminiscence bump study for music comes from Bartlett & Snelus (1980), who specifically explored participants' ability to recognize songs from across the lifespan. Participants were given musical excerpts and asked to rate familiarity as well as estimating the period during which that song was popular. In addition, they were asked to recall lyrics if they were able, as well as reporting when they had last listened to each song. Their study revealed that people performed better at lyric recall when hearing melodies rather than just song titles. This is one of the first findings to highlight the importance of modality in memory recall, thus suggesting that hearing music may serve as a stronger cue for memory than word or verbal cues. However, it is important to note that Bartlett & Snelus (1980) were interested in understanding the nature of memory for music, as opposed to personal memories associated with certain songs. Nevertheless, they concluded that their study reflected a very long-term and robust memory for songs, thus supporting the notion that music is a potent transporter to the distant past.

5.1.3 The reminiscence bump: memories associated with music

Other studies reported in this thesis have confirmed that people are better able to recognize and remember music from the reminiscence bump period (see Chapter 1), but it does not necessarily follow that these songs are linked to autobiographical remembering, so it is important to consider this as a distinct question. Janata et al.

(2007) were the first to coin the phrase 'music-evoked autobiographical memories' or 'MEAMs.' Many studies exploring the musical reminiscence bump (Bartlett & Snelus, 1980; Holbrook & Schindler, 1989) focus primarily on the recollection of song features, such as title and year of popularity, but these features are neither necessary for nor equal to the reminiscence of personal memories involving people, places and events associated with the music. For example, one may not remember the title of a song that they danced to, but immediately relive certain memories when they hear it. Janata and colleagues therefore set out to specifically characterize the memories elicited from listening to music.

After hearing musical excerpts, undergraduate participants were asked to select whether they were reminded of an event, period, person, place, or none of the above. Investigating this level of episodic-semantic detail was a novel and much needed advance in methodology. Overall, both general and specific autobiographical memories were reported, and they found that 30% of all songs evoked various emotional responses which were mainly of a positive nature. Interestingly, the third most common emotion reported was nostalgia. Nostalgia is generally characterized by a sentimental longing for a period in the past and is usually accompanied by autobiographical memories (Barrett et al., 2010): it has been suggested that "one can remember without being nostalgic, but one cannot be nostalgic without remembering." (Batcho, 2007, p. 362). Intuitively, nostalgia is a feeling that many people would describe as being a part of their recollective and emotional experience when listening to certain music. However, this study was one of the first to explicitly highlight nostalgia as its own entity within MEAM research. Despite playing a key role in the experience of music-related memory, it has been generally overlooked as a main focus of MEAM studies. This is a significant gap in the literature, given that nostalgia has also been shown to have many positive psychological effects (Routledge et al., 2013), and so has particular relevance for reminiscence therapy (Woods et al., 2018). While nostalgia has not yet been specifically explored in this thesis, it is something that participants have frequently spontaneously reported in Studies 1-3.

Other studies such as Barrett et al. (2010) have also investigated MEAMs by explicitly asking for reports of recollection and these find autobiographical salience to be a major predictor of nostalgia. Within the music literature, studies using the Autobiographical

Memory Interview technique found high reports of vivid memories and emotional responses in response to music, and internal and perceptual details (Belfi et al., 2016; Cuddy et al., 2017). Cuddy et al. also found that the type of memories evoked reflected an age effect, as both older adults and adults with probable Alzheimer's disease produced more vivid memories but less specific details than younger adults.

5.1.4 Musical preference

In parallel with the studies that have looked at a reminiscence bump for *recognition* of music, there have been studies that have explored whether there is a peak in *preference* for music from across the lifespan. Musical preference is defined as "a person's liking for one piece of music as compared with another at a given point in time." (Hargreaves, North, & Tarrant, 2006, p. 135). This concept is different from musical taste, which refers to one's preferences over a larger period of time. However, these phenomena work in a symbiotic relationship, both of which inform the other.

Holbrook & Schindler (1989) carried out the earliest of these studies in 1989, who showed that musical excerpts that were rated most preferred peaked for songs released when participants were aged 23.5 years. This study was replicated by Hemming (2013), although they found that the peak occurred earlier, at 17.4 years. Essentially, it appears that musical preferences from a provided pool of songs tend to reflect musical tastes acquired during early adulthood. Given that this finding matches people's memory for music, this suggests that music which people feel more connected to is more likely to be remembered, and this was supported by Schulkind et al. (1999). They investigated long-term memory for popular music by assessing participants' ability to remember song details, as well as asking them to provide emotion and preference ratings. Results revealed that songs from the older adults' youth were remembered best and were the most emotionally valent. This supports previous findings that memories of music are most potent earlier in life and are often accompanied by strong emotions. Studies 1-3 in this thesis offer strong evidence that the link between preference and memory for songs is driven by a specific mutual connection with autobiographical memories. In other words, songs that have a strong

connection with a person or moment in their life are both preferred and better remembered.

The link between preference and personal memories, especially of people, may explain Krumhansl & Zupnick's (2013) observation of the 'cascading reminiscence bump' discussed in Chapter 2. When looking at young adults' personal memories evoked by music across 5.5 decades, they found that as well as a musical preference from their own two decades of life, they also showed preference and recognition of music from their parents' reminiscence bump period. This supports the notion that musical preference and taste can be carried forward into newer generations, from exposure at a younger age. A later study by Krumhansl (2017) revealed a generation effect, in which older adults had a stronger preference for music from their reminiscence period than younger adults.

In the case of studies assessing musical preference, results regarding musical preference should be considered in the context of the way in which the question was asked, i.e. whether it is a free choice or a choice from a pool of songs. Whilst asking participants to identify their preferences from a list of provided sings does provide some insight into what they like and connect with, it might be shaped by the constraints of the task and not reflect their overall musical taste. When using this methodology to assess a reminiscence bump there are inherent limitations, given that most studies are restricted to researcher-provided pop songs. This does not allow for the full breadth of musical tastes, e.g. classical, folk, world music etc., all of which are much more freely available to modern day music listeners.

Studies that simply set out to investigate the familiarity of music and musical memory are less likely to be limited by these forced-choice methodologies. However, when exploring the link between preferred music and autobiographical memories, it could be argued that it is more important to allow access to the full spectrum of music, simply because as the earlier studies in this thesis have shown, personal memories are linked with very personal choices of songs. Some have used musical excerpts (Belfi et al., 2016; Krumhansl & Zupnick, 2013) or song titles (Rathbone et al., 2016) as a cue for memory (i.e. "what does this make you think of/remember?" but if the choice of music is restricted then so is the potential link to autobiographical memories. This approach

is backed up by El Haj et al. (2015) who gave participants the freedom to select music without these restrictions and found that playing self-selected music improved autobiographical memory recall, compared to provided music. They did not, however, explore this in relation to the reminiscence bump.

5.1.5 Current study

This discussion has made it clear that music is very evocative and that details relating to music, particularly preferred music, are well preserved throughout life. However, these studies have offered very little insight into autobiographical remembering, and the link that music provides to personal experience. Studies 1-3 have addressed some of these limitations by allowing people to freely select music and then exploring how these preferred choices relate to autobiographical memories. However, it is not yet clear whether this pattern would be the same for the fixed-choice methodology that has been more commonly used to investigate the reminiscence bump for music. Study 4 has directly addressed this by comparing autobiographical remembering for songs chosen freely vs songs chosen from a restricted list.

Another significant variation across the musical reminiscence bump studies, is whether the music is described by a title or actually heard. For example, Rathbone et al. (2017) simply provided the song title as a cue for memory. Given Bartlett and Snelus's (1980) early finding that audio cues provoked stronger memories than word cues, this suggests that we should be cautious about considering studies as equivalent when they have used different approaches. In addition to the above manipulation, Study 4 directly compared memories when cued with audio clips vs a song title.

Finally, this study will extend the findings from Studies 1-3 by exploring two key qualitative aspects of the autobiographical memories cued by music across the lifespan. Firstly, it will directly assess the level of nostalgia evoked by the songs (whether freely chosen or from a fixed choice, and whether heard as an excerpt or described by a title). Secondly, it will establish a clearer picture of how self-defining memories relate to music across the lifespan by asking participants directly, rather than depending on the interpretation of the researcher. This is crucial to this thesis and to

understanding the extent to which the reminiscence bump reflects development of the self. Although El Haj et al. (2015) have previously looked at self-defining memories during exposure to self-selected vs provided music, they did not look at where these memories fall in the lifespan. As memories of people have featured highly in studies 1-3 and other research, the notion of 'relationship-defining' memories was also introduced in order to investigate this aspect of memory further.

5.2 Methods

5.2.1 Design

There were two key independent factors within this study: i. *Choice condition*, which refers to level of freedom the participant has when selecting music. This between-subjects variable has two levels: Fixed Choice ($N = 18$), and Free Choice, ($N = 18$). ii. *Cue condition*, which refers to the modality in which music choices are presented to the participant. This within-subjects factor has two levels: Word Cue, and Audio Cue.

This study investigated the effect of choice condition and cue type condition on the following:

a) The nostalgia rating of chosen music
b) The number of specific memories evoked
c) The presence of a reminiscence bump across the lifespan
d) The frequency of self and relationship-defining memories evoked
e) The temporal location of self-defining and relationship-defining memories across the lifespan

5.2.2 Participants

36 subjects aged between 60 to 70 years (mean age: 64.68 years) were recruited for this study. Similarly to the previous study, participants included healthy older adults with no diagnosed memory impairments. They were screened using the Mini Mental State Examination (MMSE; Folstein, Folstein & McHugh, 1975) within the Addenbrooke's Cognitive Examination - revised (Mioshi et al., 2006). Scores ranging between 24-30 were considered to indicate no cognitive impairment, as advised by previous work (Tombaugh & McIntyre, 1992). All participants scored 24 and above, and therefore all were eligible to take part.

Participants included 19 females (range: 60-69 years, $M = 64.53$, $SD = 2.55$) and 17 males (range: 60-68 years, M = 64.83, $SD = 2.90$). They were recruited via opportunity sampling and were accessed predominantly via word of mouth on social media and University of the Third Age.

5.2.3 Materials

5.2.3.1 Addenbrooke's Cognitive Examination - revised (ACE-r)

Similarly to the previous study, the ACE-r was administered in a post-study screening session, as a way of ensuring that participants with any undetected impairments were appropriately allocated in a clinical group. Although the ACE-r was carried out, this was merely used to identify particular areas of potential abnormality; MMSE cut-off scores were applied to allocate participant eligibility where necessary. Participants were given the opportunity to opt-in for their results on the MMSE to be passed onto themselves or their General Practitioner.

5.2.3.2 Desert Island Jukebox Songbook

The Fixed Choice music was organised as an alphabetically ordered catalogue of 80 chart-topping singles measured by number of weeks at number one (see Appendix 14). The songs were selected from the official UK music charts for decades 1940 to 2010 inclusive, in order to include the lifespan of all participants (1948-present).

5.2.3.3 Musical excerpts

The music that was provided to the participant via audio excerpt was accessed, collated and played to the participant using the music-streaming platform Spotify® on an Apple MacBook Pro. For the Fixed Choice condition, a complete playlist of all 80-chart singles was produced and downloaded to the computer in advance. For the Free Choice condition, the songs were selected on the spot for each participant using the Spotify search engine. Music was exposed to participants at the computer's full volume for 60 seconds and controlled manually by the researcher.

5.2.3.4 Main questionnaire

A questionnaire was constructed using Microsoft Word (see Appendix 13). The data of all participants were transcribed onto the Word document by the researcher for a more efficient process and collection of data. Four versions of the questionnaire were distributed throughout the sample in order to account for both the choice condition (between-subjects) and cue type (within-subjects) conditions, where the within-subjects condition was counterbalanced. Analysis regarding the effect of counterbalancing is included in Appendix 10. Only one variable was found to have potentially been affected by counterbalancing.

Refer to Figure 9 for a flow-chart of the full study procedure. The first page of the questionnaire introduced the participant to a similar scenario as the previous study: "*Have you heard of Desert Island Discs? It is a radio program where people get asked to imagine themselves cast away on a desert island. I would like you to do the same and think about being in an isolated place.*"

Participants in the Fixed Choice condition were given the following instruction: "*The way we are doing this is a little bit different to Desert Island Discs, as we are going to provide you with a jukebox of songs, and you must only refer to this list provided in the following task. Please select 10 pieces of music from the book of songs that you would want with you on your desert island. You may well feel that there are more than 10 or that your choices may change if you were to think about it again another day but that is fine. Please just select the 10 that feel right at the moment.*" Participants in the Free Choice condition were asked to select any 10 pieces of music to take with them.

After providing the relevant data, participants were taken through a memory cueing task. Throughout this stage, 50% of selected song titles and artists were read back to them, whilst the remaining 50% were played in the form of a faded 60s audio excerpt that included a verse and chorus in most instances. After being provided with the cue, they were asked to rate how nostalgic the song made them feel on a 10-point scale, before being instructed to produce a specific memory: "*I would like you to think of one particular event or moment that comes to mind when you think of this song. It doesn't*

matter if the memory is directly or indirectly related to the song. The event would have happened at any point in your life, from when you were small to last week, but please do not include memories from the last 7 days." For all specific memories described, participants were then presented with questions regarding their approximate age when the memory occurred and how often they had rehearsed the memory, as well as the emotional valance.

In a final portion of the study, participants were provided with the following: "*I am interested to hear if any of your memories are what we refer to as 'self-defining' or 'relationship-defining'*". Participants were given a laypersons description of both of these terms: "*Self-defining: Is this memory something that you related to a specific change or big event in your life - a sort of pivotal, formative moment or turning point that has shaped who you are as a person?*" and "*Relationship-defining: Is this memory something that you relate to a specific moment with another individual that was a pivotal, formative moment or turning point that shaped your relationship with one another?*" Participants were reminded of each memory provided before reporting these features. Lastly, the participants were asked to choose 1 of their 10 choices as their *Castaway's favourite*, as depicted in *Desert Island Discs*.
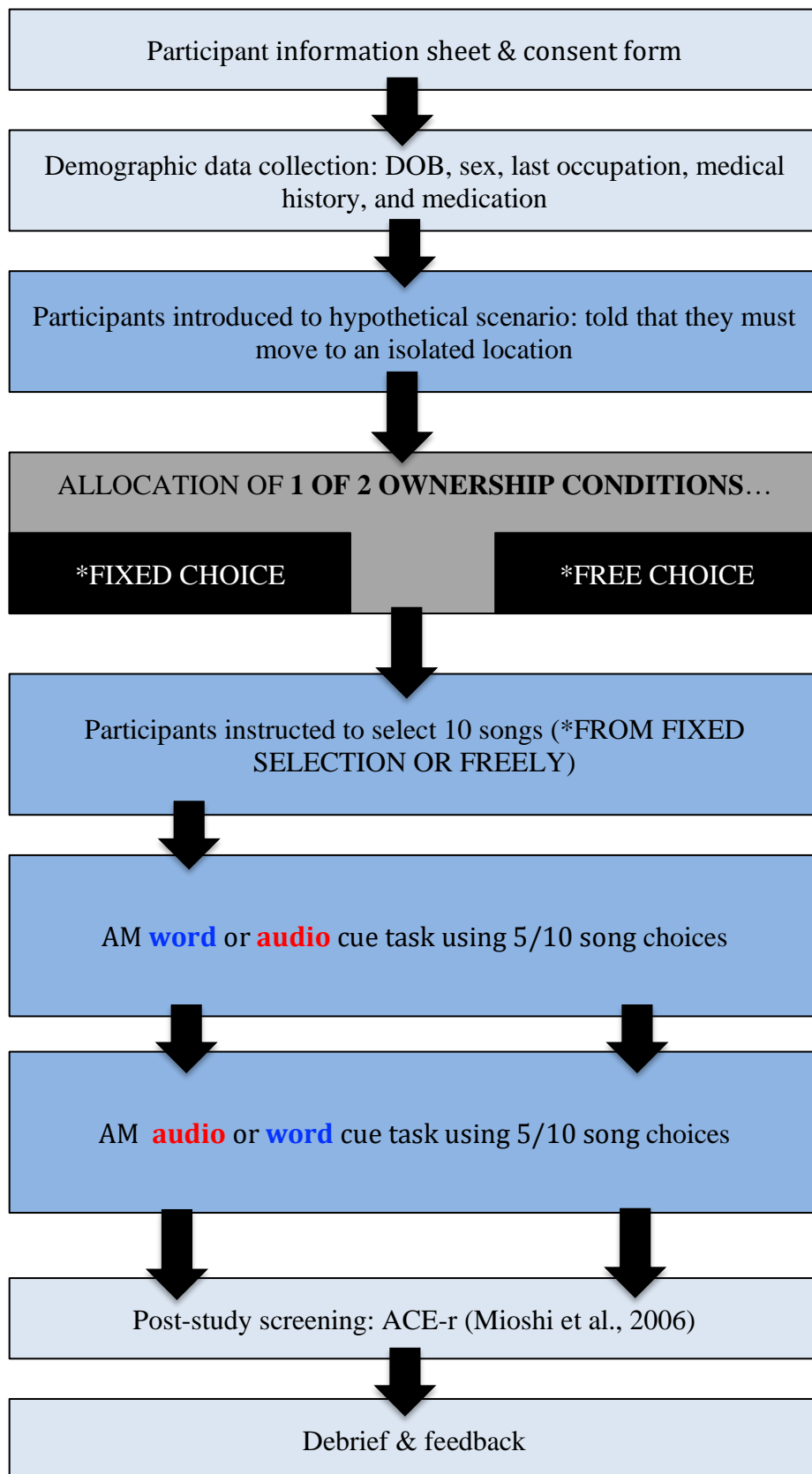
Figure 9: A flow-chart to demonstrate the procedure in Study 4

5.2.4 Procedure

5.2.4.1 Questionnaire

Participants were assigned 1 of 2 choice conditions for the basis of this questionnaire: Fixed Choice ($N = 18$), or Free Choice ($N = 18$). These conditions were chosen to disentangle the effects of this variation in previous methodologies.

Participants were randomly assigned a choice condition before any visits were made using a pseudorandom number generator (PRNG) (1 = Fixed Choice, 2 = Free Choice), as well as the counterbalanced order condition for the cue delivery (1 = Word then Audio cue, 2 = Audio then Word cue).

At the beginning of the study, participants were provided with a hypothetical scenario to imagine themselves in, in which they were isolated from the outside world. Following this, they were given the instruction to choose ten pieces of music, either from a pre-prepared catalogue, or completely freely, that they would like with them. At this point, participants were not asked to disclose any details about their selections, regarding reasons, memories or general commentary. They were not allowed to amend their decisions once they had been made.

Subjects were told that there would be more questions to follow regarding their choices, but prior to any questions, songs were provided back to the participants in the form of a word and audio cues, subject to counterbalancing. Half of the sample received word cues for their first 5 songs, and audio cues for their final 5 songs. Vice versa, half of the sample received audio excerpts first.

All participants were asked to self-report a nostalgia rating on a scale of 1-10 upon receiving the cue. Next, they were asked to think of a specific memory that this cue made them think of. They were initially provided with an example of a memory that involved episodic content, as opposed to describing a more general life period. Where participants described a general memory or no memory, they were prompted to produce a more specific memory. Details regarding prompting and specificity of memory were then recorded at this point.

Participants then responded to three further questions for any of their ten selections that evoked a specific memory. Firstly, they were asked their approximate age when the memory occurred.

Finally, participants were provided with definitions of a self-defining and relationship-defining memory and were asked to report whether or not their memories fell under either of these definitions or not. Following this, they were asked to report which of their ten songs would take to their desert island if they could only keep one.

5.2.4.2 Scoring & coding

In each case where a specific memory was successfully produced, participants reported the age they were at the time of the event or period. These data were allocated into 10-year age brackets to produce lifespan retrieval curves.

The second aspect that was being assessed was memory specificity. In accordance with the previously established methodology in study 3, all songs, fixed or freely chosen, were used to cue memories with the objective of evoking a specific memory. All memories were allocated one: Prompted General memories, Prompted Specific Memories, and Unprompted Specific Memories. Please refer to Table 14 in the previous chapter for descriptions and examples of each code.

5.3 Results

5.3.1 Nostalgia ratings for music

Nostalgia ratings were provided by participants prior to the memory cueing exercise. Overall, there were 350 nostalgia ratings reported for music chosen by participants, with one participant choosing not to provide rating.

Table 14: Mean rating of nostalgia for music across choice and cue conditions in Study 4

Choice condition	Cue condition			
	Word		Audio	
	Mean	S.D.	Mean	S.D.
Fixed	6.23	1.22	7.32	1.36
Free	7.93	0.99	8.08	1.31

Data were found to be normally distributed, therefore, parametric analyses were performed to assess the difference in mean nostalgia ratings between choice and cue conditions (Table 14).

A mixed-measures ANOVA revealed a significant main effect of choice [$F_{(1, 33)}$ 11.208, $p = .002$] and cue conditions [$F_{(1, 33)} = 9.936$, $p = .003$], and a significant interaction of choice and cue conditions [$F_{(1, 33)} = 5.644$, $p = .023$).

T-tests were conducted to further break down the significant interaction. A paired samples t-test demonstrated that for fixed choice music, audio cues resulted in significantly higher nostalgia ratings than word cues [$t_{(33)} = 4.50$, $p < .001$]. The difference between word and audio cues was not significant for free choice music [$t_{(16)} = .603$, $p = .553$].

Independent t-tests revealed that for audio excerpts, there was no significant difference in nostalgia ratings between fixed and free choice music [$t_{(33)} = 1.68$, $p = .102$]. However, for word cues, nostalgia ratings were significantly higher for free choice songs, compared to fixed choice [$t_{(33)} = 4.50$, $p < .01$]. Taken together, this shows

that free choice songs are generally more nostalgic, regardless of how the song is delivered. However, fixed choice music is much more likely to be rated as more nostalgic when delivered via audio.

5.3.2 Number of memories evoked

Participants were asked to report a memory after being provided with each cue, and overall, all music evoked a total of 333 memories, with a mean of 9.25 (*S.D.* = 1.40) memories per person. These memories included general and specific recollections. 89% of all fixed choice music evoked a memory, compared to 96% of free choice music.

Table 15: Mean number of specific memories produced by music across choice and cue conditions in Study 4

Choice condition	Cue condition			
	Word		Audio	
	Mean	*S.D.*	Mean	*S.D.*
Fixed	1.90	*1.37*	2.17	*1.51*
Free	3.94	*1.06*	3.90	*0.83*

Data were not normally distributed; therefore, non-parametric analyses were conducted. A Mann-Whitney U test was carried out to assess whether there was a significant difference between the number of specific memories evoked by fixed and free choice music (Table 15). Analysis revealed that free choice music evoked significantly more specific memories than fixed choice music [$U = 24.000$, $n_1 = n_2 = 18$, $p < .01$]. The median and range of fixed choice specific memories was 4 (range: 0-7), and for free choice memories, it was 8 (6-10).

A Wilcoxon signed-ranks test was conducted to assess the difference between the number of specific memories evoked by word and audio cues. Analysis revealed no significant difference between specific memories evoked by word and audio cues [$Z = .515$, $p = .607$]. The median of specific memories evoked by both cues was 3 (range: 0-5).

5.3.3 Temporal location of specific memories

5.3.3.1 Location of all specific memories

The ten music choices per participant cued 214 specific memories. Ages reported during specific memories were allocated into 10-year age brackets.

The distribution of specific memories was compared with the expected distribution. Similarly to the previous studies in this thesis, while all individuals were able to select songs equally from the first six age brackets (1-60 years), the ability to choose songs from the last age bracket was unequal. Therefore, a chi-square analysis was carried out to observe differences in the observed versus expected number of specific memories. The expected distribution was based on the null hypothesis that specific memories would be evenly distributed across the lifespan to date. This was calculated for each individual (years lived in each decade/age x number of dateable songs). Chi-square analysis showed that the observed distribution of specific memories was significantly different to the observed distribution [X^2 (6, $N = 427$) = 35.074, $p < .001$]. Overall, music, irrespective of the choice or cue type, evoked memories primarily within the reminiscence bump, peaking at 11-20 years.
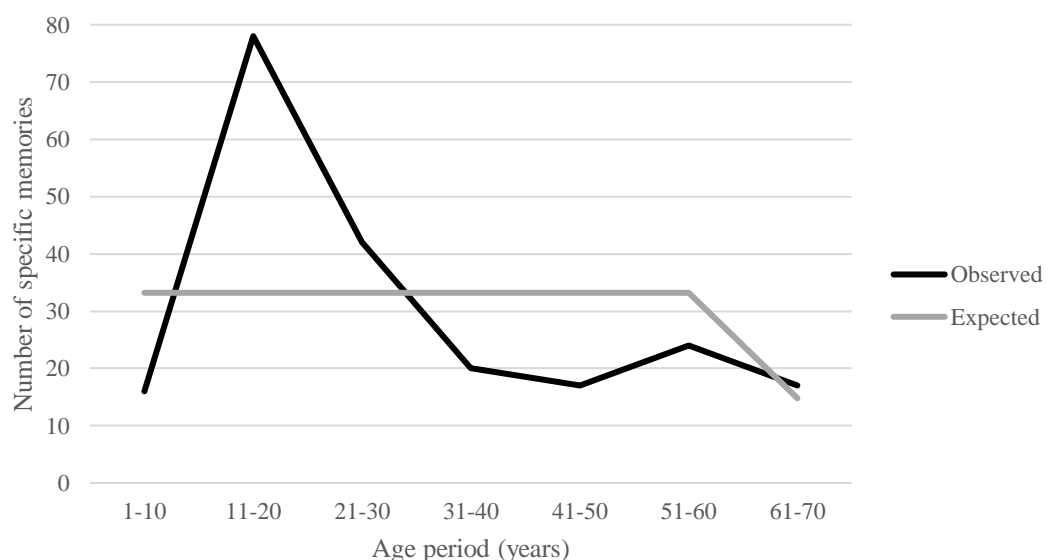
Figure 10: Expected vs observed distribution of specific memories cued by all choice and cue modality conditions across the lifespan in Study 4

5.3.3.2 Location of memories evoked by fixed vs free choice music

Both fixed and freely chosen music evoked a reminiscence bump, but freely chosen music appeared to produce a much more pronounced bump (see Figure 11). Meanwhile, fixed choice music seemed more likely to evoke memories from the recency period than free choice.
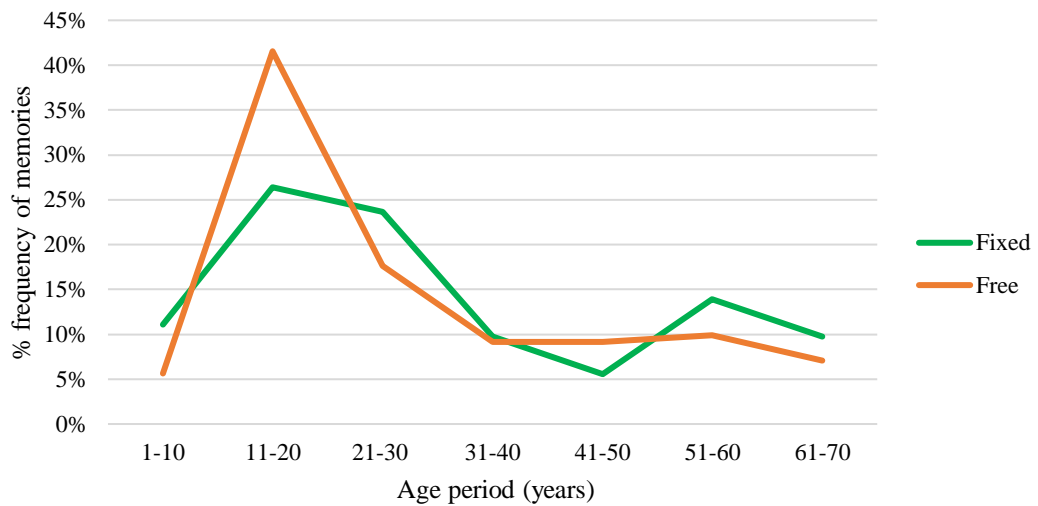
Figure 11: Percentage count of specific memories evoked by fixed vs free choice music in Study 4

A Pearson's chi-square test of independence was carried out to compare the distribution of specific memories across two choice conditions. The difference was found to be non-significant [X^2 (6, $N = 214$) = 7.727, $p = .259$]. See Table 16 for the full count and percentage distribution.

Table 16: Frequency and percentage count of specific memories evoked by fixed vs free choice music across the lifespan in Study 4

Choice condition	Age Period (years)						
	1-10	11-20	21-30	31-40	41-50	51-60	61-70
Fixed	8.00	19.00	17.00	7.00	4.00	10.00	7.00
	11.11%	*26.39%*	*23.61%*	*9.72%*	*5.56%*	*13.89%*	*9.72%*
Free	8.00	59.00	25.00	13.00	13.00	14.00	10.00
	5.63%	*41.55%*	*17.61%*	*9.15%*	*9.15%*	*9.86%*	*7.04%*

Both word and audio cues produced almost identical reminiscence bumps and lifespan retrieval curves (see Figure 17).
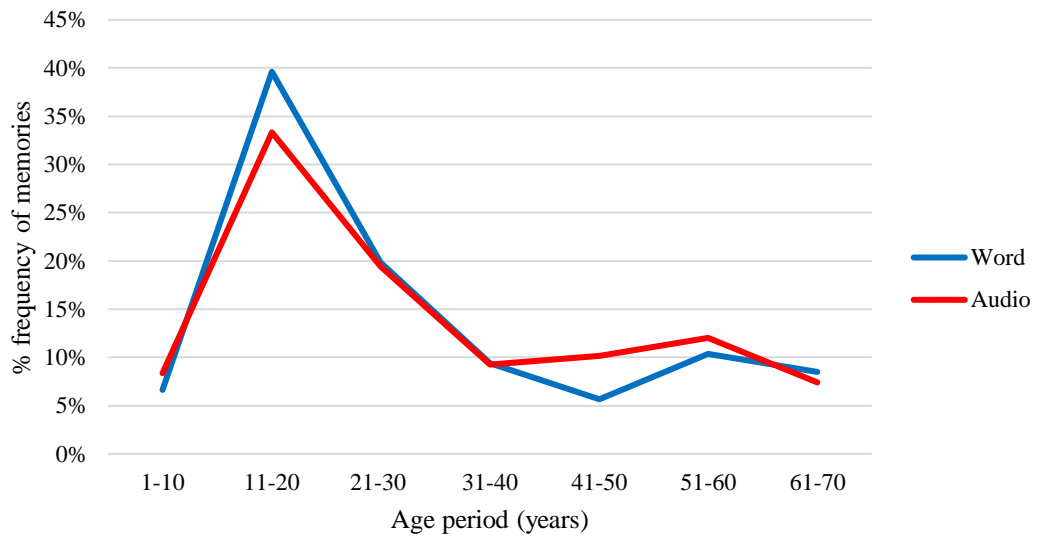
Figure 12: Percentage count of specific memories evoked by word vs audio cues of music in Study 4

A Pearson's chi-square test of independence was carried out to compare the distribution of specific memories across two cueing conditions. The difference was found to be non-significant [X^2 (6, N = 214) = 2.389, p = .881]. See Table 17 for the full count and percentage distribution.

Table 17: Frequency and percentage count of specific memories evoked by word vs audio cues across the lifespan in Study 4

Cue condition	Age Period (years)						
	1-10	11-20	21-30	31-40	41-50	51-60	61-70
Word	7.00	42.00	21.00	10.00	6.00	11.00	9.00
	6.60%	*39.62%*	*19.81%*	*9.43%*	*5.66%*	*10.38%*	*8.49%*
Audio	9.00	36.00	21.00	10.00	11.00	13.00	8.00
	8.33%	*33.33%*	*19.44%*	*9.26%*	*10.19%*	*12.04%*	*7.41%*

5.3.4 Self-defining and relationship-defining memories

5.3.4.1 Number of defining memories

During the final portion of the study, participants were asked to explicitly report whether each memory evoked was viewed as self-defining or relationship-defining. Both general and specific memories were able to be labelled as such. For part of the following analysis, self-defining and relationship-defining memories were combined into an overarching category of 'defining memories' (Table 18). In cases which participants rated memories as both self-defining and relationship-defining, these numbers were counted only once to avoid the skewing of findings. Of all memories evoked by free choice music, 74.57% were self or relationship defining. Meanwhile, 45.63% of memories evoked by fixed choice music were defining.

Table 18: Mean number of defining memories produced by music across choice and cue conditions in Study 4

Choice	Cue modality			
condition	Word		Audio	
	Mean	*S.D.*	Mean	*S.D.*
Fixed	1.83	*1.47*	2.22	*1.11*
Free	3.56	*1.34*	3.61	*1.58*

A Mann-Whitney U test revealed that free choice music was significantly more likely to evoke defining memories than fixed choice music [$U = 52.500$, $Z = 3.489$, $p < .01$]. A Wilcoxon signed-ranks test revealed that there was no significant difference in the number of defining memories evoked by word and audio cues [$Z = .856$, $p = .392$].

5.3.4.2 Temporal location of all defining memories

Self-defining memories primarily occurred within the 11-20 age period. Whilst relationship-defining memories also occurred during this period, they generally presented across a broader age period into the 21-30 year bracket (Figure 13).
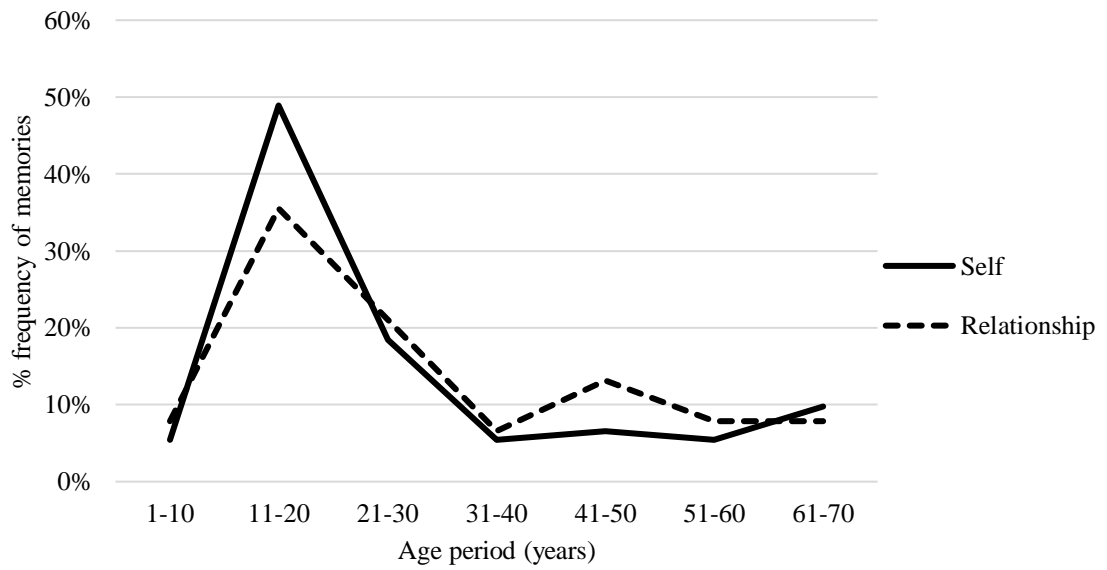
Figure 13: Percentage count of self- and relationship-defining specific memories across the lifespan in Study 4

A Pearson's chi-square test revealed no significant difference in the distribution of self and relationship-defining memories [X^2 (6, $N = 168$) = 4.832, p = .566] (Table 19).

Table 19: Frequency and percentage count of specific self and relationship-defining memories across the lifespan in Study 4

Defining memory	Age Period (years)						
	1-10	11-20	21-30	31-40	41-50	51-60	61-70
Self	5	45	17	5	6	5	9
	5.43%	*48.91%*	*18.48%*	*5.43%*	*6.52%*	*5.43%*	*9.78%*
Relationship	6	27	16	5	10	6	6
	7.89%	*35.53%*	*21.05%*	*6.58%*	*13.16%*	*7.89%*	*7.89%*

5.4 Discussion

5.4.1 Nostalgia associated with music

Nostalgia has been a recurring theme within music-evoked memory research, thus, this study sought to explore the intrinsic experience of participants after being exposed to each song choice. Songs that were chosen freely were rated significantly more nostalgic than fixed choice music. This initial finding suggests that whilst preferences can be identified from a provided list, this preference does not equate to that of one's autonomously curated music.

Interestingly, there was a significant interaction between the choice condition and the modality in which the music was delivered to participants. For freely chosen music, there was no significant difference between nostalgia ratings produced by word and audio cues of songs. However, audio cues of fixed choice music produced significantly higher nostalgia ratings than word cues. This suggests that merely hearing the title of a favourite track is just as powerful as hearing a 60 second audio excerpt. On the other hand, music that has been chosen from a pool of songs likely need to be heard before it evokes stronger feelings of nostalgia. This difference may well be due to the fact that freely choosing music has already evoked feelings of nostalgia. Meanwhile, choosing from the fixed songbook involves an aspect of recognition prior to autobiographical memory recall. Nevertheless, and considering past research has primarily relied on methods of providing music to participants, this further supports the idea that choice and ownership do matter.

5.4.2 Number of evoked memories

Overall, 92.5% of all music choices successfully evoked a general or specific memory. Music that was chosen entirely autonomously evoked significantly more specific memories than fixed choice music. This suggests that retrieving memories with free choice music involves a less effortful narrative search. This may be because these songs are associated with memories that are much more intrinsic to the person's identity. Fixed choice memories were also evocative of memory but tended to produce

memories of a general time period and sometimes require more prompting. As music was selected based on top 10 for each decade, it would be logical to assume that these songs provided an accompaniment during life periods and painted a picture for the general temporal landscape. Freely chosen music, on the other hand, was much more targeted and directly related to specific events. In terms of the cue modality, song titles and audio excerpts did not differ significantly in number of specific memories produced.

5.4.3 Specific memories across the lifespan

Based on the Study 2 and 3, it was hypothesised that free choice music would evoke a more prominent reminiscence bump than fixed choice music. Overall, both fixed and free choice music produced a reminiscence bump, reflected also in the literature (Loveday, Woy & Conway, July 2016; Rathbone et al., 2017). Indeed, freely chosen music evoked a more pronounced reminiscence bump, peaking during the 11-20 year age period. This was partially due to more specific memories being evoked overall. Fixed choice music, on the other hand, demonstrated a much broader reminiscence bump, spanning into the 21-30 year decade. This finding may be due to the nature of the fixed list provided to participants. The 'Desert Island Jukebox' included an equal number of songs from eight decades, thus providing a physical framework or even prompt to the participants of songs they may have otherwise forgotten, which was vocalised during post-debrief discussions. On the other hand, holding full freedom to choose music tracks is unrestricted but also required the participant to choose with no guidance. Word and audio cues produced very similar lifespan retrieval curves, and no significant difference was found in their distribution.

5.4.4 Self- and relationship-defining memories

This study was the first to instruct participants to explicitly state whether memories evoked were deemed to be self-defining or relationship-defining. Results showed that freely chosen music was significantly more likely to evoke these life-defining memories. 75.57% of all free choice-evoked memories were labelled as defining, compared to 45.63% of fixed choice memories. This suggests that limiting to simply

provide music for people, or confining them to a certain selection, will have a significant impact on the production of life-defining memories. Furthermore, these findings have revealed the importance of involving participants in the labelling of their own memories. A number of memory cues used in past studies may have evoked memories of a self-defining nature, in which they were not explicitly mentioned. Vice versa, certain memories described by individuals may be considered self-defining by researchers (Singer et al., 2012). People can make their preferences from a list and respond to them, have memories evoked by them, and feel some kind of connection to them. Regardless, it is the songs that they have curated entirely by themselves, that have directly evoked memories that related to their identity and sense of self, and important relationships. This is a crucial finding, supports findings of important music being present resulting in more self-defining memories (El Haj et al., 2015). However, this is the first study of its kind to allow participants to verbalise what they consider to be a key part of who they are, and this has been reflected in the results. Word and audio cues did not differ significantly, i.e. audio excerpts were no more likely to evoke defining memories than hearing just the song title.

In light of explicitly asking participants to label memories that qualified as defining, temporal location of these memories was able to be investigated. Findings revealed that both self and relationship-defining memories evoked by music tended to occur during the reminiscence bump period, peaking at 11-20 years for categories. These results provide further support for the narrative/identity account of the reminiscence bump and is the first to show that specifically music-cued memories deemed to be self-defining are primarily occurring during this period. Other findings supporting this account have based temporal location on a person's age when songs were released (Rathbone et al., 2017). This lifespan retrieval supports that this time period may not be simply the most accessible for memory retrieval, but that this is in fact a period of time that strongly relates to self-formation (Rathbone et al., 2008; Conway & Haque, 1999).

Relationship-defining memories were less abundant than self-defining memories, but nonetheless mainly occurred in the reminiscence bump period. This speaks to the previous findings of social bonding being an important part of music, as well as findings from Krumhansl with cascading reminiscence bumps (Krumhansl & Zupnick,

2013) and the social function of autobiographical memory (Alea & Bluck, 2003). From this view, it is interesting to see that autobiographical memory and music serve very similar functions, with regards to emotional regulation (Saarikallio, 2007), social bonding (Tarr, Launay & Dunbar, 2014), and potentially, identity formation.

5.4.5 Limitations

A key limitation of this research was the modest sample size. It would have been beneficial to explore further possible interactions between choice and cue conditions. Due to time constraints, each individual was only able to be allocated into one choice condition. It would be interesting to see how the same individuals would react when having a freer, or limited choice of music.

The conversations that a method of this kind evokes would benefit greatly from a more qualitative approach. The overall aims of this study were to look into the nature of memories evoked. However, from an observational point of view, there is potential for thematic analyses to be drawn from these discussions.

5.4.6 Implications and further research

This study has disentangled a number of methodologies that have been used interchangeably within the literature and has uncovered findings that aid in the understanding of the nature of autobiographical memory. Nevertheless, it would be interesting to continue testing these methods in relation to interesting music-evoked findings, for example, the cascading reminiscence bump identified by Krumhansl & Zupnick (2013), using ages of participants at song release date.

From the studies within this thesis, there has been a spectrum of choice conditions: complete freedom to choose, choice within a restricted selection, and entirely provided with age-matched samples. Future research should seek to better understand the cognitive processes involved in each of these conditions, which can inform the wider application. The concept of narrative search strategies has been discussed within this thesis, and further research should seek to identify how individuals are approaching

instructions based on curation. Lastly, this study has raised questions with regards to the modality of memory cues presented. It would be interesting to observe how individuals would react to more tangible stimuli, in word-form and physical form.

5.4.7 Conclusions

This study has further contributed to the notion that giving people freedom in choosing their musical cues allows a much clearer insight into personal narrative and defining memories. Freely chosen music is able to evoke stronger feelings of nostalgia, more specific memories than fixed choice music, which had a stronger impact when heard aloud. A selection of tailored or popular music can and does produce memories, but these findings have confirmed that restricting or removing choice limits both participants and researchers in understanding the nature of memories evoked. These findings have strong implications for future research h and applied settings and may encourage the process of prospective consideration of the most potent musical cues from life periods.

6. Study 5: Applying a self-curated cueing technique to a reminiscence exercise for mild cognitive impairment: a case study

6.1 Introduction

Thus far, the studies within this thesis have shown that music, objects, pictures, and clothing are all stimuli that appear to support autobiographical memory. The different types of stimuli also may be accessing different parts of the lifespan more readily than one another. These findings have been fairly consistent, but this thesis has not yet explored the implications that this may have for people who have memory impairments. In a wider sense, many people who experience displacement for a variety of reasons may benefit from this methodology. Refugees, prisoners, people who hare institutionalised, children in care, and the homeless are a few examples of this. Beyond this, some individuals are experiencing both disconnect from their memories, and from their familiar surroundings, such as dementia patients who have been moved into care.

This chapter considered the methods used to support memory impairments and explore the degree to which these methods currently utilise the theoretical basis of memory and cognition. Furthermore, it sought to understand how methods used throughout this thesis can be implemented in an applied setting. The fifth and final study of this thesis focused on the case of an individual with mild amnestic cognitive impairment (MCIa) and the application of a methodology developed from the previous studies in this thesis for a real-life setting. The participant and their spouse were invited to select a range of sensory stimuli and compare the process of autobiographical remembering with generic verbal cues.

This study is exploratory in nature and seeks to better understand the following research questions:

1. Will the methodology developed throughout this thesis be suitable for revealing important memory cues in an individual with MCI?
2. How does this individual go about selecting his or her own memory cues?

3. Do certain types of stimuli take precedence over others, for example, will the individual select more objects over music?

4. Will the individual respond more effectively to their own selected items compared to those selected for them?

6.1.1 Therapies for supporting cognitive impairment

Psychosocial interventions have been found to be most effective when the approach has been tailored to the needs of an individual and their support network (Oyebode & Parveen, 2016; McDermott et al., 2019). This tailoring often includes adapting the home environment to improve well-being and mood. When interventions were tailored based on the cognitive capabilities of dementia patients, they found a reduction in behavioral disturbances compared to the non-intervention group (Graff et al., 2007). Whilst this tailored approach is a step in the right direction and is evidently useful to focus on activities that engage cognitive strengths, these tasks are still set and decided by the interventionist. They allow some freedom for the caregiver and sometimes patient, but the structure and nature of the tasks is primarily led by the interventionist. A meta-analysis of non-pharmacological therapies for Alzheimer's disease concluded that there remains to be low quality studies and trials with poorly specified interventions, that are designed and implemented in absence of a theoretical model (Olazarán et al., 2010). It is therefore unclear whether the findings suggest general ineffectiveness of the intervention, or poor implementation of said intervention (Vernooij-Dassen & Moniz-Cook, 2014). Studies have reported poor adherence and variation in implementation (Low et al., 2013), which may lead to the failure of reporting positive outcomes (Vernooij-Dassen & Moniz-Cook, 2014). On the other hand, implementation error may be arising due to the sheer difficulty of applying intended plans in routine care (Hulscher, Laurant, & Grol, 2005). It has therefore been suggested that, "In contrast to the [Medical Research Council] framework we suggest that researchers should precede a pragmatic trial with a well-designed explanatory trial in which the mechanisms for practitioner behaviour are highly controlled and studied." (Vernooij-Dassen & Moniz-Cook, 2014, p. 811).

Currently, there are a number of talking therapies available to help support people with memory impairments. As well as standard forms of counselling, psychotherapy and cognitive behavioural therapy, families and care workers have found reminiscence therapy to be successful with patients (see Chapter 1) and this appears to be the most popular intervention. Reminiscence therapy involves the use of music, household objects, newspaper clippings and photographs to evoke discussions of the past. This has been shown to have positive effects, primarily in mood and depression scales (Woods et al., 2018). These practices have typically not been grounded in memory theory, however a recent study found that immersive reminiscence directly improved autobiographical memory in Alzheimer's disease (Kirk et al., 2019). Nevertheless, these developments of directly applying theory are relatively new and this may in part explain why the recent Cochrane report concluded that reminiscence therapy produces inconsistent results (Woods et al., 2018).

Overall, the stimulus selections tend to be fairly generic, for example, photographs of the Queen's coronation, a 1950's kettle or music and film from similar decades (Carr, 2019). Ultimately, this approach aims to provoke nostalgia and reminiscence, thus supporting people in connecting with their identities and their loved ones. Whilst this is a positive step which indicates a useful intervention, the majority of the formal trials are based on paradigms that use stimuli that have been chosen for the individual. The studies in this thesis have shown that self-selected stimuli tend to evoke more autobiographical memories that contain links to identity, narrative and personal relationships. Therefore, it is important to consider the impact of allowing patients, family and caregivers freedom to choose cues for memory-based activities. In many cases of more developed dementias, it is not possible to ask individuals what types of sensory stimuli are important to them.

6.1.2 Self-curated memory cues for dementia

In 2013, Studio Meineck began trialing a product called the Music Memory Box. This is a bespoke kit that can be filled with objects, photographs and music. It also has incorporated technology to allow the user to play songs by interacting with the objects, thus using previously established findings of MEAMs (Janata et al., 2007) within a

more holistic design of integrating multi-sensory experience. This project was developed artistically and experientially, as Meineck witnessed the transformative effects of music with her own family members living with dementia. Using this specialised and personal reminiscence tool, users have reported reduced confusion and anxiety in amnesic patients, and improved enjoyment and sense of self, as well as many benefits among family members and caregivers (Meineck, 2013). Meineck's innovative work shows the potential of personalization, and trials have demonstrated important benefits. Having said this, there is a distinct lack of cognitive evidence-based methodology applied in scenarios such as the music Memory Box, and protocols developed for reminiscence therapy. This input could aid in identifying the optimum stimuli for people to reconnect with their past.

Indeed, the benefits of all these therapies are heavily dependent on access to the past, which tends to be disrupted in dementia. However, as discussed throughout this thesis (see Chapters 1-4), some long-term memories are more robust than others. In particular, the age period between 10-30 years (including teenage holidays, meeting partners, wedding days) appears to be the most accessible, which may be true even if those memories cannot be explicitly verbalised.

6.1.3 Current study

This thesis has focused predominantly on middle-aged to older adults, all of whom experience no diagnosed or detected memory impairments. This has provided important insight into the way that we connect memories to music, objects, photos and clothing but the ultimate aim of this project is to lay foundations for work that might support more atypical groups, who have lost access to explicit autobiographical memories. In addition, the techniques explored in the earlier chapters of this thesis may provide a basis for developing a feasible, innovative, alternative methodology for assessing autobiographical memory in this group. Therefore, to submit this body of work without an exploratory case study focusing on the experience of such an individual would do this thesis a disservice.

An individual with mild amnestic cognitive impairment (MCIa) was chosen for this study because it was deemed to be an appropriate steppingstone towards the difficulties seen in more developed dementias. As MCIa generally presents as a precursor to dementia where memory is significantly impaired but other cognitive functions are generally intact and the individual is still able to live independently, this was deemed most appropriate for this case study. The participant was able to provide informed consent with the support and confirmation of a cognitively healthy spouse.

6.2 Methods

This study draws upon data collected during two sessions with an individual diagnosed with MCIa and his spouse, conducted over a 2-month period. The overall aim of this study is to explore the potential for developing the cueing methodology described throughout this thesis as a reminiscence tool for a person experiencing memory impairment (NG).

The primary participant (NG) and secondary participant (RG) were recruited via connections with a memory clinician in London where NG had first been tested and diagnosed. Given that the study required the couple to discuss memories from their lives whilst dealing with the presence of a cognitive impairment, it was essential that both were fully aware of NG's diagnosis. Once the couple had shown interest in taking part, they were sent an information letter as well as a consent form to read over. The research team then organised a preliminary appointment to meet and discuss the procedure in more detail. As the memory cueing had the potential to evoke quite intimate details of the past, it was important that an initial rapport was built with the couple to ensure they were comfortable to proceed with future meetings for data collection. Following this, two more visits were organised: Session 1 involved NG & RG selecting their items of importance (stimuli), whilst session 2 involved using these stimuli to evoke autobiographical memories with NG.

6.2.1 Materials

6.2.1.1 Sense of Self Scale

The Sense of Self Scale (SoSS) (Flury & Ickes, 2007) is a 12-item scale used to assess the stability of an individuals' feelings and sense of who they are.
Responses are recorded using a 4-point Likert scale ranging from 1 very uncharacteristic of me through to 4 very characteristic of me. A weaker sense of self has been associated with lower self-esteem, greater fear of rejection, greater identity impairment, and more borderline personality symptomology, demonstrating good convergent validity. Cronbach's alpha was reported to be .86 with a test–retest reliability of .83.

6.2.1.2 Autobiographical Memory Task (adapted)

The Autobiographical Memory Task (AMT) (William & Broadbent, 1986) was originally included to serve as one of two quantitative measures. This was intended to assess whether interacting with self-selected and experimenter-provided stimuli might differ in terms of memory retrieval from AMT word cues.

In the final procedure detailed below, the AMT was utilised in a similar method as Study 3. Self-selected stimuli from session 1 were used to cue memories (CAMT) and were compared with experimenter-provided stimulus word cues (AMT-1 & AMT-2). The experimenter-provided items were selected from Robinson's (1976) list of 555 trait adjectives. Due to NG's cognitive presentation of distracted attention, the pre- and post-quantitative measures were abandoned for this case study.

6.2.2 Protocol procedure (intended)

Preliminary meeting

Initial face-to-face meeting with individual and secondary participant (usually caregiver or family member) at their home. Participant information sheet is read and understood, and a general introduction to the nature of the work and their involvement is discussed. The consent forms are signed by the participant and secondary participant. The cognitive screening is carried out with the Mini Mental State Examination.

Session 1: Stimulus selection/curation stage

Part A: The participant is invited to curate a selection of tangible objects, photographs and music that they deem to be important and would want with them in a place of isolation. The participant will lead the researcher around their home to make their selections.
Part B: The secondary participant is taken through the same exercise, making stimulus choices for the main participant.

Session 2: Self-selected stimuli interaction and interview (1-2 weeks after session 1)

Part A: Participant is introduced to a 1-hour free interaction session with their own selection of stimuli, accompanied by a facilitator.

Part B: Autobiographical Memory Task (AMT) and Sense of Self Scale (SoSS) – quantitative measures.

Part C: Short interview regarding the participant's thoughts and experiences during both stimulus selection and interaction stages. An interview structure/agenda is followed based on the set research questions (see Appendix 20).

Session 3: Secondary participant's chosen stimuli interaction and interview (1-7 days after session 2)

Part A: Participant is introduced to a 1-hour free interaction session with the stimuli chosen for them by the secondary participant, accompanied by a facilitator.

Part B: Autobiographical Memory Task (AMT and Sense of Self Scale (SoSS) – quantitative measures.

Part C: Short interview regarding the participant's thoughts and experiences during interaction session.

Part D: Ethnographic interview – this interview should be structured based on observation notes of each interaction session and used for evaluation and feedback points that Part A has not addressed.

6.2.3 Protocol procedure (amended and actual)

Preliminary meeting

Initial face-to-face meeting with individual and secondary participant (usually caregiver or family member) at their home. Participant information sheet is read and understood, and a general introduction to the nature of the work and their involvement is discussed. The consent forms are signed by the participant and secondary participant. The cognitive screening is carried out with the Mini Mental State Examination.

Session 1: Stimulus selection/curation stage

The participant is invited to curate a selection of tangible objects, photographs and music that they deem to be important and would want with them in a place of isolation. The participant will lead the researcher around their home to make their selections. Note down any memories and comments that are made. (This is akin to the Desert Island Discs / Study 1 set up, of comments and potential memories that come to mind more instantaneously).

Session 2: Memory cueing session and interview

1. The Sense of Self Scale is administered once. *With some support, NG was able to complete the questionnaire, however, due to NG's presentation, the pre- and post-quantitative measures were abandoned.*

2. The Autobiographical Memory Task (AMT) were administered.
   - AMT – Experimenter-provided word cues 1 (AMT-1) - 4 words (Appendix 19).
   - AMT with selected object word cues (CAMT) - 8 words
   - AMT – Experimenter-provided word cues (AMT-2) - 4 words.

   Due to NG's presentation, the word cue numbers were limited to 8 cue words per condition.

3. An interview and feedback session are carried out to gather information on participant's thoughts and experiences during all previous sessions. *This was intended to be more structured and extensive, but due to NG's presentation, this portion was fairly short.*

6.3 The case of NG

This account will begin with a brief background of NG & his spouse RG to provide an appropriate context for framing their experiences with selecting reminiscence tools for cueing memories. NG is an 83-year-old male, who currently lives with his wife RG. They spend their time living between two homes – their primary residence, an apartment in a large city that they have recently moved in to, and a second long-term family home in a rural setting in the East of England.

NG is a gentleman of superior intelligence, with a professional background as a consultant physician. His family had first requested assessment of his cognitive functioning in September 2016, after they reported that he was becoming more forgetful and sometimes confused. The initial assessment revealed a normal level of global function (MMSE = 27/30) but minor impairments in some memory scores, and more significant impairment on immediate recall and switch tasks. At this point the clinician described his cognitive function as characterized by reduced attention and slower processing speed, with no clear indication on whether these changes were static or progressive. See Table 20 for an overview of his results and changes.

One year later, NG underwent a follow-up cognitive assessment with the same clinician. Whilst he remained stable in some domains and maintained normal global function scores (MMSE = 27/30), he showed a notable decline in two key memory measures, as well as showing a decline in measures of executive function but particularly those that are dependent on memory. Normal global functioning, despite significant impairment in specific cognitive domains, is not unusual for someone with high intelligence. The decline in cognitive function, particularly memory, was suggestive of a progressive condition and NG was subsequently diagnosed with mild cognitive impairment, amnestic type (MCIa) on 20th September 2017.

Table 20: An overview of NG's cognitive test scores from 2016-2017 in Study 5

Cognitive domain	Test	Test results (Sep 2017)	*Previous tests (Nov 2016)*	Change
Global Function Score	Mini-Mental State Examination	27/30 (Normal Range)	27/30 (Normal Range)	Stable
Depression & Anxiety	Hospital Anxiety Depression Scale (HADS)	3 (No mood concerns)	0 (No mood concerns)	Stable
Immediate Verbal Memory	WMS-III Story Recall	30/75 (SS=11) (Average)	28/75 (SS=9) (Average)	Stable
	Hopkins Immediate recall	3/12 (Very poor)	3/12 (Very poor)	Stable but impaired
Verbal Learning	Hopkins learning	14/36 (Borderline)	14/36 (Borderline)	Stable
Verbal Recognition	Hopkins recognition discrimination	2/12 (Very poor)	8/12 (Low average)	Decline
Delayed Verbal Recall	WMS-III delayed story recall	12/50 (SS=10) (Average)	14/50 (SS=10) (Average)	Stable
	Hopkins delayed recall	0/12 (Very poor)	6/12 (Low average)	Decline
Simple Cognitive Processing/Motor Speed/attention	Trail Making (Part A)	67s (Average)	45s (Average)	Decline but still within normal range
Complex cognitive processing / attention mental shift	Trail Making (Part B)	258s (Very poor)	180s (Very poor)	Decline
Verbal Fluency	Verbal Fluency	29 (Low average)	50 (Average)	Decline
Semantic Fluency	Semantic Fluency	3 (Very poor)	15 (Average)	Decline

The following sections describe the procedure and results for each of the three sessions. They are deliberately presented in a narrative form to reflect the naturalistic and observational approach of this case study. The protocol was adhered to where possible but where necessary there was some flexibility, in order to learn as much as possible about the real-world application of the experimental findings from studies 1-4. Note that some descriptions have been made more generic in order to preserve NG's anonymity. For example, the overall results are then collated and summarized in section 6.3.3 to allow for discussion.

6.3.1 Preliminary meeting - 07/03/19

The first meeting with NG & RG involved providing them with a brief explanation of what the study would entail. Given this general instruction, it quickly became clear that the couple were immediately prompted to mention things that might be appropriate, despite this information not being requested at this point.

AW: *"We are interested in looking at what sort of things from around your homes you may want to take with you if you were told you had to leave and go to somewhere less familiar."*
RG: *"Oh, I can already think of something he would have to take with him. His father's (or grandfather's) penknife)."*

At this point, NG took out the penknife from his pocket and showed it everyone.

RG: *"When we go away, I always check him thoroughly to make sure everything can get through security. This time, we were ready to go, and I noticed a glimmer from his pocket. It was his penknife! I tried to explain to staff that for him, this was very important - that he had these issues with his memory and asked if there was any way we could post it. They explained that everything that was confiscated was thrown away. I moved up through the hierarchy of staff and tried to explain the problem. Eventually, we realised that my daughter worked at one of the airlines, and she could go airside. The staff member called her, but she was on leave. Luckily, she was at home, and she drove all the way to the airport to rescue this penknife."*

This story presented an example of the lengths that people will go to in order to protect a tangible object that holds personal significance. It supports the idea that a functional object serves a more meaningful purpose in the scaffolding of memory and identity.

6.3.2 Session 1 - 08/04/19

The primary purpose of this session was to collect data on the different stimuli that NG and RG would select for NG to interact with in the third session. Upon arrival at their city home, RG informed me that their rural family home had been burgled approximately two weeks earlier. Understandably, this unfortunate news brought with it some worry and stress. I was aware that the simple thought of someone intruding into one's personal space while that person is absent would take some time to process, but for a second time in the study it highlighted the importance of possessions. Upon speaking further about the burglary later on, they explained that their prized possessions were not taken, and nothing was destroyed.

It was at this point I was first aware of the unpredictable nature of naturalistic case studies. It was inevitable that this event was going to significantly affect the conversations and procedure going forward. This initially led to some concern and uncertainty on my part as it was clear that I would not be able to run the study as planned. This situation had naturally changed the focus of NG and RG, and not currently knowing the extent to which it may have affected them, it seemed inappropriate to continue. However, it also became clear that these circumstances provided an opportunity for the study to take on an entirely new dimension. Rather than focus on the comparison of NG's own choices compared to RG's choices for him, I decided to borrow from the angle of threatened loss. Thus, I went on to explore what possessions were important to NG himself, to NG & RG as a couple, and how collaborative remembering might contribute to NG's scaffolding. The burglary may have resulted in less focus from both NG and RG, but what it also did was present an opportunity to utilise a real-life situation to ask questions that have been asked to participants throughout this thesis. Therefore, part of the way through session 1, NG and RG were instructed to tell me about things that they were glad were not taken during the burglary.

As per the protocol, NG was asked to select things that he deemed to be important to him. I decided that RG should remain present, and instead of carrying out stimulus selection separately, items were chosen by both NG and RG within a group conversation. Due to the fact that they spent time between city and rural homes, we did not carry out the tour around the city home in order to select things. I did, however, ask them to identify the location of each of the choices. Some items had been pre-emptively selected based on the introduction of the research during the preliminary session. It was due to this that the protocol was amended, as session 1 was no longer the first opportunity for chosen stimuli to be considered.

A total of 16 important items were identified by NG and RG, although two of these fell outside the usual criteria. Some of these had been selected in anticipation of the session, while the rest were prompted.

1. Painting of South Georgia landscape by father (from city home)
The first item that that NG and RG had selected was already prepared to be presented in the living room. They had pre-emptively prepared this piece, which naturally led conversation was a beautiful painting of a landscape with boats in the foreground. NG expressed that his father painted this during his travels through Southern America, and this painting specifically was done in South Georgia. At this point, RG mentioned that NG had been very father-centric of late, thus a lot of his choices and topics of conversation led to discussion of his dad. His father died in 1940, when NG was only three years old. NG is the youngest of three children, so most of his personal memories were of his mother and two sisters in contrast to the memories about his father which were necessarily semantic, having been learnt from others. The conversation about the painting led to a declaration from NG that his father was an academic, and that his reason for being away was to do research through Southern Europe and America. This trip led to him plotting an important geographical feature. The conversation revealed that there appeared to be a great deal of ego and politics within academia even then, and so the battle of claiming and owning a finding was very prevalent amongst researchers. This discussion led to choice number two.

2. A book written by NG's father (from city home)

Discussion of the academic history of the family, with many having attended University of Cambridge, led to another item. RG struggled to remember the name, but NG immediately recalled the book title, which appeared to come to him quite naturally. The focus of this memory seemed to be about a boarding and day school in Oxford, which NG was able to name. It was referred to by NG as the school for *"children of dons"*. *"I boarded there. My father had been killed…"* - a detail that was repeated a few times throughout the session. *"My mother was in Germany".* NG revealed that as well as having attended this school himself, so did many of his ancestors, including NG's uncle who featured strongly in NG's own academic trajectory, and contributed financially. *"This was on the condition that he could see my school reports in the summer, which introduced quite a bit of pressure."* NG clarified that he was involved but not always present, although he recalled going climbing with him once. RG then went on to explain, *"If you weren't related to him, he was a delight! He was quite tricky for family members. When he sent cheques for NG's education, he would nag about whether or not I had paid them in. I had to have my pay-in book copied and sent to make sure he knew!"* RG explained that NG's grandmother and grandfather on his father's side lived quite separately. NG's grandfather and father died within 6 months of each other in 1940.

3. Father's penknife (with NG)

I then asked NG directly what he think he'd like to have with him in his group of possessions in a place of isolation (as per protocol). This brought us back to the object discussed in the introductory session, which arose very spontaneously both in the preliminary session and in this one. NG explained that he would like to have his father's penknife with him, as he does so often. I asked him what it reminded him most of, and he said his bedroom in a house, for which he gave the address. *"My father bought the house they lived in. There was the river [name given] just behind, which is where it got its name."* RG chipped in, *"I'd forgotten that!"* Throughout the sessions, there were a few moments like this, where nuggets of knowledge (semantic memory) were remembered quite clearly by NG. It was important and warming to observe that the collaborative remembering process was reciprocal.

<u>4. My wife (Person, with NG)</u>

"What else would you want to have with you NG?" I asked.

NG: *"Oh, well I'd have to have my wife with me! I'm quite fond of her."* Whilst this choice wouldn't normally be accepted in a more structured study design, it seemed important to include this mention in this report. One aspect I had wanted to empirically explore in this case study was a comparison of NG's own choices with ones made for him by RG, as well as the types of memories attached to these selections and how they navigated them. But in the very early stages of this session it became clear that there was something remarkable about the camaraderie, connection and collaboration between RG & NG. Given the naturalistic focus of this study and the need to make it a comfortable experience, it was deemed important to allow this to happen and to use it as an opportunity to investigate the importance of their teamwork and collaborative remembering.

<u>5. Asian wooden man sculpture (from the city home)</u>

After asking what next item NG might like with him in the hypothetical place of isolation, RG & NG both directed my attention to a medium sized wooden figure sat on a corner table. They explained that they were quite fond of him and were gifted it a while ago. RG said that they were told to polish him for good luck, which was followed up by NG joking, *"Not much luck then!"* NG and RG did not appear to have anything more to say about this item, thus, we moved on. I had wanted to ask more about where he came from, and why he is featured in their city home, but it did not feel appropriate at the time.

<u>6. Grand wall clock (from the city home)</u>

N then more naturally drew my attention to a dark wood clock hanging in the corner of the room. "That's a family heirloom. It has a lovely bong!" They told me about how it's currently broken and they'd like to get it repaired, but it needs to stay upright.

<u>7. Bronze angel (from the rural home)</u>

RG explained that this was gifted to RG & NG by his uncle, who they refer to as *"The Bachelor"*. RG continued, *"He was a very eccentric man, the Bachelor. I was sewing labels onto his clothes when he was in the hospital. He sat up and said, 'I love you!' and made everyone laugh."* The origins of this item surrounded NG's great

grandfather, who was a British consulate in Naples, and the bronze angel came from the garden of Fuller / Roseberry. *"He was at Eaton with NG's great grandfather and died in 1909. Their time in Italy was around 1840-1850."* RG gave all of the information about this item.

8. Pieces of silver (both homes)

At this point, RG had taken a more prominent role in the conversation, as NG appeared to be distracted from the task. RG explained that they had some silver possessions that they were quite fond of. We only spoke briefly about these pieces, and how many were wedding gifts, which suggested that these pieces may be something that they would both like to have with them, rather than just NG. I attempted to prompt NG in engaging with the discussion, but he was fairly passive during this portion, although not dismissive or in disagreement.

9. The garden (rural home)

Whilst this doesn't constitute as an item, I was inclined to ask NG what his favourite part of the main house was. I decided to do this because at this point, it was clear that this house held a lot of his history and narrative, and that asking about important items more holistically may allow a more natural recollection. He immediately mentioned their garden. *"I'm a garden lover - it is part of the family generally. My uncle's grandmother lived there. We tried to look after it for her, all 1½ acres of land. There was an orchard, but most of the trees are now gone. There are about 7 or 8 remaining."* While this fell outside the protocol and was not an object that NG could keep, this natural progression of conversation was an important part of learning about NG's identity and sense of place: the passion and fondness of the garden was clear and seemed just as important to him as the inside of the home.

At this point, I drew attention to the burglary in particular and used this as a trigger to lead the next discussion. "What were you particularly glad about not having been stolen?"

<u>10. Glass-fronted cabinet (rural home)</u>

"We are incredibly fond of our furniture, and our initial worry was that they would have destroyed things once they were done for the hell of it." RG explained. The glass-fronted cabinet was a wedding present in 1900 to N's maternal grandparents, gifted by Magdalen College, Oxford.

At this point, we were approximately an hour and a half into the session, and it was clear that the activity was drawing to a natural close. It was also evident that we had exhausted NG's focus on the task. RG continued to list some things from the rural home in particular that were special to them, but no wider conversation was had. Some of these items included jewellery, furniture, personal documents, framed maps of their hometown, family photographs, as well a copy of British Medical Journal. It was a shame that this item was mentioned last, as it was one of the items that appeared to relate to NG's career and thus a possible link to the self. Nonetheless, these items were considered for further attention during the next session.

6.3.3 Session 2 - 06/06/19

The original protocol plan for session 2 involved the observation of NG interacting with the different chosen stimuli. However, the protocol was amended for two reasons. Firstly, the event of the burglary and general demeanour of NG led RG to be more involved in the discussion for session 1, thus compromising the separation of NG vs RG choices. Speaking to both of them together led to a more conversational approach, rather than simply collating a list of stimuli. To then conduct the planned interaction sessions would have likely resulted in a lot of repetition during interaction sessions, deeming it a redundant exercise. Circumstantially, NG appeared to be very distracted and it was difficult to keep him on task. I did not want to exhaust him by forcing structured tasks that would require regular switching of attention, which included the quantitative tests measuring pre- and post- performance.

Without a clear-cut experimenter-provided set of cues to interact with, we instead decided to conduct the AMT as the main task of session 2. Memories were retrieved by listing NG & RG's choices from session 1, one at a time, and prompting NG for a

specific memory where he did not initially provide one. We compared this to other generic, experimenter-provided object word cues, and again, asked NG to retrieve memories in response to these.

Throughout this session, it is important to note that NG seemed far more distracted than during session 1, thus there were many attempts by myself and RG to keep him on task. Whilst it was initially planned for him to complete a second SoSS at the end of the memory cueing tasks, it was decided that this was not appropriate under the circumstances and would not offer much additional insight. In addition, while the proposal was initially to use a total of twenty prompts (ten self-selected items and ten experimenter-provided items) it was decided that this would be reduced to a total of 16 (eight of each).

The purpose of this session was to see if the items chosen by NG & RG would evoke more specific memories with stronger self-related elements than the generic experimenter selected items provided to him.

NG was told that he would be given flashcards with an item written on them, and that he was to tell me the first memory that came into his head when he thought of that item. We practiced with two words, CANDLE and SPOON, and he was reminded of the instructions for almost each object in order to keep him focused on the task. At some points, NG would attempt to list things related to the object but was again reminded that the task was to provide a memory as specific as possible. If no memory was provided within one minute, the next cue was provided (Table 22).

After the first four provided cues, NG was given a brief break, before moving on to C-AMT (Chosen-AMT, with self-selected items). The cues in this section consisted of eight of the important objects chosen in Session 2. A small number of these were available in the home to interact directly with (Table 21).

Table 21: Memories cued with self-selected item words in Study 5

Choice	Memory
Georgia Landscape Painting*	*"My father's painting. He used to go on boats like that on the south Atlantic, and onto Antarctic."* *** *The painting in general, they are my father's. We have some pictures outside."*
NG's father's book	RG explains book. *** *"Well, sadness about my father not being alive. He was killed in 1940. In England."*
Father's penknife*	*"What a lovely one I had!"* (Currently lost) *** *"It was my father's penknife, it's all metal. My mother had it because it came from him, and she kept it. I got it when she died."*
Wife RG*	*"She's a very good wife, a very good lady. I met her when I was a student, and hadn't qualified in medicine yet, but was in the process of doing that. She was a nurse - Junior Doctors are not immune from ill health. I went to, I was a medical student that had done all my degrees, and I was looking for a job. This job came up; my first job was actually in a place Barnet hospital. I went up … they had someone who had glandular fever and was going to take quite a while to recover from. This is where I met R. I remember taking her out for meals once or twice, and she put up with me!"*
Wall Clock*	*"An heirloom from my grandparents."* *** Nothing else said.
Bronze Angel	Nothing said. *** No clear recollection. RG explains that it's in the dining room of their rural home.
Maps of hometown	Nothing said. *** *"My uncle gave us those. They are different shapes and sizes."*
British Medical Journal*	*"I look at them with great joy to be able to read what the content is."* *** *"The difficulty is to know how to store them."*

*Present at the time of memory retrieval, *** Prompted for specific memory

Table 22: Memories cued with experimenter-provided item cue words in Study 5

Choice	Memory
Letter	*"School. When else do I write and receive letters?"* *** *"I wrote to my mother; I was at a boarding school and I've been to 3. 2 of the schools I went to. I felt homesick at the Dragon School. My mother went abroad and I felt homesick. She went to a nutrition place and another professor went to the other."*
Flower	*"Any flowers? We've got some orchids over there."* *** *"I bought the two small ones quite recently, at Chelsea Flower Show."*
Game	*"Cricket. I think of cricket. Football. Rugby. Tennis. Squash."* *** *"Played these sports at all schools."*
River	*"Thames."* NG starts trying to list things and is reminded of the instructions. *** *"At the Dragon School I was at, after the war."*
Machine	*"The shed in [hometown]. There's a shed of machines. Reminds me of the [rural] house. *** There's a trail you have to follow. I still use it now."*
Dog	*"My mother never had a dog. I never had a dog."* RG reminds him that they had a dog called Tara. He remembers the name. RG says she is surprised he didn't mention "Raffa". NG laughs.
Car	*"I have a memory of when we were going to see my grandfather in Petersfield, when we lived in Esher, coming up to Christmas time. He had a car, we had a car, we were driving there and the car conked out. [She] rang her father who came in his car and rescued us. He always had a grand car."* ***
Bell	*"A lady. D. Bell."* *** RG explained she was the wife of a colleague.

*** Prompted for specific memory

NG generally found the task more difficult than he appeared to in session 1. This may have been due to the unpredictability of his impairment where his symptoms were more severe on this day than on others. On the other hand, it may be that this type of structured memory recall task was much too experimental for someone with his level of impairment. There were difficulties in keeping NG on track with each task, and he generally struggled to come up with autobiographical memories when instructed and prompted.

NG was much more reactive and fluid when retrieving memories cued by his and RG's selected items. Even when recall started with primarily semantic and repetitive details (for example, father-centric), he was able to describe general and sometimes even specific events. The most remarkable recollection was when NG was asked to recall a memory in response to his wife, as the cue word. NG naturally began recalling when they first met, and confidently talked about other aspects of his life around that time. As a main theme in this is collaborative remembering, the camaraderie and support of a cognitively healthy spouse, it was very fitting and not all that surprising that his recollection was typical of what would be expected from another healthy individual.

Something that was clear from the self-selected AMT exercise was that whether or not NG was able to effectively verbalise it, the meaning and purpose of each item was very clear. That is to say, the way in which these items supported his memory was apparent. Meanwhile, the memories and themes coming from the more generic provided objects did not hold the same weight. For the items that we had in front of us to look at, he tended to refer to these using repeated semantic details, such as "my dad painted that" or "that's in Georgia" rather than it evoking any further autobiographical remembering. However, I do think having these items present in the room allowed for NG to stay on task for longer.

I felt that cueing memories with his self-selected items may have aided him in recalling memories relating to the final four experimenter-provided items. Despite coming to the end of the session and being someone that can struggle to stay focused, he successfully recalled a range of semantic, general and specific memories, in a much

more fluent and timely fashion. it was as if his own items may have provided a kind of narrative buffer. However, this improved performance may have been due to a practice effect.

What cannot be ignored is the impact that RG had on his ability to remember, or lack thereof during session 2. Whilst RG did interject in order to help prompt him, he was largely left to produce memories by myself. I found RG's prompts to be far more effective than mine. Even simple encouragement without any contextual prompting or leading questions, he found it easier to regain his thread and tell me more about what he thought.

6.3.3.2 Quantitative findings from session 2

NG scored 22/48 on the SoSS. For previously conducted SoSS reliability analysis, the mean SoSS score for males was found to 22.87 (Flury & Ickes, 2007), therefore, NG appeared to fall within the normal range. Observationally speaking, aside from a larger ratio of semantic to episodic detail within our conversations thus far, I feel that his score was an accurate representation of his sense of identity.

During the AMT exercises, NG was able to recall the same number of memories for each item-word cue condition ($N = 7$). Self-selected items produced five general memories and five specific memories, whilst experimenter-provided items produced four general and three specific memories. All self-selected cued memories had a clear relation to specific places, people, and moment that provide scaffolding in his life. 86% of all self-selected items reminded him of a person, compared to only 42% of experimenter-provided items.

Whilst NG did recall details of events and places more with experimenter-provided items, these took more prompting to achieve, compared to the memories and elements evoked from his and RG's choices. He often tried to form lists of semantic association in response to the experimenter-provided items, whereas self-selected item cued memories more naturally.

6.3.4 Observations during session 1 compared to session 2

This section considers the comparison of a conversational true free-recall session, vs a more structured AMT free-recall session in response to items chosen by NG & RG.

NG knew who he was, who his wife was, and who I was despite not having seen me for 2 months. He would repeat to some stories and knowledge across from one session to another, which was to be expected with his diagnosis, but this wasn't an overwhelming amount. He had not only scored fairly well to begin with on quantitative measures, but upon reflection I believe that there were other scales that may have been better suited to NG in his condition, that may have been easier to focus on and comprehend.

The protocol for this case study had initially set out to compare the memories evoked by NG's choice of items and RG's choices on his behalf. A combination of NG's presentation and the negative events of the burglary led to an amended session 1, but also towards an opportunity to observe collaborative memory in practice. RG's presence and input during the sessions had a clear impact on NG. Together, they were able to work as a team and leave natural prompts for one another to build up their story and support each other's memory. Whilst RG mainly laid the groundwork for NG when discussing their past stories, NG did come into his own and surprise RG with some semantic and episodic memories with seemingly little effort. This was particularly evident in session 1.

In asking people to choose things that are important to them, the discussions that follow are almost inevitable. It felt wrong to prevent session 1 from evolving into what it did - to stifle the ability to freely explore one's past, semantic to episodic, single reminiscence and collaborative reminiscence. I wanted them to select their things, but what happened in front of me was my own personal desert island discs. Would we have had these conversations without these prompts around us, curated from the simple concept of 'what would you like to take with you?'. Where RG may have started off some suggestions, NG was not far behind in discussing his thoughts and memories

relating to these items. It seemed that her input propelled him to share more than he might have without her presence.

Although I had planned to have NG engage in two candid interaction sessions, I was able to observe a similar situation within session. NG was given the freedom to speak and explore, tell and share, and reminisce and remember. Instead of his vs hers, it ended up being free natural structure vs a fixed task. He didn't perform as well during the AMT, partially because it was probably hard to stay on track with, and partially because he didn't have his partner to discuss with as he did in session 1.

6.4 Discussion

This exploratory case study revealed some interesting findings in relation to the previous conclusions within this thesis, and the act of applying such theory to real life settings.

6.4.1 Pattern of memories in MCIa

The temporal location of NG's memories was not looked at in great detail due to the limited number of specific recollections that were able to be dated. However, from our discussions, it appears that most of his chosen objects related to memories from his childhood. This was to be expected, as the development of dementia tends to lead people to recall memories from further back in time as the disease progresses (Irish, et al., 2010; Matuszewski et al., 2009). This fits well with the findings of Study 2 which showed that object-related first encounters occurred most often during childhood, with a 40-50 year old sample. In Study 3, objects were also most likely to produce memories from the childhood period.

6.4.2 Self-selected cues versus experimenter-provided cues

Supporting the findings of Study 3, the objects chosen by NG and RG served as much more effective tools for evoking memories than the item cue words provided for him. He reported semantic details for most things, and some general and specific memories. Five of the eight chosen objects used to directly cue memories in Session 2 were present in the city home where the testing occurred and whilst NG was recalling memories associated with them. This is an important development from Studies 2 and 3 of this thesis, in which these important or chosen stimuli were delivered via word-label cues only. While Study 4 introduced the condition of sensory cues through the use of audio excerpts, these did not produce significantly more memories than word cues. Contrary to the findings of Study 4, the presence of the sensory stimuli did appear to stimulate NG's ability and desire to converse, both in sessions 1 and 2. It appears that these objects existed as naturally occurring cues for memories that form a scaffolding for personal narrative. For example, NG choosing his father's pen knife

eventually evoked memories of his childhood home and the surrounding area. This may be because objects were the optimum cue type in NG's case, or that tangible prompts were more beneficial. However, there are a number of reasons why this may have occurred.

This study made it clear to me that everyone is different, and not one set of everyday household objects or list of 1940's music will resonate with every user. The sheer amount that I learnt about NG's history of not only him and his partner, but his family history, was truly astonishing. Not all of this was able to be included within this chapter for ethical reasons, but a couple of hours spent with two strangers allowed me to explore their past and the very core of who they were by simply asking them what they deem to be most important to them. This ability to break down barriers is something that could be implemented more often in reminiscence therapy and is arguably where future tailored interventions should place their focus.

6.4.3 Collaborative curation of cues

The concept of scaffolding that has been mentioned through this thesis has received attention in the literature on collaborative storytelling for older couples, particularly when one partner has memory impairment (Hydén, 2011). Study 5 suggests that the input of family members might be greatly beneficial to the identification of reminiscence tools, due to collaborative remembering. Whilst this area was not within the research questions of the intended protocol, the phenomenon of collaborative memory prevailed as one of the strongest observations in this study. Originally, this study had aimed to compare the NG's reactions to his own selections with those that RG chose for him. However, NG may not have been nearly as engaged as he was if his collaborator and teammate was absent. This was partially observed in his engagement during session 1, the more conversational and relaxed setting, as opposed to session 2 where he was required to recall memories individually.

Autobiographical remembering often occurs via socialisation and memories are often jointly constructed and retrieved in close relationships, such as couples and relatives (Harris et al., 2011; Barnier et al., 2008). As discussed in Chapter 1, the transactive

memory theory suggests that this sharing of memories can directly benefit these memory processes (Wegner, 1987), particularly in older adults (Harris et al., 2011). A more recent study showed that older married couples gained benefits when remembering together as opposed to alone, with these benefits remaining stable over 2 years later (Barnier et al., 2018). It has been noted that considering individuals within their everyday social contexts, such as spending time interactive with their partner, can provide a powerful insight into their functioning (Barnier et al., 2018). In atypical populations, it was found that individuals with Alzheimer's disease were able to recall more detailed autobiographical memories when their spouse was present to prompt them, compared to recalling singularly (Kemper et al., 1995).

From the observations made, it would seem that the presence of NG's spouse, RG, played an invaluable role in NG's performance and functioning across the sessions. These findings from the present study, provide an important new perspective on how the results from Studies 1-4 might be considered in applied settings, particularly those in which individuals with memory impairment are in contact with next of kin.

6.4.4 Limitations

A great deal of the limitations of this research relate to the nature of real life, which is an inevitable part of ecologically valid, qualitative research and these should be not be ignored, but embraced as an opportunity to discover something new. The difficulties that arose are typical of those that consistently challenge research that attempts to make an impact in applied settings. To be able to address these occurrences mindfully is imperative to the progress of applying theory to practice. Nonetheless, this section details some of the difficulties faced throughout.

It would have been interesting to see how NG would have reacted to other types of sensory stimuli, both in the types of memories evoked and the temporal location of these memories. Due to time constraints and life circumstance, the focus naturally landed on choosing tangible stimuli, and not music which has been the most consistent stimulus throughout this thesis. In the timescale it did not become clear whether NG

might have chosen music had he been more explicitly asked, or if his natural preference would have remained with tangible stimuli.

It would also have been beneficial to provide a more immersive sensory experience, both for stimuli chosen by NG and RG, and those that were provided to him via word cues. He was able to interact with some of the items he selected because they were present in the room, and these were the ones where he seemed especially able to engage in conversation. In the original protocol, it was intended that he would be able to physically interact with both his and RG's choices (as per section 6.2.2), but most of the items discussed were in their rural home, which seems to provide a much stronger scaffolding for them. It appeared that they do not have the same attachment to the city home where the testing occurred, and therefore there were fewer of his significant items present. This situation offered some unexpected findings in some ways, as it gave insight into what can happen when someone is removed from their scaffolding. Future research might benefit from explicitly comparing whether the presence of stimuli and the location makes a difference to the nature and quality of remembering.

With regards to the quantitative measures, it would have been beneficial to see how NG may have changed over time on the Sense of Self Scale. Although his individual score was in line with the expected score for males (Flury & Ickes, 2007), it was not possible to observe whether the overall process of memory recall and reminiscence had a positive impact on this score, or to provide a full T2-T1 quantitative indicator on how this protocol performed. Furthermore, it was not possible to use the AMT as a purely quantitative measure of improvement before and after reminiscence settings, which could have contributed to discussions of past research (Kirk et al., 2018). However, it must be noted that from the observations that were made, the AMT was a very difficult task for NG and did not provoke recall of memories. This structured approach with the AMT did not appear to show the recall that NG had exhibited during session 1. However, it is not clear whether or not this was due a loss of access to these memories or being limited by methodology. However, this may have important implications for those who use the AMT to assess memory. This study showed that NG was able to recall specific autobiographical memories, when cued with significant stimuli and these would be missed by traditional clinical testing with the AMT.

When it comes to statistical analysis, calculating generalisability and replicability for autobiographical memory can only do so much. Everyone is different, they have their own stories, their own preferences that will work better for some than others. Quantitative experimental group studies may reveal trends which can help us to understand the nature and function of memory but ultimately, individual differences are key to this field, and taking the approach used in this study allowed a much deeper exploration into the individual.

6.4.5 Implications and future research

This study attempted to assess a practical implementation of a methodology that has been developed across four studies. The qualitative findings from this case study reveal new knowledge about addressing implementation errors in therapeutic approaches for memory impairments. Settings such as this require much more in-depth qualitative analysis, particularly with regards to the collaborative remembering aspect. It has been suggested that spouses are able to implement specific conversational strategies to aid their partner in engaging in more collaborative remembering (Hydén, 2011), and the field would certainly benefit from exploring this involvement further.

A key finding from this study is that using self-selected cues to provoke remembering is more profitable than using simple word-cues, but it also reveals that future research on developing reminiscence therapies should seek to incorporate input from family members where possible, in order to optimise the full spectrum of memory that may be available with the appropriate cues. Given the differences between NG and the healthy participants in Studies 3 and 4, researchers could also use these findings as an opportunity to explore the consequences of encouraging proactive reminiscence and activities of this kind earlier on in life. People may be able to prospectively identify the most appropriate cues for use in later life, when cognitive decline has become more apparent, in both typical and atypical aging.

6.4.6 Conclusions

In conclusion, this study has revealed that applying theory to real life settings can be challenging, but the unpredictable nature allowed other themes to prevail, primarily how camaraderie can provide a further scaffolding for memory. Stimuli curated as natural memory cues allowed NG to explore memories related to his personal narrative. These findings should be used to make current practices more theory-driven.

7. General discussion

At the beginning of this thesis, a question was posed to the reader: "What would you take to a desert island?" While this may seem a trivial or fun question, this body of work has shown that it is, in fact, a very important one.

7.1 Summary and conclusions

7.1.1 Identifying and explaining preferences

This thesis aimed to explore the nature of autobiographical memory, specifically in response to different types of sensory stimuli, and how they can be 'selected' to be used as explicit memory cues (see Table 23 for an overview of all study findings). Study 1 explored secondary data of interview guests discussing their preferred music, and this set the precedent of how to encourage individuals to curate their own preferences. This was the first study of its kind to analyse free recall responses of chosen music and explore possible links with theory related to autobiographical remembering. Findings showed that in a non-empirical setting, guests chose music for a range of different reasons, but many of these included personal recollections and accounts of the past, supporting previous findings (Barrett et al., 2010; Belfi et al., 2016). Popular reasons for choosing music also included being reminded of other people. These memories tended to occur during the reminiscence bump period, thus providing early evidence that the memories during this age period may not just be most accessible, but that there may be an effect of preference. Whilst these results were promising, a lack of standardised methodology restricted clearer findings. Not all memories could be dated, and a lack of prompting (as seen in AMT and AMI) suggested that general and non-memory reasons for selecting music may have disguised equally relevant specific memories.

Study 2 addressed some of the weaknesses of Study 1 by piloting the Desert Island Discs methodology in an experimental setting and taking the opportunity to introduce a comparison of different sensory stimuli. The link between music and autobiographical memory had been reasonably well-documented within the literature

(see Chapter 5), whilst other popular reminiscence tools were not as well investigated. Findings from Study 2 suggested that self-selected music tended to be first encountered during the traditional reminiscence period, as the temporal location of ages of first encounter were in line with previous findings for remembered and preferred music. On the other hand, objects and pictures displayed different temporal curves in terms of when associated memories were first encountered. Individuals described a similar range of reasons for making their choices across all stimuli, with memories of people once again taking precedence. The major discussion points from this study surrounded the validity and meaning of the temporal distribution of reported ages. Participants were potentially being encouraged to search within the same life period for each choice. Furthermore, the age at first encounter was selected as a standardised way to locate a date, but it became clear that this did not necessarily correlate with more prominent and relevant memories related to the stimuli.

7.1.2 Comparison of self-curated and experimenter-provided cue words

At this point, it remained unclear whether self-selected stimuli would impact on the nature and temporal location of memories, in comparison to providing cue words, which has been the established methodology in previous studies (Crovitz & Schiffman, 1974). Study 3 was designed to investigate this important question by directly cueing autobiographical memories using both self-selected ("chosen") and other-selected ("provided") cues. It was found that for music both chosen and provided title cues evoked a reminiscence bump. In contrast, the other tangible stimuli evoked different lifespan retrieval curves, not dissimilar to those found in Study 2. This suggests that the temporal distributions observed in Study 2 were not entirely due to confounds in the methodology, and that different sensory stimuli may evoke different parts of the lifespan more readily. This has significant implications for the creation and development of reminiscence therapy protocols.

Study 3 also found that self-selected stimuli (chosen cues) evoked significantly more specific memories than general memories, whereas when they were given other people's choices (provided cue words), these did not affect memory specificity. Given that episodic recollections are known to be negatively impacted with age (Piolino et

al., 2002), it is fascinating and highly significant to discover that cues curated by the self may, in fact, support the remembering of specific events better than others.

7.1.3 The spectrum of self-curation

This thesis successfully addressed a number of important methodological problems within the literature, throughout which different cueing instructions have been used interchangeably but never directly compared. As well as exploring the contrast between provided and self-curated cues, it also went on to consider the different ways in which those self-curated cues were selected. Specifically, Study 4 compared the memories cued by (self-selected) music that was chosen without any restrictions, to those that were cued by music chosen from a pre-prepared list. In line with Study 3, the music that was chosen completely freely, evoked significantly more specific memories than general memories, whereas music chosen from the "jukebox" style book evoked a similar number of general and specific memories. These findings provide strong evidence that even simple variations in the instructions given to participants when they are curating their preferences, can significantly impact on autobiographical remembering. Overall, it seems that the freer the cue is chosen, the less effortful it might be to retrieve episodic memories that are integral to sense of self. This supports previous findings from Uzer & Brown (2017), who found that personal cues evoked more directly retrieved, or involuntary memories, than generic word cues. However, this thesis presents this in the context of identity formation, and its link to temporal distribution of memories.

At present, in both memory research and practical therapeutic application, researchers and clinicians generally provide cues and reminiscence tools for participants and patients, using current knowledge of what might be memorable from the past (Cotelli et al., 2018; Kirk et al., 2019). This has proven to be useful for the improvement of wellbeing in reminiscence therapy (Woods et al., 2018), and this thesis supports the notion that when music and objects from the past are selected for people, they do produce a response. People recognise these choices and are able to produce semantic and episodic information, and these tools do promote conversations and general well-being (Cotelli et al., 2012). However, the crucial finding from the studies throughout

this thesis is that when freely chosen cues are compared to a pre-determined set of cues, these produce more powerful mnemonic effects, delving into memory in much more direct, specific, and self-defining way. This is highly relevant to those creating reminiscence therapies and may explain why the effectiveness of this treatment varies so much.

7.1.4 Self-defining memories

While self-defining memories were estimated in all studies, a specific exploration of the extent to which self-defining memories are prompted by cues was not explicit until Study 4. Up until this point, judgment about which memories were 'self-defining' was coded, based on definitions from the literature. This was an important and new approach as previous studies have not reported the extent to which music memories are self-defining. However, Study 4 took this important step further by providing people with a definition of self-defining and relationship-defining memories and asking them to report directly whether they thought the memory they were describing fitted the description. This made all the difference as a memory that may appear superficially to fulfil the criteria of being self-defining may not have those qualities when the individual is asked directly.

In Study 4, 67% of self-defining memories and 57% of relationship-defining memories occurred in the 11-30 age period. This work has therefore added clarity to the debate regarding the explanation of the reminiscence bump. Study 4 findings, in particular, provide support for the identity account posed by Conway & Haque (1999). As discussed by Rathbone et al. (2017), these findings in no way discount other accounts, and it is still possible that these operate in an interrelated manner.

In a wider theoretical sense, this thesis has attempted to consider and test a number of ways that researchers investigate the reminiscence bump. For music, we found it to be consistent, and stronger in self-selected cues. This suggests that the bump is not simply associated with the most accessible memories that any word cue will trigger. If stimuli that are more personal give a stronger effect, then this has implications for the life narrative account. Future research investigating the reminiscence bump should seek to

clarify the stance of those arguing for a life narrative theory, particularly with regards to how they see this working in tandem with the identity theory. For example, culturally typical events such as meeting your partner, graduating, getting married, having children, are inherently self-defining (Munawar et al., 2018). If this were the case, it might have been expected that all stimuli should have produced a reminiscence bump. In fact, they each produced entirely different lifespan retrieval curves. The experiments reported in this thesis, therefore offer stronger support for the identity theory than the life narrative account.

7.1.5 Theoretical implications of memory cueing

The concept of ownership and autonomy in the cueing of memories was very significant in this thesis. Naturally, curated cue words were unique in that participants were specifically assigned time to produce their cue list from things that were important to them. When cueing the memories, participants had already orientated themselves to a particular context with their own stimuli. On the other hand, provided cues (i.e. other people's selections) essentially served as a generic word cue. A crucial point is that the self-curated stimuli already held a place in the person's life. These songs, pictures, objects or clothes already existed as a form of scaffolding for them and their memories, as indicated by their choice to select them. This was precisely what this thesis set out to explore, how individuals identify and access these structures to retrieve memories, and how they might serve as more potent cues than generic word cues. In Study 4, participants within the fixed choice condition commented that in some ways, it could be considered easier to make selections from the songbook. First and foremost, this curation exercise involves a recognition task, as seen in previous musical memory research (Rathbone et al., 2017; Krumhansl & Zupnick, 2013). However, while freely selecting songs is more effortful, these pieces of music are likely to evoke recall of specific memories and evoke greater nostalgia.

The findings from Study 3 raised questions about the temporal distributions of memories evoked by other peoples ('provided') stimulus word cues, specifically, whether for some types of stimuli this condition of the study equates simply to the standard 'word cue' technique first established by Galton (1879) and refined by

Crovitz & Schiffman (1974). After all, a labelled word cue for a stimulus such as an object or item of clothing, that does not have one discrete value, is likely to be received as more generic. Dancing Queen – ABBA is very unlikely to be an ambiguous cue. Meanwhile, within the clothing condition in Study 3, one participant chose 'A silk dressing gown' and it reminded them of "*It reminds me of my mother dying of cancer at home. As I was staying there most nights, I would wear it at the hospice, she wore it and she died in it and I wanted it back. It's very special to me because of my mum. I'd take it away with me.*". When another individual received this as a cue, they reported: "*I used to have one when I was little, but people don't really own them anymore, not my family anyway.*"

While self-selected stimuli only produced statistically significant differences in some aspects of memory, it cannot be ignored that individual differences are imperative when considering one's past and personal narrative. There is clearly value in group studies that investigate why the reminiscence bump changes locations depending on the instruction or other confounding variables (Munawar et al., 2018). But ultimately, if a rise in the retrieval of autobiographical memories is associated with a time of identity formation, then it may be naïve to believe that everyone should discover their sense of self at exactly the same time, in the same way, supported by the same scaffolding. The way we utilise and rely on our memory scaffolding might be similar, but how and why we do may not be as widely generalisable.

Lastly, Study 5 attempted to apply these findings to a real-life setting in order to explore and address the striking lack of theory that is currently applied to the field of reminiscence therapy. This study experienced many of the implementation issues reported within the literature, for example patients not staying on task or being able to follow the protocol (Woods et al., 2018; Vernooij-Dassen & Moniz-Cook, 2014). Regardless of the difficulties faced, an individual with MCI was able to work with his spouse to curate a list of important objects that were then used to evoke memories. The memories evoked during the sessions were much more fluid and accessible when he engaged in collaborative remembering with his partner. This study highlighted that the concepts of autonomy over reminiscence cues and shared memory should be considered when designing protocols for people with memory impairments, and in a wider context, those who have been displaced from their life scaffolding in some way.

7.2 Future directions of research

This thesis began with some limitations which were successfully addressed as the body of work evolved. Nevertheless, this section acknowledges that there were a number of restrictions throughout the research that should be considered for future exploration.

Firstly, the sample size for all studies was relatively small, and used a Westernised demographic. Whilst research investigating autobiographical memory and the reminiscence bump has reported on larger participant pools, these studies often relied on both online or short questionnaires and, thus lacked the richness and depth of the data that was collected throughout the experiments reported here. Asking someone to think about things that are important to them across a number of conditions and discussing the nature of them for up to two hours is a lengthy and demanding process but offers far more depth and was therefore seen as a more beneficial approach. Although some methodological flaws surrounding the reminiscence bump were addressed, not every cueing method was considered and compared due to sample size. Future work should seek to apply these methods in a wider context, across a variety of cultures. This is particularly important in terms of the explanations for the reminiscence bump, for which the cultural life script account is a key contender.

The rich and in-depth data collected throughout this thesis has allowed scope for a more qualitative approach for analysis. Full discussions with individuals were not transcribed, as this was not the aim of this thesis. Therefore, it was not appropriate to draw out themes from incomplete records of data collection. However, the currently applied method shows the potential of how much of a narrative that is accessible if asked in the correct way. Qualitative researchers should seek to investigate the content of these memories rather than the overall representation of each cue.

Furthermore, the cueing methodologies used in this thesis could be developed by utilising the cues in their intended and main modalities. For example, the use and direct interaction of tangible objects may serve to be far more impactful than the mere mention and discussion of them. It was found in Study 4 that nostalgia ratings of music were higher when the song choices were delivered via audio cue. This, in turn, would also address the generic word cue descriptions for tangible objects in Study 3, in which

it was difficult to ensure mental representation the participants had for 'red skirt' or 'wedding photo', for example, was consistent across the sample. Therefore, future research should seek to understand the importance of the physical presence of these cues, particularly in relation to the specificity of memories and nostalgia.

With regards to the sample and their interpretation, this also leads to further questions regarding participants' retrieval strategy. It was found from this thesis that when a cue is more freely selected, it evokes more direct and automatic memories. However, future research should seek out further self-reports from participants to better understand the personal cue selection process, and the potential occurrence of directly retrieved autobiographical memories at this stage compared to later and intended memory recall stage, as seen in previous literature (Uzer, Lee, & Brown, 2012; Uzer & Brown, 2017). Overall, autobiographical memory research is still lacking in personal curation of cues and separating out preferences from accessibility in terms of lifespan retrieval. The concept of preference should certainly be explored further, ranging from word cueing to more sensory cues such as those in this thesis.

Whilst the final study of this thesis attempted to apply this body of work to a real-life setting, researchers and clinicians should attempt to map these methodologies into clinical practice for providing support for memory impairments.

7.3 Final conclusions

It is evident from listening to Desert Island Discs that, intuitively, talking about music preferences and favourite songs leads very smoothly towards vivid recollections from life experience. It provides a view into oneself, both for the speaker and the listener. On a theoretical basis, it provides deeper insight into the nature memories evoked from these tools. Naturally, this is something that translated across to the other studies in this thesis. Regardless of whether people were asked to choose preferences and explain why, describe when it was first encountered, or explicitly produce memories, Studies 1-4 showed a consistent reminiscence bump, and laid the foundations for a deeper understanding of autobiographical memory, in particular the role of identity.

When people are able to choose their own cues, they produce more specific memories with more personal significance, and produce different lifespan distributions of these memories. Different stimulus types resonate with people in various ways. But what is evident is that these different stimuli which appear to only serve a functional purpose, have the ability to evoke strong feelings of the past, and they should continue to be used and tailored to the individual in applied settings. Having stimuli present in reminiscence settings is of particular importance if they are available to users.

Future research should seek to further disentangle the methodological inconsistencies within memory research in order to better understand the inner workings of how, what, and why people remember. The importance and direct retrieval seen in sensory cues should be further explored, particularly with regards to self-curation. Lastly, it is crucial that the application of memory support practices is built upon theory, to create the most effective settings for people to feel less displaced from their life scaffolding.

7.4 Personal reflection

It is evident from listening to Desert Island Discs that, intuitively, talking about music preferences and favourite songs lead very smoothly towards vivid recollections from life experience. It provides a view into oneself, both for the individual and the receiver. On a theoretical basis, it provides deeper insight into the nature memories evoked from these tools. Naturally, this is something that translated across to the other studies in this thesis.

One participant from Study 4 enjoyed the process so much so that he wrote a song after our debrief and posted it to YouTube, which he then shared with me. This was so incredibly touching and had revealed a wider finding and implication of this type of research: that it was truly enjoyable for the participants as well as me, the researcher. It wasn't just about completing a task to assess some findings, but the general experience of discussing music and other cues with people was a genuinely uplifting and stimulating situation. This allowed me to truly connect with someone who, less than an hour before, was a complete stranger to me. I will be forever grateful for the kindness and openness that these individuals showed me, to allow me in to discuss very vulnerable parts of their lives and to connect with them in a meaningful way. I

left them with thoughts and feelings, after disseminating a bit of the theory of memory and how these things may be working. They were able to apply it to their own lives, as they face the inevitability of cognitive decline that we all do and take something from it. So, it not only is enjoyable in the moment as an activity, but it has left people reflecting and seemingly had a lasting impact. This activity has allowed the breaking down of barriers between groups, and although not a clear finding, provides a strong rationale for more studies looking into inter-group bonding.

On the other hand, some of the participants did not particularly care for the activity. This was reflected in completion rates, and some individual cases, in which people made their best attempt but vocalised that they just did not find the activity to be working for them in the way they are aware it might for others. One participant allocated to the music condition in Study 3 explained that she always has the radio on but was never hugely enamoured with music. Despite this, she was able to recall memories from the past but generally reported that she was not as connected to music in the way a lot of people do. This should not be seen as a weakness, but rather an opportunity. It does not necessarily mean that music is not useful, but it is not as evocative for her. This attitude should be considered more within the research.

At one point, we may hit a time when we do not have the privilege of vocalising our preferences, our choices, and in a wider sense, making our own decisions. In pathological memory loss, this level of autonomy is often not feasible. But that should not suggest that this process of cognitive reflection and curation should not be encouraged, as a prospective task in fact. We should encourage people to optimise the time that we do have, to think about these things that do naturally float to the surface for us. What would you bring? Even asking why? Soon an explanation may transform into a reflection, then a recollection of time gone by. We are starting to see how valuable it would be to have self-selected memory cues prepared for later on, that even if we cannot verbalise it, these things are helping us get in touch with something once so familiar.

Table 23: Overview of findings from Studies 1-5

Study	Participants	Methodology	Measures	Findings
Study 1	$N = 55$ 35-95 years	Secondary data of radio interviews in which 8 songs were self-selected and discussed	Temporal location of Age at importance (AaI)	AaI peak 11-20 years
			Reasons for choosing disc	#1 Reason: General memories, person-related memories
Study 2	$N = 28$ 40-50 years	10 self-selected pieces of music/ objects/pictures that hold great importance	Temporal location of Age at First Encounter (AaFE)	Music: AaFE peak 11-20 years Objects: AaFE peak 1-10 years Pictures: AaFE peak 31-40 years
			Reasons for choosing stimulus	#1 General memories, person-related memories
			Emotional valence and strength ratings	#1 Positive

Study 3	$N = 40$	10 SS pieces of	Memory specificity	SS = EP Overall (all stimuli)
	65-88 years	music/objects/pictures/clothing		SS > EP Music & Clothing
		to take to a place of isolation		SS = EP Objects & Pictures
		10 EP pieces of		
		music/objects/pictures/clothing	Temporal location of specific	SS: AM peak 61-70 years
			memories	SS: AM peak 11-20 years
			Temporal location of specific	SS Music: AM peak 11-20 years
			memories	SS Objects: AM peak 31-40 years
				SS Pictures: AM peak 61-70 years
				SS Clothing: AM peak 61-70 years
				EP Music: AM peak 11-20 years
				EP Objects: AM peak 21-30 years
				EP Pictures: AM peak 61-70 years
				EP Clothing: AM peak 51-60 years
			Feature of memory or reason	SS & EP: #1 Person

			Rehearsal frequency of specific memories	SS cues: #1 Every now and then EP cues: #1Not often
			Emotional valence of specific memories	SS cues: #1 Positive EP cues: #1 Positive
Study 4	$N = 36$ 60-70 years	10 freely self-selected pieces of music 'free choice' 10 restricted self-selected pieces of music selected 'fixed choice'	Nostalgia rating	Free > Fixed Audio > Word Free: Audio = Word Fixed: Audio > Word
			Number of specific memories	Free > Fixed Word = Audio
			Temporal location of specific memories	Free: AM peak 11-20 years Fixed: AM peak 11-20 years Word: AM peak 11-20 years Audio: AM peak 11-20 years

			Number & temporal location of self & relationship-defining memories	Free > Fixed Word = Audio Self-defining: AM peak 11-20 years Relationship-defining: AM peak 11-20 years
Study 5	$N = 1$ 81 years	Exploratory study to form protocol for applied reminiscence-based support with self-selected cues	Sense of Self Scale AMT-style task	Normal Observations: More fluid recollection of semantic and episodic details during unstructured conversation Session 1 Structured AMT-task appeared too regimented for individual Collaborative remembering with spouse aided in individual producing more semantic and episodic detail

Acronyms/abbreviations: Reminiscence bump (RB), Age at Importance (AaI), Age at First Encounter (AaFE), autobiographical memory (AM), Autobiographical Memory Task (AMT), Self-selected (SS), Experimenter-provided (EP)

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9. Appendices

Appendix 1: Full list of participants for study 1

Ppt #	Castaway name
1	Russell Brand
2	Josephine Barstow
3	Steven Pinker
4	Ruby Wax
5	Janet Street-Porter
6	Tim Minchin
7	Gillian Clarke
8	Randy Newman
9	Mary Berry
10	Rev John Graham
11	Sir Alfred Ayer
12	Sir Mervyn King
13	Dame Monica Mason
14	Margaret Rhodes
15	Ranulph Fiennes
16	Wangari Maathai
17	Camila Batmanghelidjh
18	Terry Jones
19	Eric Clapton
20	Susan Blackmore
21	Terry Pratchett
22	Iain Banks
23	Douglas Adams
24	Oliver Sacks
25	Steve Coogan
26	Jane Goodall
27	Paul Nurse

28		Bill Bailey
29		Stephen King
30		Uta Frith
31		Brian Cox
32		Hugh Laurie
33		Dawn French
34		Kathy Burke
35		Tom Jones
36		Ron Goodwin
37		Annie Lennox
38		Stan Tracey
39		Julie Andrews
40		John Lee Hooker
41		Yoko Ono
42		Ruthie Henshall
43		Adelaide Hall
44		Jane Glover
45		Emmy Lou Harris
46		Tasmin Little
47		Barbara Taylor Bradford (2003)
48		Beryl Bainbridge (2008)
49		Elizabeth Longford (2002)
50		Fay Weldon (2010)
51		Irene Thomas (1997)
52		Joanna Lumley (2007)
53		P.D. James (2002)
54		Petula Clark (1995)
55		Sian Phillips (1997)

Appendix 2: Example transcript of DID from Study 1

Russell Brand (R)

Presenter: Kirsty Young (K)

Date of broadcast: 21st July 2013

Age at time of broadcast: 38 (04/06/1975)

Comedian, actor

K: Your list of 8 – tell me about the first one.

R: It's *Amy Winehouse –You Know I'm No Good*. I really loved Amy, and we were friends. I suppose what's wonderful about great art broadly is it's difficult to see where it's come from, it's difficult to understand how she was able to convey such depth of emotion, because when you talk to her before or after she's just some normal bird. And now, suddenly, you've become this vessel of this profound, devastating emotion. Kept that quiet.

(Song plays)

K: Let's have some more music then – tell me about this.

R: This is good, this. This is *Daniel Johnston*. I have bought into the appealing myth of the artists who's tortured, who's mentally ill. But Van Gogh is not great because he cut his ear off; he's great because he painted crows over the wheatfield [Wheatfield with Crows]. Daniel Johnston is a mentally ill person and a brilliant, brilliant genius. And that's what I find attractive about him, is that he creates wonderful pieces of music and that the mental illness is a bloody convenience actually – not the thing that you're marketing.

(Song plays)

K: Let's have some more music then – tell me about your third, what are we going to hear?

R: Oh, right. This is *Nick Cave – Red Right Hand*. It's just got such grandeur and potency, and I suppose like a lot of Nick Cave's writing, mythic resonance. He understands archetype and hero.

(Song plays)

K: Let's have some music. We're on your fourth choice of the day; tell me why you've chosen this.

R: This is really pertinent, as a matter of fact Kirsty. It's almost like you know what you're doing. This is *The Libertines – Tell the King* and I like it because I think Pete Doherty and Carl [Barât], I think that they were very, very brilliant artists and

musicians, and here I think they're sort of talking about how you can achieve something from nothing, and I think they render it very, very well.

(Song plays)

K: We've got to fit in the music, Russell Brand. Tell me about this, it's your fifth of the morning.

R: This is *Ravi Shankar and George Harrison* [I Am Missing You]. And I like this song in particular because it's sort of about Krishna who I think is a really, really good deity. When you first hear it, it seems a bit cheesy. But when you listen it's actually very beautiful, like a carol.

(Song plays)

K: We're going to have some music Russell Brand. We're on your sixth choice of the day; tell me about this.

R: It's Timmy Mallett!

(Both laugh)

R: No, obviously it's something really meaningful and deep, like me. This is *Dan Le Sac and Scroobius Pip – Thou Shalt Always Kill*. I like it because it's an interesting take on commandments in doctrine.

K: On that note, disc seven. Tell me about this.

R: This here is a mantra called *Triple Mantra*. There's two reasons this is in here. One is because it makes me look good, "He's got a mantra in – he's changed". The other thing is, if you listen to it for about 20 minutes, if you just loop this, your consciousness will change. You'll think different things, and that's really positive.

(Song plays)

K: It's time for your last piece of music Russell. What are we going to hear now?

R: *Morrissey – Now My Heart Is Full*. Morrissey, as you know, the poet laureate of the dispossessed. This song, I like it because of the crescendo. I asked him, you know how hard it is, you've interviewed him, how hard it is to get any sense out of the man. I go to him, "What is this? Why are you saying them people out of Brighton rock for?" And he just wistfully went, "The gang." Like: "So, for your friends, you know? For your friends."

(Song plays)

Full track list (with release dates):

1. You Know I'm No Good – Amy Winehouse (Released 8th January 2007)
2. Like a Monkey In A Zoo – Daniel Johnston (Released to public in 1988)
3. Red Right Hand – Nick Cave & The Bad Seeds (Released 1994)
4. Tell the King – The Libertines (Released 14th October 2002)
5. I Am Missing You – Ravi Shankar, George Harrison (Released 13th September 1974)
6. Thou Shalt Always Kill – Dan Le Sac VS Scroobius Pip (Released 16th April 2007)
7. Triple Mantra – Nirinjan Kaur *Castaway's favourite (Released 3rd September 2013)
8. Now My Heart Is Full – Morrissey (Released 23rd August 1994)

AGE & REASON CODES:

Russell Brand

Disc 1: General memory of a <u>person</u> | Age: 32

Genre: R&B/Soul | Popularity of artist: 2 castaways

Disc 2: N/A | Age: N/A

Genre: Alternative | Popularity of artist: 1 castaway

Disc 3: <u>Music lyrics</u> | Age: N/A

Genre: Rock | Popularity of artist: 1 castaway

Disc 4: <u>Music lyrics</u> | Age: N/A

Genre: Alternative | Popularity of artist: 1 castaway

Disc 5: <u>Music structure</u> | Age: N/A

Genre: World | Popularity of artist: 1 castaway

Disc 6: <u>Music lyrics</u> | Age: N/A

Genre: Hip-Hop/Rap | Popularity of artist: 1 castaway

Disc 7: <u>Emotional response</u> *Castaway's favourite | Age: N/A

Genre: New Age | Popularity of artist: 1 castaway

Disc 8: <u>Music structure</u>| Age: N/A

Genre: Alternative | Popularity of artist: 2 castaways

Appendix 3: University of Westminster Ethics Committee Approval Letter

**UNIVERSITY OF
FORWARD
THINKING
WESTMINSTER**

Amy Woy
Student number: 13295385
University of Westminster
Department of Psychology
309 Regent Street
London
W1B 2UW

13 December 2013

Dear Amy

Application Number: UG13/14/105_Psych
Student Name: Amy Woy

Project title: Music, autobiographical memory and sense of self: To what extent is music tied to our identity?

I am writing to inform you that your application was considered by the Psychology Ethics Committee. The proposal was **approved**. Please note the conditions below.

Please save this letter as you will be expected to include a hard copy in the appendix section of your project.

Yours sincerely

Debs Harris
Psychology Administrator; Faculty of Science and Technology

....
I am advised by the Committee to remind you of the following points:

1. Please inform your supervisor immediately of any harmful outcomes during the research e.g. participant distress.

2. The need to comply with the Data Protection Act 1998

3. The need to comply, throughout the conduct of the study, with good research practice standards

4. The need to refer proposed amendments to the protocol to the Ethics Committee for further review and to obtain Ethics Committee approval thereto prior to implementation (except only in cases of emergency when the welfare of the subject is paramount).

5. The desirability of including full details of the participant information sheet and consent form in an appendix to your research, and of addressing specifically ethical issues in your methodological discussion.

6 Your responsibility to notify the Ethics Committee immediately of any information received by you, or of which you become aware, which would cast doubt upon, or alter, any information contained in the original application, or a later amendment, submitted to the Ethics Committee and/or which would raise questions about the safety and/or continued conduct of the research.

Appendix 4: Study 2 Qualtrics questionnaire

☐ Q1   **Project:** Sensory Stimuli and Autobiographical Memory

⚙   **Lead Researcher:** Amy Woy, Department of Psychology, University of Westminster

For many people, stimuli such as music, images and objects can trigger a variety of feelings and memories. You are being invited to participate in a research study that helps us to understand this better. This is part of a wider project that aims to develop ways to support people with dementia and other memory impairments. In this questionnaire, you will be asked to identify things that have particular significance to you and briefly explain why.

The study will require you to complete a questionnaire on 10 pieces of music, objects, OR photographs that you can remember and to briefly state when these songs/items were most relevant to you and why.

This study is aimed at participants aged 40-50 years old.

This questionnaire should take approximately 20-25 minutes to complete. Please read all instructions carefully.

Please note:

·   Participation is entirely voluntary.
·   You have the right to withdraw at any time without giving a reason.
·   You have the right to ask for your data to be withdrawn as long as this is practical, and for personal information to be destroyed.
·   You do not have to answer particular questions either on questionnaires or in the interview if you do not wish to.
·   Your responses will be confidential. No individuals will be identifiable from any collated data, written report of the research, or any publications arising from it.
·   All personal data will be kept in a locked cupboard on University premises.
·   If you wish you can receive information on the result of the research.
·   The researcher can be contacted after participation by email on a.woy@westminster.ac.uk / amy.woy@my.westminster.ac.uk.

Options ⌄

☐ D1   How old are you?

☐ D2   What is your gender?

Male   Female   Other
○   ○   ○

Import Questions From...   **+ Create a New Question** ⌄

☐ Q2   Please select:

⚙

❋

○ I agree to these terms

○ I do NOT agree to these terms

↳ Condition: **I do NOT agree to these terms Is Selected**. Skip To: **End of Survey**.   Options ⌄

- Page Break -

☐ Q3   I acknowledge that these procedures are **not** designed to detect cognitive abnormalities.

⚙

❋

○ Yes

○ No

↳ Condition: **No Is Selected**. Skip To: **End of Survey**.   Options ⌄

▼ Block: Music   Block Options ⌄

☐
CHOICE 1   **Please name 10 pieces of music or other recorded sound that you feel hold importance or significance to you. These pieces should be something that has existed or something that you have personally heard. You may well feel that there are more than 10 or that your choices may change if you were to think about it again another day but that is fine. Please just select the 10 that come to your mind right now. Where possible, please explain very briefly why you have made that choice. If you remember the age you were when you listened most to this piece of music, please write this down too.**
⚙

☐ Q4   **Song/Tune No 1:**
⚙

✱

☐ Q5   Why did you choose this piece of music?
⚙

✱

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Q6 When (approximately) did you first encounter this piece of music?

[   ]

*

Q7 If you have any memories associated with this piece of music, are they generally...

Very negative	Negative	Neither positive or negative	Positive	Very positive	Mixed
○	○	○	○	○	○

Display This Question:
If If you have any memories associated with this piece of music, are they generally... Mixed Is Selected

Q8 If you responded with **'mixed'**, how would you rate the strength of these mixed emotions?

Overall quite weak	Overall medium strength	Overall quite strong
○	○	○

- - - - - - - - - - - Page Break - - - - - - - - - - -

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Thank you for taking part in this survey.

If you have any further questions, you can reach the main researcher via email at amy.woy@my.westminster.ac.uk.

If you would be interested in receiving a summary of the findings, please leave your email address below:

Feedback

If you would like to leave any feedback regarding your experience in completing this questionnaire, please do so below:

Appendix 5: University of Westminster Ethics Committee Approval Letter (Studies 2 & 3)

UNIVERSITY OF
FORWARD
THINKING
WESTMINSTER▦

12 September 2016

Dear Amy

Ethics application: VRE1617-0069
Project title: Using multi-sensory cues to study and curate autobiographical memories in dementia.
Applicant: Miss Amy Woy
Supervisor: Dr Catherine Loveday

I am writing to inform you that your application was considered by the Psychology Ethics Committee. The proposal was approved, however the committee would like you to ensure that you will make all appropriate arrangements to ensure your safety when meeting participants, you should not meet participants alone or at their home without ensuring your own safety.

If your protocol changes significantly in the meantime, please contact me immediately, in case of further ethical requirements.

Yours sincerely

Dr Laura Boubert

Psychology Ethics Committee

I am advised by the Committee to remind you of the following points:

1. Your responsibility to notify the Research Ethics Committee immediately of any information received by you, or of which you become aware, which would cast doubt upon, or alter, any information contained in the original application, or a later amendment, submitted to the Research Ethics Committee and/or which would raise questions about the safety and/or continued conduct of the research.
2. The need to comply with the Data Protection Act 1998.
3. The need to comply, throughout the conduct of the study, with good research practice standards.
4. The need to refer proposed amendments to the protocol to the Research Ethics Committee for further review and to obtain Research Ethics Committee approval thereto prior to implementation (except only in cases of emergency when the welfare of the subject is paramount).
5. The requirement to furnish the Research Ethics Committee with details of the conclusion and outcome of the project, and to inform the Research Ethics Committee should the research be discontinued. The Committee would prefer a concise summary of the conclusion and outcome of the project, which would fit no more than one side of A4 paper, please.
6. The desirability of including full details of the consent form in an appendix to your research, and of addressing specifically ethical issues in your methodological discussion.

Appendix 6: Study 3 Participant information sheet

PARTICIPATION INFORMATION SHEET

Project: Sensory Stimuli and Autobiographical Memory

Lead Researcher: Amy Woy, Department of Psychology, University of Westminster

For many people, stimuli such as music, images and objects can trigger a variety of feelings and memories. You are being invited to participate in a research study that helps us to understand this better. This is part of a wider project that aims to develop ways to support people with dementia and other memory impairments. In this questionnaire, you will be asked to identify things that have particular significance to you and briefly explain why.

The study will require you to attend two appointments (5-7 days apart), each with a duration of approximately 1 hour. During these visits, you will be asked to complete a questionnaire on pieces of music, objects, pictures, or items of clothing that you can remember and to briefly state when these songs/items were most relevant to you and why. You will also be asked about how you're feeling at points throughout this questionnaire.

Part of this study involves a short cognitive test that assesses your memory. Feedback from this assessment can be provided to you upon request.

Please note:

- Participation is entirely voluntary.
- You have the right to withdraw at any time without giving a reason.
- You have the right to ask for your data to be withdrawn as long as this is practical, and for personal information to be destroyed.
- You do not have to answer particular questions either on questionnaires or in the interview if you do not wish to.
- Your responses will be confidential. No individuals will be identifiable from any collated data, written report of the research, or any publications arising from it.
- All personal data will be kept in a locked cupboard on University premises.
- If you wish you can receive information on the result of the research.
- The researcher can be contacted after participation by email on amy.woy@my.westminster.ac.uk.

Appendix 7: Study 3 Consent form

CONSENT FORM

Title of study: Sensory Stimuli and Autobiographical Memory

Lead Researcher: Amy Woy

Director of Studies: Dr. Catherine Loveday

I acknowledge that part of these procedures can detect some cognitive abnormalities. (Please tick) [   ]

Would you be happy to participate in follow-up work? Yes / No

I have received and read the contents of the Participant Information (Please tick) [   ]

I have read the information in the Participation Information Sheet, and I am willing to act as a participant in the above research study.

Name: _____

Signature: _____ Date: _____

Visit 1

DEMOGRAPHIC INFORMATION

Could you please first provide some simple background information?

How old are you? _____

Are you male or female? _____

What is your occupation now or what was your last occupation prior to retirement?
_____

Do you have any medical history or memory problems that you are aware of?
_____
_____
_____

In this study, we will be assessing your memory using a cognitive test. If we detect any memory impairments, would you like us to contact your GP? Please circle:

     YES   **NO**

If you answered **YES**, then please leave their contact details below:

GP Name & Practice: _____
Address: _____
_____
_____

Do you consider yourself to be a musician? Please circle: **YES** **NO**

If you answered **YES**, can you briefly summarise your musical training?
_____

Introduction of Scenario

"Before we get started, I am going to set out a scenario for you that I want you to imagine that you are in as we are moving through this questionnaire."

Imagine that you have been told you must move to a new, unfamiliar location. You will be away from all of your friends and family, but will have all of the amenities and essential things that you would need to live your life day-to-day.

(Possibly include the story of somebody else as an example)
(Possibly introduce Desert Island Discs and set this scene)

"I am now going to be asking you some questions about some different things, known as cues that have particular significance to you."

STAGE 1: Identification/titling of cues (*MUSIC)* (Self-selected)

Please name 10 pieces of music or other recorded sound that you feel hold importance or significance to you. You may well feel that there are more than 10 or that your choices may change if you were to think about it again another day but that is fine. Please just select the 10 that come to your mind right now.

Song/Tune No 1: _____

Song/Tune No 2: _____

Song/Tune No 3: _____

Song/Tune No 4: _____

Song/Tune No 5: _____

Song/Tune No 6: _____

Song/Tune No 7: _____

Song/Tune No 8: _____

Song/Tune No 9: _____

Song/Tune No 10: _____

STAGE 1: Identification/titling of cues (*OBJECTS*) (Self-selected)

Please name 10 objects that you feel hold importance or significance to you. You do not need to own these objects but they should be something that you have at some point seen or held. You may well feel that there are more than 10 or that your choices may change if you were to think about it again another day but that is fine. Please just select the 10 that come to your mind right now.

Object No 1: _____

Object No 2: _____

Object No 3: _____

Object No 4: _____

Object No 5: _____

Object No 6: _____

Object No 7: _____

Object No 8: _____

Object No 9: _____

Object No 10: _____

STAGE 1: Identification/titling of cues (*PICTURES)* (Self-selected)

Please name 10 still images (e.g. photographs or pictures) that you feel hold importance or significance to you. You do not need to own these images but you must at some point have seen them. You may well feel that there are more than 10 or that your choices may change if you were to think about it again another day but that is fine. Please just select the 10 that come to your mind right now.

Picture No 1: _____

Picture No 2: _____

Picture No 3: _____

Picture No 4: _____

Picture No 5: _____

Picture No 6: _____

Picture No 7: _____

Picture No 8: _____

Picture No 9: _____

Picture No 10: _____

STAGE 1: Identification/titling of cues (*CLOTHING*) (Self-selected)

Please name 10 items of clothing that you feel hold importance or significance to you. You do not need to own these clothes but you must at some point have seen them. You may well feel that there are more than 10 or that your choices may change if you were to think about it again another day but that is fine. Please just select the 10 that come to your mind right now.

Clothing No 1: _____

Clothing No 2: _____

Clothing No 3: _____

Clothing No 4: _____

Clothing No 5: _____

Clothing No 6: _____

Clothing No 7: _____

Clothing No 8: _____

Clothing No 9: _____

Clothing No 10: _____

Visit 1 Continued: Memories evoked & ratings

- Produce memories for **owned cues** **OR** produce memories for **not owned cues** **(COUNTER BALANCING)**
- Rate memories for **owned cues** **OR** rated memories for **not owned cues** **COUNTER BALANCING)**

Visit 2

Visit 2: Memories evoked & ratings

STAGE 2.1 – produce memories for **experimenter-provided cues**

STAGE 2.2 – produce memories for **self-selected cues**

STAGE 3.1 – rate memories for **experimenter-provided cues**

STAGE 3.2 – rated memories for **self-selected cues** PAGE 22-31

Memories evoked – RANDOMISED (Self-selected)

"I'm now going to ask you some questions about the pieces of music/objects/pictures/items of clothing that you have told me about during my first visit to you."

I want you to think of a specific event that happened to you which it reminds you of. The event could have happened at any point of your life from when you were small to last week, but please do not include memories from the last week.

1. (Cue No   title) _____

   Memory: _____

   _____

   _____

   _____

   _____

2. (Cue No   title) _____

   Memory: _____

   _____

   _____

   _____

   _____

3. (Cue No   title) _____

   Memory: _____

   _____

_____

_____

_____

4. (Cue No   title) _____

    Memory: _____

    _____

    _____

    _____

    _____

5. (Cue No   title) _____

    Memory: _____

    _____

    _____

    _____

    _____

6. (Cue No   title) _____

    Memory: _____

    _____

    _____

_____

_____

7. (Cue No   title) _____

   Memory: _____

   _____

   _____

   _____

   _____

8. (Cue No   title) _____

   Memory: _____

   _____

   _____

   _____

   _____

9. (Cue No   title) _____

   Memory: _____

   _____

   _____

   _____

_____

10. (Cue No   title) _____

Memory: _____

_____

_____

_____

_____

Age, Rehearsal, and Emotionality – RANDOMISED (Self-selected)

"I'm now going to ask you some final questions about all of the pieces of music/objects/pictures/items of clothing that we've talked about today.

1. (Cue No   title) _____

    i) At what age (approximately) were you in specific memory (of an event) that you described?

    _____

    ii) How often do you rehearse this memory? Please circle the most appropriate answer.

    Not often at all   Every now and then   Very often
          O   O   O

    iii) Is the memory associated with this piece of piece of music/object/ picture/item of clothing generally…

Very Negative	Negative	Neither positive or negative	Positive	Very Positive	Mixed
O	O	O	O	O	O

    iv) If you responded with 'mixed', how would you rate the strength of these emotions?

    Overall quite weak   Overall medium strength   Overall quite strong
          O   O   O

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MEMORIES EVOKED (Experimenter-provided)
(MUST BE PRE-PREPARED)

"I'm now going to ask you some questions about 10 more pieces of music/objects/pictures/items of clothing, but this time I am going to give you things that have already been selected for you.

I am going to read to you some different pieces of music/object/picture/ item of clothing and I want you to think of a specific event that happened to you which it reminds you of. The event could have happened at any point of your life from when you were small to last week, but please do not include memories from the last week. It might be an important event or a trivial event.

Just one more thing: the memory should be a specific event – an event that lasted less than a day and occurred in a particular time and place. So if I said the words "Dancing Queen - ABBA" – it would <u>not</u> be okay to say "It reminds me of parties", because that does not mention a <u>specific</u> event. But it would be okay to say "It reminds me of my 17th birthday party" (because that is a specific event). It is important to try to retrieve a different memory or event for each cue word.

1. (Cue A title) _____

   Memory: _____

   _____

   _____

   _____

   _____

2. (Cue B title) _____

   Memory: _____

   _____

   _____

_____

_____

3. (Cue C title) _____

Memory: _____

_____

_____

_____

_____

4. (Cue D title) _____

Memory: _____

_____

_____

_____

_____

5. (Cue E title) _____

Memory: _____

_____

_____

_____

_____

6. (Cue F title) _____

    Memory: _____

    _____

    _____

    _____

    _____

7. (Cue G title) _____

    Memory: _____

    _____

    _____

    _____

    _____

8. (Cue H title) _____

    Memory: _____

    _____

    _____

    _____

    _____

9. (Cue I title) _____

Memory: _____

_____

_____

_____

_____

10. (Cue J title) _____

Memory: _____

_____

_____

_____

_____

Age, Rehearsal, and Emotionality (continued) (Experimenter-provided) (MUST BE PRE-PREPARED)

"You are now going to answer the same questions, except this time they are going to be about the pieces of music/objects/pictures/items of clothing that I gave to you."

1. (Cue A title)

   _____

   i) At what age (approximately) were you in specific memory (of an event) that you described?

   _____

   ii) How often do you rehearse this memory? Please circle the most appropriate answer.

Not often at all often	Every now and then	Very
O	O	O

   iii) Is the memory associated with this piece of piece of music/object/ picture/item of clothing generally…

Very Mixed Negative	Negative	Neither positive or negative	Positive	Very Positive
O	O	O	O	O
O				

   iv) If you responded with 'mixed', how would you rate the strength of these emotions?

Overall quite weak quite strong	Overall medium strength	Overall
O	O	O

Appendix 9: Counterbalancing analysis for Study 3 and Study 4

	Study	Topic	Area	Mann-Whitney U	Wilcoxon W	Z	Asymp. Sig	Exact Sig		Exact Sig
1	Study	Topic	Area	Mann-Whitney U	Wilcoxon W	Z	Asymp. Sig	Exact Sig		Exact Sig
2	Study 3	Specific memories	Total All	170.500	380.500	-0.801	0.423	0.429		Non-significant
3			Total Owned	157.000	367.000	-1.174	0.241	0.253		Non-significant
4			Total Provided	197.000	407.000	-0.082	0.935	0.947		Non-significant
5			Music All	11.000	26.000	-0.315	0.753	0.841		Non-significant
6			Music Owned	10.500	25.500	-0.424	0.671	0.690		Non-significant
7			Music Provided	11.500	26.500	-0.214	0.831	0.841		Non-significant
8			Objects All	10.000	25.000	-0.524	0.600	0.690		Non-significant
9			Objects Owned	12.500	27.500	0.000	1.000	1.000		Non-significant
10			Objects Provided	8.000	23.000	-0.976	0.329	0.421		Non-significant
11			Pictures All	5.500	20.500	-1.471	0.141	0.151		Non-significant
12			Pictures Owned	3.000	18.000	-2.003	0.045	0.056		Non-significant
13			Pictures Provided	10.500	25.500	-0.430	0.667	0.690		Non-significant
14			Clothing All	11.500	26.500	-0.212	0.832	0.841		Non-significant
15			Clothing Owned	11.000	26.000	-0.324	0.746	0.841		Non-significant
16			Clothing Provided	11.500	26.500	-0.212	0.832	0.841		Non-significant
17	Study 4	Specific memories	Total All	154.500	325.500	-0.240	0.810	0.815		Non-significant
18			Total Word	130.000	301.000	-1.034	0.301	0.323		Non-significant
19			Total Audio	126.500	297.500	-1.154	0.249	0.265		Non-significant
20			Fixed All	38.500	83.500	-0.179	0.858	0.863		Non-significant
21			Fixed Word	37.000	82.000	-0.319	0.750	0.796		Non-significant
22			Fixed Audio	29.000	74.000	-1.043	0.297	0.340		Non-significant
23			Free All	37.000	82.000	-0.316	0.752	0.796		Non-significant
24			Free Word	29.500	74.500	-0.998	0.318	0.340		Non-significant
25			Free Audio	34.000	79.000	-0.590	0.555	0.605		Non-significant
26		Self-defining	Total All	142.500	313.500	-0.623	0.533	0.542		Non-significant
27		memories	Total Word	136.500	307.500	-0.824	0.410	0.424		Non-significant
28			Total Audio	151.000	322.000	-0.357	0.721	0.743		Non-significant
29			Fixed All	26.500	71.500	-1.242	0.214	0.222		Non-significant
30			Fixed Word	31.000	76.000	-0.852	0.394	0.436		Non-significant
31			Fixed Audio	24.000	69.000	-1.504	0.133	0.161		Non-significant
32			Free All	36.000	81.000	-0.405	0.686	0.730		Non-significant
33			Free Word	37.000	82.000	-0.318	0.750	0.796		Non-significant
34			Free Audio	27.000	72.000	-1.235	0.217	0.258		Non-significant
35		Relationship-	Total All	120.000	291.000	-1.344	0.179	0.192		Non-significant
36		defining memories	Total Word	110.000	281.000	-1.704	0.088	0.104		Non-significant
37			Total Audio	140.000	311.000	-0.718	0.472	0.501		Non-significant
38			Fixed All	20.000	65.000	-1.845	0.065	0.077		Non-significant
39			Fixed Word	10.500	55.500	-2.812	0.005	0.006		*Significant*
40			Fixed Audio	36.500	81.500	-0.369	0.712	0.730		Non-significant
41			Free All	39.000	84.000	-0.134	0.893	0.931		Non-significant
42			Free Word	36.000	81.000	-0.411	0.681	0.730		Non-significant
43			Free Audio	35.000	80.000	-0.500	0.617	0.666		Non-significant
44		Nostalgia rating	Total All	147.500	300.500	-0.182	0.856	0.858		Non-significant
45			Total Word	151.000	304.000	-0.066	0.947	0.961		Non-significant
46			Total Audio	135.500	288.500	-0.579	0.563	0.568		Non-significant
47			Fixed All	34.500	70.500	-0.145	0.855	0.888		Non-significant
48			Fixed Word	33.000	69.000	-0.291	0.771	0.815		Non-significant
49			Fixed Audio	34.500	70.500	-0.145	0.855	0.888		Non-significant
50			Free All	40.000	85.000	-0.044	0.865	1.000		Non-significant
51			Free Word	38.500	83.500	-0.177	0.859	0.863		Non-significant
52			Free Audio	32.000	77.000	-0.751	0.452	0.489		Non-significant

Appendix 10: University of Westminster Ethics Committee Approval Letter (Study 4)

UNIVERSITY OF
FORWARD
THINKING
WESTMINSTER⌗

Dear Amy

I am writing to inform you that your application was considered by the Psychology Ethics Committee.

The proposal was approved.

Yours,

Donna Taylor

Psychology Ethics Committee

I am advised by the Committee to remind you of the following points:

Your responsibility to notify the Research Ethics Committee immediately of any information received by you, or of which you become aware, which would cast doubt upon, or alter, any information contained in the original application, or a later amendment, submitted to the Research Ethics Committee and/or which would raise questions about the safety and/or continued conduct of the research.

The need to comply with the Data Protection Act 1998.

The need to comply, throughout the conduct of the study, with good research practice standards.

The need to refer proposed amendments to the protocol to the Research Ethics Committee for further review and to obtain Research Ethics Committee approval thereto prior to implementation (except only in cases of emergency when the welfare of the subject is paramount).

The desirability of including full details of the consent form in an appendix to your research, and of addressing specifically ethical issues in your methodological discussion.

The requirement to furnish the Research Ethics Committee with details of the conclusion and outcome of the project, and to inform the Research Ethics Committee should the research be discontinued. The Committee would prefer a concise summary of the conclusion and outcome of the project, which would fit no more than one side of A4 paper, please.

Appendix 11: Study 4 Participant information sheet

PARTICIPATION INFORMATION SHEET

Project: Music & Autobiographical Memory

Lead Researcher: Amy Woy, Department of Psychology, University of Westminster

Director of Studies: Professor Catherine Loveday, Department of Psychology, University of Westminster

For many people, particular music can trigger a variety of feelings and memories. You are being invited to participate in a research study that helps us to understand this better. This is part of a wider project that aims to understand these processes in healthy aging so that we can ultimately develop ways to support people with dementia and other memory impairments. In this questionnaire, you will be asked to identify things that may have a particular significance to you and briefly explain why.

The study will require you to complete a questionnaire on various pieces of music, and briefly discuss when these songs may have been most relevant to you and why.

Part of this study involves conducting a cognitive test that assesses your memory. This is not used as a diagnostic tool, but will allow us to observe your ability in areas such as memory recall, attention, orientation, and language.

Please note:

- Participation is entirely voluntary.
- You have the right to withdraw at any time without giving a reason.
- You have the right to ask for your data to be withdrawn as long as this is practical, and for personal information to be destroyed.
- You do not have to answer particular questions either on questionnaires or in the interview if you do not wish to.
- Your responses will be confidential. No individuals will be identifiable from any collated data outside of the research team, in any written report of the research, or any publications arising from it.
- All personal data will be kept in a locked cupboard on University premises.
- If you wish you can receive information on the results of the research. Results will be delivered in the form of a short report from the Director of Studies. Contact details will remain confidential within the team and stored securely.
- The researcher can be contacted after participation - please find contact details overleaf.

CONTACT DETAILS

Lead Researcher: Amy Woy

Email address: amy.woy@my.westminster.ac.uk

Phone number: 07763 849817

Director of Studies: Professor Catherine Loveday

Email address: C.Loveday@westminster.ac.uk

Phone number: 02079 115000 ext. 69009

Address: University of Westminster
115 New Cavendish Street
London
W1W 6UW

Appendix 12: Study 4 Consent form

CONSENT FORM (PARTICIPANT COPY)

Title of study: Music & Autobiographical Memory

Lead Researcher: Amy Woy
Director of Studies: Prof. Catherine Loveday

In signing this consent form I am agreeing to the following, and that my participation has been
explained to my satisfaction – please tick each box below, as appropriate:

- I have read & received the information in the Participation Information ☐

  Sheet, and I am willing to act as a participant in this research study.

- My participation in this research is on an entirely voluntary basis. ☐

- I am able to stop at any point during the process without having to ☐
  provide an explanation.

- Once I have taken part, I am still able to withdraw **my data** at any ☐
  point
  until the research has been published/submitted as part of my research
  project, or has been anonymised.

- I do not have to answer all questions asked, and I can decline to ☐
  answer

  any questions as I see fit.

- My data will be anonymised, and all identifying features will be ☐
  removed

so that my contribution will not be identifiable when reporting this

research.

- My data will be securely stored, and destroyed in accordance with the □
  Data Protection Act, 1998.

- My identity, contact details and the information that I provide will be treated □
  confidentially and in accordance with the University of Westminster ethical
  guidelines and British Psychological Society code of human research ethics.
  My personal information will not be shared with anyone outside of the
  Research/teaching team.

- The duty of confidentiality is **not absolute** and in exceptional circumstances □
  this may be overridden by more compelling duties such as to protect
  individuals from harm.

- The data from this study may be used for future research, and may undergo □
  secondary analysis. Future research may be related or unrelated to the
  goals of this study.

□

- I acknowledge that part of these procedures can detect some cognitive
  abnormalities.

You will be asked to complete a short cognitive task that looks at aspects such as memory.
We are not using this to formally diagnose any deficits. However, occasionally we may note
something unusual. In these cases would you like us to:

- Inform you?   **YES   /   NO**

- Inform your GP?   **YES   /   NO**

If you answered YES, please let us know of your GP name and practice below:

……………………………………………………………………………………

……………………………………………………………………………………

……………………………………………………………………………………

Participant Signature ………………………………….

Date …………………………….

Appendix 13: Study 4 Questionnaire

Please fill in your 10 song selections in the list below.

SONG 1:

……………………………………………………………………………………

SONG 2:

……………………………………………………………………………………

SONG 3:

……………………………………………………………………………………

SONG 4:

……………………………………………………………………………………

SONG 5:

……………………………………………………………………………………

SONG 6:

……………………………………………………………………………………

SONG 7:

……………………………………………………………………………………

SONG 8:

……………………………………………………………………………………

SONG 9:

……………………………………………………………………………………

SONG 10:

……………………………………………………………………………………

SONG CHOICE X:

……………………………………………………………………

(1 OF 5 **WORD CUED**)

Please think of a <u>specific memory/event</u> that happened to you, which this song reminds you of and describe it in the space below. The event would have happened at any point in your life, from when you were small to last week, but please do not include memories from the last 7 days.

……………………………………………………………………………………

……………………………………………………………………………………

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Please state how old you were in the specific memory described above, even if it is approximate:

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How often do you rehearse this memory?

Not often at all	Every now and then	Very often
O	O	O

Is the memory associated with this song generally…

Very Mixed Negative	Negative	Neither positive or negative	Positive	Very Positive	
O	O	O	O	O	O

You will now be played an excerpt of a song. *Excerpt plays*

Please think of a <u>specific memory/event</u> that happened to you, which this song reminds you of and describe it in the space below. The event would have happened at any point in your life, from when you were small to last week, but please do not include memories from the last 7 days.

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Please state how old you were in the specific memory described above, even if it is approximate:

………………………………………………………………………………………

How often do you rehearse this memory?

Not often at all	Every now and then	Very often
O	O	O

Is the memory associated with this song generally…

Very Mixed Negative	Negative	Neither positive or negative	Positive	Very Positive	
O	O	O	O	O	O

Appendix 14: Study 4 Desert Island Jukebox song list

(Everything I Do) I Do It For You	Bryan Adams	Rather Be	Clean Bandit Ft Jess Glynne
All Of Me	John Legend	Relax	Frankie Goes To Hollywood
Amazing Grace	Judy Collins	Release Me	Engelbert Humperdinck
Bad Day	Daniel Powter	Rhythm Is A Dancer	Snap!
Believe	Cher	Ride On Time	Black Box
Bohemian Rhapsody	Queen	Rivers Of Babylon	Boney M
Call On Me	Eric Prydz	Rock Around The Clock	Bill Haley & His Comets
Cara Mia	David Whitfield With Mantovani & His Orchestra	Rose Marie	Slim Whitman
		Sailing	Rod Stewart
Chandelier	Sia	Secret Love	Doris Day
Chirpy Cheep	Middle Of The Road	Shape of You	Ed Sheeran
Crazy	Gnarls Barkley	She Loves You	The Beatles
Diana	Paul Anka	Side Saddle	Russ Conway
Do They Know It's Christmas?	Band Aid	Someone Like You	Adele
Don't Cha	The Pussycat Dolls featuring Busta Rhymes	Stay	Shakespear's Sister
		Stranger On The Shore	Mr Acker Bilk
Frenesi	Artie Shaw	Swing The Mood	Jive Bunny & The Mastermixers
Ghostbusters	Ray Parker Jr	Take Me To Church	Hozier
Give Me Your Word	Tennessee Ernie Ford	Tears	Ken Dodd
Grace Kelly	Mika	Telstar	The Tornados
Green Grass Of Home	Tom Jones	Terry's Theme (From 'Limelight')	Frank Chacksfield
Happy	Pharrell Williams	The Breeze & I	Jimmy Dorsey
Hips Don't Lie	Shakira featuring Wyclef Jean	The Last Waltz	Engelbert Humperdinck
I Believe	Frankie Laine	The Power Of Love	Jennifer Rush
I Don't Feel Like Dancin'	Scissor Sisters	The Wonder Of You	Elvis Presley
I Just Called To Say I Love You	Stevie Wonder	The Woodpecker Song	Glenn Miller
I Remember You	Frank Ifield	Think Twice	Celine Dion
I Will Always Love You	Whitney Houston	Thinking Out Loud	Ed Sheeran
I'd Do Anything For Love (But I Won't Do That)	Meat Loaf	Tie A Yellow Ribbon Round The Old Oak Tree	Dawn featuring Tony Orlando
I'll Be Missing You	Puff Daddy & Faith Evans	Two Tribes	Frankie Goes To Hollywood
I'll Never Smile Again	Tommy Dorsey & Frank Sinatra	Umbrella	Rihanna featuring Jay-Z
In the Mood	Glenn Miller	Wannabe	The Spice Girls
It's Now Or Never	Elvis Presley	We Three (My Echo, My Shadow & Me)	The Ink Spots
Karma Chameleon	Culture Club		
Love Is All Around	Wet Wet Wet	When You Wish Upon a Star	Cliff Edwards (Ukelele Ike)
Mull Of Kintyre / Girl's School	Wings	When You Wish Upon a Star	Glenn Miller
Never Gonna Give You Up	Rick Astley	Without You	Nilsson
Oh Mein Papa	Eddie Calvert	Wonderful Land	The Shadows
Only Forever	Bing Crosby	You Are My Sunshine	Jimmie Davis
Patience	Take That	You're Beautiful	James Blunt
Perfect	Ed Sheeran	You're The One That I Want	John Travolta & Olivia Newton-John
Pompeii	Bastille		

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Appendix 15: University of Westminster Ethics Committee Approval Letter (Study 5)

Project title: Using multi-sensory cues to study and curate autobiographical memories in dementia.

Application ID: ETH1819-0610

Date: 28 Jan 2019

Dear Amy

I am writing to inform you that your application was considered by the Psychology Ethics Committee.

The proposal was approved.

Yours,

Coral Dando

Psychology Ethics Committee

I am advised by the Committee to remind you of the following points:

Your responsibility to notify the Research Ethics Committee immediately of any information received by you, or of which you become aware, which would cast doubt upon, or alter, any information contained in the original application, or a later amendment, submitted to the Research Ethics Committee and/or which would raise questions about the safety and/or continued conduct of the research.

The need to comply with the Data Protection Act 2018 and General Data Protection Regulation (GDPR) 2018.

The need to comply, throughout the conduct of the study, with good research practice standards.

The need to refer proposed amendments to the protocol to the Research Ethics Committee for further review and to obtain Research Ethics Committee approval thereto prior to implementation (except only in cases of emergency when the welfare of the subject is paramount).

The desirability of including full details of the consent form in an appendix to your research, and of addressing specifically ethical issues in your methodological discussion.

The requirement to furnish the Research Ethics Committee with details of the conclusion and outcome of the project, and to inform the Research Ethics Committee should the research be discontinued. The Committee would prefer a concise summary of the conclusion and outcome of the project, which would fit no more than one side of A4 paper, please.

PARTICIPATION INFORMATION SHEET

Project: Immersive Tailored Reminiscence with Sensory Stimuli

Lead Researcher: Amy Woy, Department of Psychology, University of Westminster
Director of Studies: Professor Catherine Loveday, Department of Psychology, University of Westminster

You are being invited to take part in this study, being conducted by Amy Woy. Before you decide, we would like you to understand why the research is being done and what it would involve for you. Please take time to read the following information carefully and discuss it with family or friends if you wish.

What is the study about?
For many people, particular music, objects and pictures can trigger a variety of feelings and memories of their lives. These things are often used in Reminiscence Therapy - a treatment that helps to support people with memory problems with remembering their past. We are interested in trialing a new method of immersive reminiscence with you, to better understand how we can improve these therapies.

What does the study involve?
If you decide to participate in this project, it will take place over 3 visits to your home, over the space of approximately 1-2 weeks.

You will firstly attend a screening session, which involves completing a Participant Consent Form, a questionnaire on your general health, and a brief cognitive test.
Following this, you will be participating in some activities which involve collecting together various pieces of music and tangible objects in your home. Part of this study also involves some input from a relative, and whom this will be is entirely your decision. This should take no longer than 2 hours. Approximately 1 week later, you will be asked to spend an hour talking a bit more about items you chose during the first visit. This will be followed by a brief memory task. You will then be asked to take part in an interview, to discuss how you found your overall experience. This process will be repeated one day later, with a different selection of items chosen by your relative.

How much time will the study take?
The study will take approximately 2 weeks to complete over 3-4 days. These days consist of a screening interview, 3 sessions each lasting approximately 1 hour, and 2 short feedback interviews.

Will the study benefit me?

With our research being in its infancy, we are eager to increase our understanding of the nature of autobiographical memory to improve reminiscence practices by working with you. Overall, our research has been very well received by participants; therefore we are hopeful that you will find this process to be useful and enjoyable.

If you have any further questions, please contact a member of the study team.

Please note:

- Participation is entirely voluntary.
- You have the right to withdraw at any time without giving a reason.
- You have the right to ask for your data to be withdrawn as long as this is practical, and for personal information to be destroyed.
- You do not have to answer particular questions either on questionnaires or in the interview if you do not wish to.
- Your responses will be confidential. No individuals will be identifiable from any collated data outside of the research team, in any written report of the research, or any publications arising from it.
- All personal data will be kept in a locked cupboard on University premises.
- If you wish you can receive information on the results of the research. Results will be delivered in the form of a short report from the Director of Studies. Contact details will remain confidential within the team and stored securely.
- The researcher can be contacted after participation - please see details below.

CONTACT DETAILS

Lead Researcher: Amy Woy
Email address: amy.woy@my.westminster.ac.uk
Phone number: 07763 849817

Director of Studies: Professor Catherine Loveday
Email address: C.Loveday@westminster.ac.uk
Phone number: 02079 115000 ext. 69009

Address: University of Westminster 115 New Cavendish Street, London, W1W 6UW

CONSENT FORM (PARTICIPANT COPY)

Project: Immersive Tailored Reminiscence with Sensory Stimuli

Lead Researcher: Amy Woy
Director of Studies: Prof. Catherine Loveday

In signing this consent form I am agreeing to the following, and that my participation has been
explained to my satisfaction – please tick each box below, as appropriate:

- I have read & received the information in the Participation Information

  Sheet, and I am willing to act as a participant in this research study. ☐

- My participation in this research is on an entirely voluntary basis. ☐

- I am able to stop at any point during the process without having to
  provide an explanation. ☐

- Once I have taken part, I am still able to withdraw **my data** at any point
  until the research has been published/submitted as part of my research
  project, or has been anonymised for publication. ☐

- I do not have to answer all questions asked, and I can decline to answer
  any
  questions as I see fit. ☐

- My data will be anonymised, and all identifying features will be removed
  so
  that my contribution will not be identifiable when reporting this
research. ☐

- My data will be securely stored, and destroyed in accordance with the
  Data Protection Act, 1998. ☐

- My identity, contact details and the information that I provide will be treated
  confidentially and in accordance with the University of Westminster ethical
  guidelines and British Psychological Society code of human research ethics.
  My personal information will not be shared with anyone outside of the Research/teaching team.

☐

- The duty of confidentiality is **not absolute** and in exceptional circumstances
  this may be overridden by more compelling duties such as to protect individuals from harm.

☐

- The data from this study may be used for future research, and may undergo
  secondary analysis. Future research may be related or unrelated to the goals
  of this study.

☐

- I acknowledge that part of these procedures can detect some cognitive abnormalities.

☐

You will be asked to complete a short cognitive task that looks at aspects such as memory.
Would you like us to provide information on your results to you or your GP?

- Inform you ☐

- Inform your GP ☐

If you answered YES, please let us know of your GP name and practice below:

……

Participant Signature …………………………………….

Date …………………………….

Appendix 18: Amended protocol procedure from original

Preliminary meeting

Initial face-to-face meeting with individual and secondary participant (usually caregiver or family member) at their home. Participant information sheet is read and understood, and a general introduction to the nature of the work and their involvement is discussed. The consent forms are signed by the participant and secondary participant. The cognitive screening is carried out with the Mini Mental State Examination.

Session 1: Stimulus selection/curation stage

The participant is invited to curate a selection of tangible objects, photographs and music that they deem to be important and would want with them in a place of isolation. The participant will lead the researcher around their home to make their selections. Note down any memories and comments that are made. (This is akin to the Desert Island Discs / Study 1 set up, of comments and potential memories that come to mind more instantaneously).

Session 2: Memory cueing with self-cues

Administer Sense of Self Scale 1
AMT task using self-selected stimuli
Administer Sense of Self Scale 2

Session 3: Memory cueing and interview

Administer Sense of Self Scale 1
AMT task using secondary participant-chosen / experimenter-provided stimuli
Administer Sense of Self Scale 2
Short interview regarding the participant's thoughts and experiences during interaction session.

AUTOBIOGRAPHICAL MEMORY TEST
(Williams & Broadbent, 1986)
(Words derived from Robinson's (1976) list of 555 trait adjectives)

This is an autobiographical memory task, and the procedure is very straightforward, and goes as follows. I'll be showing you a series of **5 words**. Each word is printed on a separate card. Each word is a commonly known object or item. When I show you each word, I would like you to tell me the first memory that comes to mind.

The memory you retrieve should be very specific, and can be from any point in your life. For example, if the word was "candle", you might say, "Last month I had a surprise birthday party". This would be specific. If you said, "It reminds me of birthdays", this would be too general.

I want you to answer as quickly as you can, but the most important thing is that you try to tell me a specific memory. As soon as you think of a specific instance, I want you to describe it out loud briefly. I'll be giving you up to 60 seconds for each word. I'll also record your responses on this tape recorder. We'll have a practice first. Any questions?

Shall we have a practice?

SHOE   *BOTTLE*   *KEY*

MAIN WORD LIST:

AMT-1	**C-AMT** **(self-selected list)**	**AMT-2**
1. LETTER		6. DOG
2. FLOWER		7. CAR
3. GAME		8. WINDOW
4. COIN		9. TREE
5. MACHINE		10. BELL

Appendix 20: Study 5 intended interview schedule

STUDY 5 INTERVIEW SCHEDULE

Aim of the interview is to get feedback and thoughts of the Immersive Reminiscence experience, and to identify any particular benefits and/or issues with the process in order to refine this methodology for further application.

Introduction

- ❖ Thank the participant for taking part
- ❖ Inform the participant that the interview will last up to an hour and just say if you need a break at any point (this may need to be shorter, or individual may need to be reminded that a break is fine)
- ❖ Explain purpose of interview, to evaluate the experiences of these exercises
- ❖ Explain that there is no set list of questions or 'right or wrong' answers; we would just like to hear your 'story/experiences', good and bad.
- ❖ Check the participant is happy to proceed and for the interview to be recorded

Questions RE: Stimuli interaction stage (SESSION 2)

1. Can you tell me your experience of talking to me about these items today?
   Prompts:
   - Plus points - what's worked well? What did you enjoy in particular?
   - Difficulties - did you find any parts of the experience awkward or difficult to do?
   - Did the process bring lots of memories to mind for you? How did it feel to relive these memories?

2. Did you choose a lot of your things together? Tell me about how you found that.
   Prompts:
   - Did you enjoy picking them together?

3. Did you prefer talking about/interacting with anything in particular?
   Prompts:
   - How did you find the objects and pictures?
   - Is there anything you felt was missing in hindsight

4. Going back to when you chose things from your home - tell me how you went about doing that.
   Prompts:
   - Did you already have things in mind? Did you go logically around the space? Did you think of things as you saw them? Did you think of what you'd like to be reminded of?

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5. *SECTION OF QUESTIONS HERE DEDICATED TO ANY FURTHER THOUGHTS IDENTIFIED IN NOTES DURING OBSERVATION IN SESSIONS 1 & 2.*

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6. Is there anything you would change about the way we did things?

7. Is there anything else you want to say that you have not had a chance to say?
   Prompts:
   - Have you learnt anything?
   - Would you do something like this again?

Final notes

❖ Thank the participant once again for taking part
❖ Remind participant they have the right to withdraw their data at any time
❖ Provide a debrief to clarify what this research aims to explore