

Digital Life Story Books: Intervention to maintain sense of self in older adults with memory difficulties

Majse Lind, Susan Bluck & Elizabeth Barbour

To cite this article: Majse Lind, Susan Bluck & Elizabeth Barbour (2025) Digital Life Story Books: Intervention to maintain sense of self in older adults with memory difficulties, Educational Gerontology, 51:1, 88-101, DOI: [10.1080/03601277.2024.2383830](https://doi.org/10.1080/03601277.2024.2383830)

To link to this article: <https://doi.org/10.1080/03601277.2024.2383830>



© 2024 The Author(s). Published with license by Taylor & Francis Group, LLC.



Published online: 30 Jul 2024.



Submit your article to this journal [↗](#)



Article views: 756



View related articles [↗](#)



View Crossmark data [↗](#)

Digital Life Story Books: Intervention to maintain sense of self in older adults with memory difficulties

Majse Lind^a, Susan Bluck^b, and Elizabeth Barbour^b

^aDepartment of Communication and Psychology, Aalborg University, Aalborg, Denmark; ^bDepartment of Psychology, University of Florida, Gainesville, Florida, USA

ABSTRACT

The sharp increase in dementia and age-related memory impairments worldwide has made reminiscence-based interventions attractive. Past research is mixed with little focus on self-functioning. The aims of this study were (i) to develop and assess the implementation of a reminiscence-based intervention, Digital Life Story Books, grounded in evidence-based principles of autobiographical memory, and (ii) to evaluate its effectiveness in improving sense of self in older adults with memory difficulties. A remote reminiscence intervention, using multisensory Digital Life Story Books (DLSB), was developed. Using a short-term experimental, longitudinal design, 25 participants with memory difficulties were assigned to the DLSB condition (16 females; $M = 73.96$, $SD = 8.8$) and 23 to a Wait-List Control (16 females; $M = 78.57$, $SD = 9.38$). Informal caregivers ($N = 34$; $M = 63.44$, $SD = 13.8$) provided proxy-reports on the effects of the DLSB. The DLSB was successfully developed and positively evaluated by participants. In the DLSB condition, a strengthened sense of self, reflected directly in the memories selected for the DLSB was detected. No overall condition difference was detected pre- to post-therapy. The findings highlight the appeal of reminiscence activities but also the challenge of adequate measurement sensitivity to demonstrate effects.

Introduction

You may call it a book, but really, it's a bridge between who we once were and who we still are deep inside.

– Male study participant

The number of older persons is expected to double from 962 million, reported in 2017, to approximately 2.1 billion people in 2050 (United Nations, Department of Economic and Social Affairs, Population Division, 2017). The rapidly aging population has resulted in a sharp increase in people with dementia (Ferri et al., 2005). Providing care for persons with dementia has become an important public health issue.

As pharmacological methods have shown limited effects in ameliorating dementia symptoms, attention has turned to psychosocial interventions for individuals with memory difficulties and their caregivers. Reminiscence interventions are popular amongst both informal caregivers and individuals suffering from dementia. Extant research has linked reminiscence activities with several beneficial outcomes such as improved cognition, mood, and well-being (e.g., Elfrink et al., 2018; Park et al., 2019). However, its efficacy is inconclusive, potentially due to methodological shortfalls in past research. This includes very small sample sizes, lack of control groups, lack of follow-ups, and

CONTACT Majse Lind  mlind@ikp.aau.dk  Department of Communication and Psychology, Aalborg University, Aalborg 9000, Denmark

© 2024 The Author(s). Published with license by Taylor & Francis Group, LLC.

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited. The terms on which this article has been published allow the posting of the Accepted Manuscript in a repository by the author(s) or with their consent.

reminiscence interventions developed based on intuitive principles instead of scientific grounding (Park et al., 2019; Woods et al., 2005).

Our first aim was thus to develop and evaluate a reminiscence intervention addressing some of the limitations identified in previous work. The most novel aspect of this intervention, Digital Life Story Books (DLSB), was that books were based on a Life Story Book Interview grounded in well-established, evidence-based autobiographical memory principles. The study also included a control group and several follow-ups. A novel element was to, when possible, involve informal caregivers by inviting them to provide proxy-reports for the person with memory difficulties, on the effects of the intervention. A second aim was to assess the effects of the DLSB, focusing on a multidimensional battery of sense of self. Improvement in sense of self through reminiscence has been suggested by many but studied by few (e.g., Moss & Björn, 2006). Here, we examined whether the DLSB could indeed act as a bridge from the past self to the present, as suggested in the opening quote.

Reminiscence therapy to preserve a gradual loss of self

Dementia is often characterized by forgetting recently acquired information, while distant, autobiographical memories remain unaffected for a longer time (Berntsen et al., 2022; Morris & Kopelman, 1986). Autobiographical memory refers to recall of personally experienced life events (Pillemer, 1998), that is, recall of one's self over time. As such, eventual loss of autobiographical memory threatens our ability to maintain a sense of self over time (Bluck & Liao, 2013; McAdams, 2018). Indeed, dementia has been referred to as 'the little death' as loss of memory eventually results in a diminished sense of self (Ward, 2015). The fear of loss of self for those with dementia can be so intense that some consider it a reason for ending their life. Loved ones are also affected, expressing the feeling of having lost the person they once knew. They report: 'he is no longer the man I married' or 'it is like living with a stranger' (Ward, 2015). As pharmacological solutions to memory difficulties have limited efficacy in general (Cotelli et al., 2012) and in preserving one's sense of self in particular, non-pharmacological, therapeutic approaches such as reminiscence interventions have gained attention. Within that work, researchers have noted that the sense of self has been overlooked as a target for improvement with the majority of studies focusing on memory repair or on well-being (Moss & Björn, 2006). The history of reminiscence activities suggests, however, that it should be a promising approach for maintaining a sense of self.

Reminiscence interventions were introduced to dementia care in the late 1970s (e.g., Kiernat, 1979) and quickly became one of the most popular psychosocial interventions for older adults with memory difficulties. It is loosely defined as any activity that involves reminiscing about one's life and sharing personal memories with others (Cotelli et al., 2012). Theoretically, reminiscence activities are based on the idea that older individuals have a biographical identity (Erikson, 1959), a life story they can look back at and reminisce about (Butler, 1963). In doing so, they can maintain a core set of significant autobiographical memories crucial for maintaining their sense of self (Bluck & Levine, 1998; Conway & Pleydell-Pearce, 2000; Subramaniam & Woods, 2012).

Reminiscence activity: past research and its shortfalls

Persons with dementia are believed to still have personal memories but require significant external cueing to aid retrieval (Norris, 1986). Based on this idea, reminiscence activities use a variety of cues, including photographs, music, and familiar household objects from the past. Incorporating digital technology in reminiscence activity is becoming more popular as it offers the potential to cue memories in new ways (Elfrink et al., 2017 for a review of types of life story books in reminiscence activities). Some past research indicates benefits of reminiscence interventions such as improved cognition, mood, well-being, general behavioral functioning, and sense of self (e.g., self-integration and self-esteem; Moss & Björn, 2006; Park et al., 2019; Woods et al., 2005).

The most recent Cochrane review (Woods et al., 2018), however, shows inconclusive evidence for its effectiveness. Woods et al. (2018) emphasize that methodological limitations of past research may be responsible for null findings (e.g., small sample sizes, typically qualitative and case studies, lack of control groups, lack of or only short-term follow-ups, and large variation in type and structure of reminiscence interventions). That is, the large heterogeneity of reminiscence activities (i.e., individual vs group-based interventions, verbal vs written, digital vs analog) may be associated with different outcomes, and comparing reminiscence interventions all together may not be feasible. In addition, persons with memory difficulties may not always provide accurate self reports (Moss & Björn, 2006), but only rarely are caregivers included to provide proxy reports for assessing intervention efficacy (see however Bruvik et al., 2012). Including caregivers can provide a crucial, alternative perspective to determining the effectiveness of reminiscence interventions.

Besides the methodological limitations reviewed above, we argue that mixed findings in past literature may also be due to reminiscence programs relying on creative and intuitively interesting techniques that are, however, not grounded in basic principles of autobiographical memory (Bluck & Levine, 1998). We believe it is important to continue evaluating and improving reminiscence interventions to help individuals maintain a sense of self in the face of memory difficulties.

The present study

The current study systematically evaluates a digital, multi-sensory reminiscence intervention developed based on robust, and evidence-based memory principles (see Methods for a detailed description) to address several methodological shortcomings of past research (i.e., based on intuition instead of evidence-based research, lack of control groups, follow-ups, and proxy-reports). That is, this quantitative study design comprises a between-groups experimental, short-term longitudinal design, to assess a novel reminiscence activity. We base our newly developed activity on memory principles used to create a Life Story Book Interview from which personalized Digital Life Story Books (DLSB) are created. Informal caregivers are included as proxy-reporters of intervention effects, enabling an additional perspective on its effect. The aims of this study were (i) to develop, and assess implementation of a DLSB intervention that participants with memory difficulties will evaluate positively (i.e., Digital Life Story Book Feedback Questionnaire), and (ii) to evaluate its effectiveness in improving sense of self (i.e., self-concept clarity, personal-continuity, self-esteem) in older adults with memory difficulties. In regard to this second aim, participants in the DLSB condition and their informal caregivers (proxy reporters) were both expected to report increases in sense of self from baseline to the first and to the second follow-up compared to a Wait-List Control group. Participants in the DLSB condition were also expected to show an increase in sense of self-related specifically to the memories selected for their book (i.e., Self-Memory Experiences Questionnaire).

Methods

Participants

The study involved American older adults with memory difficulties as the main sample, but their caregivers were also invited to participate with them and provide proxy assessments. Participants were recruited from across the United States using IRB-approved flyers posted to listservs, in community centers, senior living facilities, and on social media. Paid ads were placed in magazines and weekly newsletters for seniors. Virtual presentations were given through two states' Alzheimer's Associations and 55+ senior communities. Flyers included the phrase 'We will create your own personal Life Story Book.' The dyad, or participant with memory difficulties if there was no informal caregiver involved, received \$60 for complete study participation. They also received their own Digital Life Story Book to keep, regardless of condition. Wait-List Control participants received their book, if they wanted one, after the study was complete.

Participants with memory difficulties

Inclusion criteria were the following: 1) a diagnosis of mild dementia by a doctor or a score <33 on the Telephone Interview for Cognitive Status (TICS; $M = 29.02$) or a score of ≤ 10 on TICS-MOD (i.e., working and short-term memory subtasks; $M = 6.53$), 2) ability to provide informed consent, 3) access to, and ability to use, a computer. Exclusion criteria: Not meeting the inclusion criteria. Individuals had a range of conditions, including mild-to-moderate dementias (e.g., Alzheimer's Disease, Lewy Body Dementia), Mild Cognitive Impairment, primary progressive aphasia, or undiagnosed memory loss. The total sample consisted of 48 older US residents (32 females, $M = 76.17$ years, $SD = 9.26$). By race, 83.7% identified as Caucasian, 12.2% as Black, 2% as Asian, and 2% as Other.

Informal caregiver participants (proxy reporters)

Participants with memory difficulties were invited to involve their informal caregivers ($N = 34$; 28 females, $M = 63.44$, $SD = 13.8$, range 24–81), but not all participants had a caregiver able to do so (e.g., some did not have a close other they felt comfortable asking; others preferred to participate on their own). Informal caregivers were as follows: 47.05% adult child, 38.24% spouse, 8.82% relative, and 5.88% close friend. Among informal caregiver participants, 82.35% were Caucasian, 14.71% were Black, and 2.94% did not report race.

Ethical issues

This research complies with the Declaration of Helsinki (2023), aside from the requirement to preregister human subjects research, and received approval from a local institutional review board (ID: 202001443). Participation was voluntary and all participants provided informed consent.

Instruments

To increase measurement sensitivity, all sense of self measures were modified so that participants focused on the present. Participants with memory difficulties were instructed: 'Consider how you have been feeling *today*. Then, rate how much you agree with each statement as describing how you are feeling *today*.' Caregiver proxy reporters were given the following instructions: 'Please think about each item, and rate how your loved one has been feeling *today*, or the last time you were in contact with them. Then, rate how much you agree with each statement as describing how he/she has been feeling.'

Background measures

Telephone Interview for Cognitive Status (TICS). The 11-item measure based on the Mini-Mental State Examination (Brandt et al., 1988) was used to determine cognitive eligibility for study participation. The TICS maximum score is 41 with scores >31 suggesting mild to severe cognitive impairment. Two subtasks (referred to as TICS-MOD) were selected to limit inflation on overall TICS scores from performing well on crystallized intelligence tasks: 10-word immediate recall and serial 7 subtraction. Total possible score on the subtasks is 15, with scores 11 and lower suggesting mild-to-moderate cognitive impairment.

Sense of self measures

Self-esteem scale. Ten items were used to examine global self-worth (Rosenberg, 1965). The scale uses a 4-point Likert scale ranging from *strongly disagree* to *strongly agree*. Example item: *As of today, I feel that I am a person of worth, at least on an equal plane as others*. Cronbach's α was good for person with memory difficulties (.71 at baseline) and for their caregiver (.93).

Personal-Continuity Scale. Self-continuity was measured using the Personal-Continuity Scale (Sedikides et al., 2015) to determine personal- and temporal-continuity. The 8 items were responded

to using a 5-point Likert scale ranging from *strongly disagree* to *strongly agree*. Example item: *Today, I feel that, at my core, I am the same person today I was years ago*. Cronbach's α was .85 for person with memory difficulties and .78 for the caregivers' reports of them.

Self-concept clarity (SCC). Self-Concept Clarity (Campbell et al., 1996) was used to determine the clarity, definition, and consistency of self-beliefs. Participants responded to 12 items using 5-point Likert scales ranging from *strongly disagree* to *strongly agree*. Example item: *Today, my beliefs about myself often have conflicted with one another*. Cronbach's α was good for those with memory difficulties (baseline $\alpha = .74$) and caregivers' proxy reports (baseline $\alpha = .85$).

Measures related to Digital Life Story Book

Self-Memory Experiences Questionnaire. Assessed qualities of the five autobiographical memories shared in the Digital Life Story Book. Items were inspired by the Memory Experiences Questionnaire (Sutin & Robins, 2007) when assessing time perspective, sensory details, visual perspective, emotional intensity, personal significance, and reflectiveness of one's 'true self' in the memories. The five items were rated on a 5-point Likert scale ranging from *not at all* to *extremely*. Example item: *Reflecting on this today, to what extent do these 5 memories represent the Real You?* Cronbach's α was .76 for all items.

Digital Life Story Book Feedback Questionnaire. The feedback questionnaire was used to assess whether participants in the DLSB condition evaluated the implementation of the Digital Life Story Book positively. The short, 7-item questionnaire used a 5-point Likert scale ranging from *not at all* to *very much* and assessed: participants' satisfaction with engaging with their book, the satisfaction with the book itself, the personal relevance of their Digital Life Story Book, if the intervention helped them reflect on their lives and themselves, if it reminded them of bonds with loved ones, if it made them realize how rich and varied their life had been, if they felt Digital Life Story Book activities are important for people with memory difficulties, their satisfaction with participating in the study overall, and whether they would recommend this study to others.

Procedures

Procedures subsections are provided for participants with memory difficulties by condition (i.e., DLSB condition and Wait-List Control) across all study time points and then for the informal caregiver participants.

Procedure for participants with memory difficulties

While maintaining gender-balance across conditions, 25 participants were assigned to the DLSB condition (16 females; $M = 73.96$, $SD = 8.8$) and 23 to the Wait-List Control (16 females; $M = 78.57$, $SD = 9.38$) by a research assistant blinded for specific study hypotheses but aware of which one of the conditions were the reminiscence intervention and the waitlist group. Generally, participants were enrolled in the order they were recruited while also keeping an eye on gender-balance across the two conditions. There were no significant differences, $t(46) = .10$, $p > .05$ in cognitive ability (i.e., TICS) between the DLSB condition ($M = 28.92$, $SD = 6.189$) and the control condition ($M = 29.13$, $SD = 8.21$).

In both conditions, study sessions were completed by Zoom or phone (summer 2020-summer 2021) during the COVID-19 pandemic. The virtual format allowed interacting with participants with memory difficulties and informal caregiver participants in a safe, distanced, manner. A research assistant screen-shared Qualtrics from a lab computer and guided the participant through survey measures, providing support as needed (e.g., reading each item aloud, clarifying meaning of items) and recording responses based on the answers the participant provided. If the person with memory difficulties wanted it, the informal caregivers took part of these meetings to support the person with memory difficulties.

Digital Life Story Book (DLSB) condition

The intervention included the following steps:

Step 1: Before the interview. Participants received the Life Story Book Interview instructions to review a few days before meeting with a research assistant to conduct the interview. The Life Story Book Interview instructions were to provide a memory in each of the following categories: 1) from your early teenage years, 2) from your later teenage years, 3) from young adulthood, 4) of a challenging experience with a positive outcome (from any time in your life) and, 5) a memory that you feel defines who you are as a person (from any time in your life) (see [Appendix A](#) for the full life story interview). It was introduced as:

Each of the five memories will be included in the Digital Life Story Book that we will be making for you. These should be the memories that you personally feel define most strongly who you are as a person. There are no right or wrong answers – everyone will share different types of memories because each of us has a unique life. You can share any kind of memories that you want – all that matters is that they are your memories and important to your life.

The interview drew from McAdams's Life Story Interview (2008) but was also strongly grounded in six established memory principles identified by the authors as providing optimal conditions for remembering self-relevant, autobiographical events. Participants were asked to recall memories that were (1) *self-defining* (McAdams, 2001; Singer & Blagov, 2004) because these are the most critical to recall in maintaining a sense of self. This core set of memories encapsulate instances when in life the individual most felt themselves (McAdams, 2018); (2) *positive*, as these are more easily recalled over time (Skowronski et al., 2014) and support self-esteem. (3) *vivid and intense as such memories* are most easily recalled and elaborated. Individuals' most meaningful memories are affectively intense and vivid (Singer & Salovey, 1993) and tend to remain vivid, when recalled even decades later (Berntsen & Thomsen, 2005). In addition, the Life Story Books were (4) *multisensory* (e.g., hearing, taste, smell) because these are well remembered and can create a sense of reliving (Sutin & Robins, 2007). (5) Three out of five memories were to be selected within the *reminiscence bump period* (between the ages of 15 and 30) as those are more easily and frequently recalled (Berntsen & Rubin, 2004).

Step 2: Baseline. The Life Story Book Interview. At the first baseline session, participants met with a research assistant online. The research assistant screen-shared Qualtrics from a lab computer guiding them through informed consent, demographics, and Sense of Self Measures. They also completed the Life Story Book Interview sharing the five memories they had decided to include in their Digital Life Story Book. The interview was recorded.

Step 3: Digital life story book creation after the session. After the Life Story Book Interview, participants with memory difficulties provided multi-sensorial materials related to each of the five memories they shared (two digital photos/memory, one song/memory) and a cover photo for their book. If they did not wish to share personal photos, stock photos related to the memory or time period were used. The majority of participants provided personal photos. Research assistants then used these materials to create a multi-sensorial Digital Life Story Book using free digital book creation software (see [Appendix B](#)). Each page had instructions, a clickable audio link for listening to the memory narrative, the related photos, and a link to listen to each song. See example of book pages, Figures B1–B4. Informal caregivers, if available, often helped with collecting and sending music choices and photos for the book. Finally, a huge body of literature has demonstrated the benefit of rehearsal for improving memory (Walker et al., 2009). As such, after their books had been created, 6) participants were asked to *rehearse* the memories in their unique Digital Life Story Book to promote recall.

Step 4. Rehearsing the Digital Life Story Book. Between the baseline and first follow-up sessions, participants with memory difficulties in the DLSB condition were instructed to spend 10–20 min a day reading over and engaging with (i.e., rehearsing) their Digital Life Story Book for 14 days. Each memory in the book contained pre- and post-instructions about how to interact with the memory. Rehearsal included listening to the five recorded memories, looking at photos for each memory, and listening to songs related to each memory. Pre-instructions: *On the next page, you will see your memory of [memory title, e.g., my high school dance]. While you listen to that memory, please try your best to bring this experience to mind as fully and as vividly as you can. You chose this positive memory to be in your Life Story Book because it is important to who you are as a person.* See an example of a pre-instruction page in Figure B2. Post-instructions: *As you keep thinking about your memory [memory title; e.g., my high school dance], please spend a moment reflecting on: How does this memory convey who you truly are? What make this memory particularly positive?* See an example of a post-instruction book page in Figure B4.

Step 5. First follow-up. Two weeks after receiving their Life Story Book, participants completed the same measures given at the baseline session. Participants were asked at the start of the first follow-up session if they had reviewed their book for the past 2 weeks. If they had not, the first follow-up session was rescheduled for 2 weeks later, and they were instructed to review their book during the next 14 days. At the end of the first follow-up session, participants with memory difficulties were instructed not to rehearse their Life Story Book for the next month, before the second follow-up session would occur. Together with the research assistant, participants completed the same sense of self questionnaires as at baseline.

Step 6. Second follow-up. A month after the first follow-up session, measures from the first follow-up session were repeated. Participants also completed the Digital Life Story Book Feedback Questionnaire.

Wait-List Control condition

The Wait-List Control participants also completed a baseline, first follow-up and second follow-up session and completed the same self-report assessments during these meetings as did those in the DLSB Condition. However, they did not complete the Life Story Book Interview nor assessments related to the intervention (i.e., the Self-Memory Experience Questionnaire, the Digital Life Story Book Feedback Questionnaire). After all measures were completed, participants with memory difficulties were asked if they would like a Digital Life Story Book created and provided further instructions for having that done. Of the 23 participants in the Wait-List Control, 20 asked for and received a Digital Life Story Book.

Procedure for informal caregiver participants (proxy reporters)

Informal caregiver participants were emailed a Qualtrics link to the proxy-assessment of the Sense of Self Measures at the same three time points as the person with memory difficulties completed these assessments. They were allowed 2–4 days to complete the questionnaires and given a reminder phone call or e-mail if they were not completed.

Analytic strategy

Aim 1. Participants' evaluation of the DLSB activity was determined based on mean scores on the Digital Life Story Book Feedback Questionnaire.

Aim 2. Sense of self: to examine whether the DLSB intervention contributed to an increase in sense of self, a 2 (condition) $\times$ 3 (time) Repeated Measures MANOVAs was conducted to examine differences between the DLSB condition and the Wait-List Control on the sense of self measures (i.e., self-concept clarity, self-esteem, self-continuity) as completed by the person with memory difficulties. The same

MANOVA was run for the proxy reports given by the informal caregivers on those measures. Finally, participants in the DLSB condition were asked to rate whether their five memories had become more vivid, emotionally and personally significant, and reflective of their most authentic self (i.e., Self-Memory Questionnaire) and Paired Sample T-Tests were conducted to examine change following the intervention.

Results

Aim 1. Participants' subjective evaluation of the DLSB intervention

Participants in the DLSB condition rated engagement with the Life Story Book as highly positive and important in regard to strengthening their sense of self: they experienced that participation in the intervention gave them the feeling of being the same person as always (4.4/5.0), they realized how rich and varied their life has been (4.5/5.0), they experienced increased acceptance and understanding of self (5.0/5.0), and were reminded of the strong bonds they have with loved ones (4.35/5.0). In addition, they were extremely satisfied with having participated in the DLSB condition (4.8/5.0), found the activity important for people with dementia (4.6/5.0), and would recommend the activity to people with dementia (4.7/5.0).

Aim 2. Sense of self

The analysis examining differences between the DLSB and the Wait-List control group on sense of self was non-significant with respect to sense of self in persons with memory difficulties, $F(6,40) = .25$, $p > .05$, $\eta_p^2 = .04$, and also for their informal caregivers' proxy reports, $F(6,22) = 1.46$, $p > .05$, $\eta_p^2 = .29$.

Paired Sample T-Tests showed that participants' memories in the DLSB condition increased in vividness, emotionality, personal significance, and authenticity from before ($M = 4.09$, $SD = .70$) to immediately after finishing the intervention ($M = 4.41$, $SD = .52$), $t(22) = -2.39$, $p < .05$. A non-significant increase was also detected from before the intervention ($M = 4.06$, $SD = .70$) to the final follow-up ($M = 4.23$, $SD = .59$), $t(22) = 1.52$, $p > .05$.

Discussion

The loss of sense of self that can occur in individuals with dementia and other memory difficulties has a large human cost that is increasing as populations age. As autobiographical memory problems are inevitably linked to a declining sense of who one is, reminiscence interventions have been suggested to contribute to prolong a sense of self. To date, however, the effects of these activities are mixed (e.g., Elfrink et al., 2021). In this study, we developed and evaluated a reminiscence intervention (DLSB) grounded in evidence-based autobiographical memory principles and examined its effectiveness on improving sense of self in older adults with memory difficulties. The study succeeded in developing an intervention that was positively evaluated by participants. Participants with memory difficulties also reported a strengthened sense of self in relation to the intervention, engaging with their Digital Life Story Book, itself. Effects for assessments of sense of self from baseline to follow-ups, between conditions, were not obtained by the person with memory difficulties nor the caregiver proxy-reports.

Reminiscence: Digital Life Story Books successfully developed and evaluated

The novel DLSB grounded in evidence-based autobiographical memory principles was successfully developed, implemented, and evaluated systematically. Participants with memory difficulties found the reminiscence intervention meaningful in several ways. Importantly, our findings show that the DLSB stimulated a sense of self-continuity and self-compassion (e.g., *strengthened sense of being the same person as always, experienced increased acceptance and understanding of oneself*). This is congruent with the fundamental ideas of the benefits of life review (Butler, 1963) and the self-continuity functions life stories serve (Bluck & Liao, 2013; McAdams, 2018). Participants were also very satisfied

with having taken part in the intervention, believing it to be a meaningful activity for people suffering from dementia, and having contributed to stimulated social bonding with loved ones. Thus, when listening to the key persons, individuals with memory difficulties, there is no doubt that reminiscence activities are valid and meaningful (see also Elfrink et al., 2017; Westerhof, 2023). The DLSB also contributes with a multi-sensory legacy for the loved ones to keep and to share (e.g., Johnston & Narayanasamy, 2016) and unexplored caregiver effects related to strengthened meaning-making related to vicarious life stories (i.e., the stories we have about other people: Lind & Thomsen, 2018) may exist and should be explored in future studies. Indeed, researchers have struggled with capturing hidden effects of reminiscence interventions, which we will discuss in the following.

Methodological challenges in capturing effects of RT

Intriguingly, the results showed an increased sense of self when measured within the DLSB itself, but the effect was not present when sense of self was assessed across conditions over time in the experimental design. The field has struggled to find optimal, particularly sensitive enough, ways to empirically demonstrate effects of reminiscence that, based on positive participant feedback and professional judgment likely exist (e.g., Rasmussen et al., 2021). Relatedly, researchers have stressed the importance of publishing non-significant findings so that the extent to which reminiscence interventions are being assessed, enjoyed by participants, but not demonstrating statistically significant findings is occurring (Westerhof, 2023). One way of capturing potential changes in sense of self could be to, on the one hand, zoom in on the activity itself and capture effects, while the activity is taking place. For example, some research has shown an increase in number and quality of autobiographical memories while situated within a reminiscence-induced environment (i.e., a museum with cues; Miles et al., 2013). Others have focused on involuntary memories arising spontaneously when watching nostalgia films (Rasmussen et al., 2021). Thomsen et al. (2021) testified an increase in sense of self while engaging in life story writing (Thomsen et al., 2021). Thus, participants could have been asked to rate their sense of self while selecting memories for their book, sending photos and material for book preparations, and while reviewing their book. On the other hand, by zooming out and focus on long-term follow-ups, delayed effects in sense of self might be captured (see also Westerhof, 2023).

Limitations, strengths, and future directions

Several limitations, strengths, and future directions should be acknowledged. That is, the study contributed to the literature with a more systematically evaluated digital, multi-sensory reminiscence intervention developed based on robust, and evidence-based memory principles. However, although extant research consists of several case studies and very small sample sizes, the current study (1) did not have a large sample and it was heterogeneous in regard to cognitive impairment. Future studies should aim at recruiting a larger, and more homogeneous sample (also a larger sample of informal proxy-reporters). Despite the virtual and easily accessible format, recruitment was particularly difficult due to the ongoing COVID-19 pandemic. (2) proxy caregivers did not always live with the participant so may have had difficulty visiting them often during the pandemic, affecting their ratings of their loved ones' changes in sense of self. (3) we were not able to check how often participants reviewed their books. If participants did not review their books adequately, this might help explain the non-significant findings outside the activity, which should be systematically controlled for in future studies. In addition, the instructions to not review the book between the two follow-ups could potentially have hindered some cumulative effect over time and future studies should take this into account, as well as allowing more memories than just five. While the findings emphasize the reminiscence interventions' potentials for strengthening sense of self, of interest to politicians interested in creating policies for healthy aging, the findings also highlight the many hindrances that still exist in developing measurement sensitivity to capture these benefits.

Conclusion

Coming back to the opening quote, reminiscence interventions may serve as a bridge to the self in people with dementia or memory difficulties. We developed a remote, multisensory intervention (i.e., Digital Life Story Books; DLSB) based on evidence-based memory principles. While the activity was successfully developed and evaluated positively the ‘bridge’ to the self only increased significantly when related directly to the activity itself where between-conditions effects were not detected. The study sheds light on the ongoing challenges in identifying *what* elements are changeable in reminiscence activities and *how* to capture this change adequately.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

The Independent Research Fund Denmark [no: 8023-00029B].

ORCID

Majse Lind  <http://orcid.org/0000-0001-5837-8389>

References

- Berntsen, D., Kirk, M., & Kopelman, M. D. (2022). Autobiographical memory loss in Alzheimer’s disease: The role of the reminiscence bump. *Cortex: A Journal Devoted to the Study of the Nervous System and Behavior*, 150, 137–148. <https://doi.org/10.1016/j.cortex.2022.02.008>
- Berntsen, D., & Rubin, D. C. (2004). Cultural life scripts structure recall from autobiographical memory. *Memory & Cognition*, 32(3), 427–442. <https://doi.org/10.3758/BF03195836>
- Berntsen, D., & Thomsen, D. K. (2005). Personal memories for remote historical events: Accuracy and clarity of flashbulb memories related to World War II. *Journal of Experimental Psychology General*, 134(2), 242–257. <https://doi.org/10.1037/0096-3445.134.2.242>
- Bluck, S., & Levine, L. J. (1998). Reminiscence as autobiographical memory: A catalyst for reminiscence theory development. *Ageing and Society*, 18(2), 185–208. <https://doi.org/10.1017/S0144686X98006862>
- Bluck, S., & Liao, H. W. (2013). I was therefore I am: Creating self-continuity through remembering our personal past. *The International Journal of Reminiscence and Life Review*, 1(1), 7–12.
- Brandt, J., Spencer, M., & Folstein, M. (1988). *Telephone Interview for Cognitive Status (TICS)* [Database record]. APA PsycTests. <https://doi.org/10.1037/t28542-000>
- Bruvik, F. K., Ulstein, I. D., Ranhoff, A. H., & Engedal, K. (2012). The quality of life of people with dementia and their family carers. *Dementia and Geriatric Cognitive Disorders*, 34(1), 7–14. <https://doi.org/10.1159/000341584>
- Butler, R. N. (1963). The life review: An interpretation of reminiscence in the aged. *Psychiatry*, 26(1), 65–76. <https://doi.org/10.1080/00332747.1963.11023339>
- Campbell, J. D., Trapnell, P. D., Heine, S. J., Katz, I. M., Lavallee, L. F., & Lehman, D. R. (1996). Self-concept clarity: Measurement, personality correlates, and cultural boundaries. *Journal of Personality & Social Psychology*, 70(1), 141. <https://doi.org/10.1037/0022-3514.70.1.141>
- Conway, M. A., & Pleydell-Pearce, C. W. (2000). The construction of autobiographical memories in the self-memory system. *Psychological Review*, 107(2), 261. <https://doi.org/10.1037/0033-295X.107.2.261>
- Cotelli, M., Manenti, R., & Zanetti, O. (2012). Reminiscence therapy in dementia: A review. *Maturitas*, 72(3), 203–205. <https://doi.org/10.1016/j.maturitas.2012.04.008>
- Elfrink, T. R., Ullrich, C., Kunz, M., Zuidema, S. U., Westerhof, G. J., & Dey, A. (2021). The Online Life Story Book: A randomized controlled trial on the effects of a digital reminiscence intervention for people with (very) mild dementia and their informal caregivers. *PLOS ONE*, 16(9), e0256251. <https://doi.org/10.1371/journal.pone.0256251>
- Elfrink, T. R., Zuidema, S. U., Kunz, M., & Westerhof, G. J. (2018). Life story books for people with dementia: A systematic review. *International Psychogeriatrics*, 30(12), 1797–1811.

- Elfrink, T. R., Zuidema, S. U., Miriam Kunz, M., & Westerhof, G. J. (2017). The effectiveness of creating an online life story book on persons with early dementia and their informal caregivers: A protocol of a randomized controlled trial. *BMC Geriatrics*, 17(1), 1–11. <https://doi.org/10.1186/s12877-017-0471-y>
- Erikson, E. H. (1959). *Identity and the life cycle*. W. W. Norton.
- Ferri, C. P., Prince, M., Brayne, C., Brodaty, H., Fratiglioni, L., Ganguli, M., Hall, K., Hasegawa, K., Hendrie, H., Huang, Y., Jorm, A., & Scazufca, M. (2005). Global prevalence of dementia: A delphi consensus study. *Lancet*, 366 (9503), 2112–2117. [https://doi.org/10.1016/S0140-6736\(05\)67889-0](https://doi.org/10.1016/S0140-6736(05)67889-0)
- Johnston, B., & Narayanasamy, M. (2016). Exploring psychosocial interventions for people with dementia that enhance personhood and relate to legacy-an integrative review. *BMC Geriatrics*, 16(1), 1–25. <https://doi.org/10.1186/s12877-016-0250-1>
- Kiernat, J. M. (1979). The use of life review activity with confused nursing home residents. *The American Journal of Occupational Therapy: Official Publication of the American Occupational Therapy Association*, 33(5), 306–310.
- Lind, M., & Thomsen, D. K. (2018). Functions of personal and vicarious life stories: Identity and empathy. *Memory*, 26 (5), 672–682. <https://doi.org/10.1080/09658211.2017.1395054>
- McAdams, D. P. (2001). The psychology of life stories. *Review of General Psychology*, 5(2), 100–122.
- McAdams, D. P. (2008). The life story interview.
- McAdams, D. P. (2018). Narrative identity: What is it? What does it do? How do you measure it? *Imagination, Cognition and Personality*, 37(3), 359–372. <https://doi.org/10.1177/0276236618756704>
- Miles, A. N., Fischer-Mogensen, L., Nielsen, N. H., Hermansen, S., & Berntsen, D. (2013). Turning back the hands of time: Autobiographical memories in dementia cued by a museum setting. *Consciousness and Cognition*, 22(3), 1074–1081. <https://doi.org/10.1016/j.concog.2013.07.008>
- Morris, R. G., & Kopelman, M. D. (1986). The memory deficits in Alzheimer-type dementia: A review. *The Quarterly Journal of Experimental Psychology Section A*, 38(4), 575–602. <https://doi.org/10.1080/14640748608401615>
- Moss, I., & Björn, A. (2006). Use of the life story in the institutional care of people with dementia: A review of intervention studies. *Ageing and Society*, 26(3), 431–454.
- Norris, A. (1986). *Reminiscence with elderly people*. Winslow.
- Park, K., Lee, S., Yang, J., Song, T., & Hong, G. R. S. (2019). A systematic review and meta-analysis on the effect of reminiscence therapy for people with dementia. *International Psychogeriatrics*, 31(11), 1581–1597. <https://doi.org/10.1017/S1041610218002168>
- Pillemer, D. B. (1998). *Momentous events, vivid memories*. Harvard University Press.
- Rasmussen, K. W., Salgado, S., Daustrand, M., & Berntsen, D. (2021). Using nostalgia films to stimulate spontaneous autobiographical remembering in Alzheimer's disease. *Journal of Applied Research in Memory and Cognition*, 10(3), 400–411. <https://doi.org/10.1016/j.jarmac.2020.11.001>
- Rosenberg, M. (1965). Rosenberg self-esteem scale (RSE). *Acceptance and commitment therapy. Measures Package*, 61 (52), 18.
- Sedikides, C., Wildschut, T., Routledge, C., & Arndt, J. (2015). Nostalgia counteracts self-discontinuity and restores self-continuity. *European Journal of Social Psychology*, 45(1), 52–61.
- Singer, J. A., & Blagov, P. (2004). The integrative function of narrative processing: Autobiographical memory, self-defining memories, and the life story of identity. In D. R. Beike, J. M. Lampinen, & D. A. Behrend (Eds.), *The self and memory; the self and memory* (pp. 117–138, Chapter x, 268 Pages). Psychology Press.
- Singer, J. A., & Salovey, P. (1993). *The remembered self: Emotion and memory in personality*. Free Press.
- Skowronski, J. J., Walker, W. R., Henderson, D. X., & Bond, G. D. (2014). The fading affect bias: Its history, its implications, and its future. In J. M. Olson & M. P. Zanna (Eds.), *Advances in experimental social psychology* (Vol. 49, pp. 163–218). Academic Press.
- Subramaniam, P., & Woods, B. (2012). The impact of individual reminiscence therapy for people with dementia: Systematic review. *Expert Review of Neurotherapeutics*, 12(5), 545–555. <https://doi.org/10.1586/ern.12.35>
- Sutin, A. R., & Robins, R. W. (2007). Phenomenology of autobiographical memories: The memory experiences questionnaire. *Memory*, 15(4), 390–411. <https://doi.org/10.1080/09658210701256654>
- Thomsen, D. K., Pfattheicher, S., & Dunlop, W. L. (2021). Authoring esteem: writing about vicarious and personal life story chapters boosts state self-esteem. *Personality Science*, 2, 1–24. <https://doi.org/10.5964/ps.7017>
- United Nations, Department of Economic and Social Affairs, Population Division. (2017). *World population ageing 2017 (ST/ESA/SER.A/408)*.
- Walker, W. R., Skowronski, J. J., Gibbons, J. A., Vogl, R. J., & Ritchie, T. D. (2009). Why people rehearse their memories: Frequency of use and relations to the intensity of emotions associated with autobiographical memories. *Memory*, 17 (7), 760–773. <https://doi.org/10.1080/09658210903107846>
- Ward, J. (2015). What happens to the 'self' in dementia: Implications for the health care system? *Annals of Gerontology and Geriatric Research*, 2, 1–5.
- Westerhof, G. J. (2023). How to make narrative interventions work. *Narrative Works*, 11, 87–112. <https://doi.org/10.7202/1108956ar>
- Woods, B., O'Philbin, L., Farrell, E. M., Spector, A. E., & Orrell, M. (2018). Reminiscence therapy for dementia. *Cochrane Database of Systematic Reviews*, 2018(3), Article CD001120. <https://doi.org/10.1002/14651858.CD001120.pub3>

Woods, B., Spector, A. E., Jones, C. A., Orrell, M., & Davies, S. P. (2005). Reminiscence therapy for dementia. *Cochrane Database of Systematic Reviews*. <https://doi.org/10.1002/14651858.CD001120.pub2>

World Medical Association. (2023). *WMA declaration of Helsinki - ethical principles for medical research involving human subjects*.

Appendices

Appendix. A

Life Story Book Interview

For this part, I would like you to tell me about five of your most powerful and positive memories. Each of the five memories will be included in the Digital Life Story Book that we will be making for you. These should be the memories that you personally feel define, most strongly, who you are as a person. There are no right or wrong answers – everyone will share different types of memories because each of us has a unique life. You can share any kind of memories that you want – all that matters is that they are your memories and important to your life.

We will begin with a few memories from your younger days.

Memory 1. For the first one, I would like you to take a few minutes to remember an experience from when you were a young teenager that you feel conveys the “real you.” That means, a memory that represents, most clearly, who you are as a person. I would like you to think about a memory that stands out as positive for you and expresses who you truly are. Please bring that memory as vividly to mind as you can and describe it as richly as you can to me. For example, you might include when the event happened, who was involved, but also the sights and sounds, smell, taste and touch that were part of this experience?

Memory 2. I would now like you to take a few minutes to remember an experience from late teens, like when you were 16 or older, that you feel conveys the “real you.” That means, a memory that helps you define, most clearly, who you are as a person. I would like you to think about a memory that stands out as especially positive for you and expresses who you truly are. Please describe the memory as vividly and richly as you can. For example, when did the event happen as well as the sights and sounds, smell or taste and touch that might have been part of this experience?

Memory 3. For the next one, I would like you to take a few minutes to remember an experience from your young adulthood that you feel conveys the “real you.” That means, a memory that help you define, most clearly, who you are as a person. I would like you to think about a memory that stands out as especially positive for you and expresses who you truly are. Please describe the memory as vividly and richly as you can. For example, when did the event happen as well as the sights and sounds, smell or taste and touch that might have been part of this experience?

You’ve been going through positive memories from your life so far. Now I’d like to move on and ask you to think about one challenging experience in your life. This means experiences that lasted moment, hours or up to one day but not longer than that. An example could be deciding to get a divorce.

Memory 4. Memories from our past can also encompass challenging experiences and some challenging experiences allow the “real you” to shine through. In everyone’s life, there are some experiences which stand out because they are initially challenging but then allow us to learn, grow, and change for the better and thereby shape who we become as persons. Many people have these types of experiences in their lives, though the type of challenges that arise and the benefits experienced differ from one person to another. I would like you to take a few minutes to remember, and then recall, a challenge from your life that you feel you conveys, most clearly, who you are as a person. Please describe the memory as vividly and richly as you can. For example, when did this challenge happen and what were you thinking and feeling when it occurred? How did you rise above this experience and what benefits did you experience?

Memory 5. Now, I would like you to take a few minutes to remember an experience from any point in your life that you feel conveys the “real you.” That means, a memory that helps you define, most clearly, who you are as a person. I would like you to think about a memory that stands out as especially positive for you and expresses who you truly are. Please describe the memory as vividly and richly as you can. For example, when did the event happen as well as the sights and sounds, smell or taste and touch that might have been part of this experience?

Thank you. I look forward to meeting with you and hearing your memoirs. We will be making your Digital Life Story Book based on the memories you tell us.

We will also be asking you to give us some names of music that you have liked across your lifetime, please start thinking about some of your favorite music from the time of each of these five memories. That is, when you were: 1) in your early teens, 2) in your late teens, 3) a young adult, 4) going through the challenging event, 5) in the fifth memory.

Appendix. B

Digital Life Story Book Example

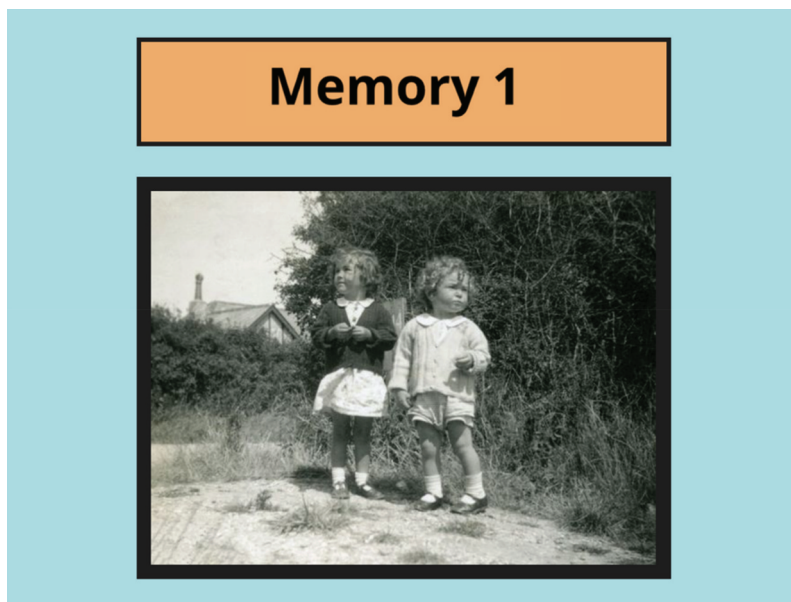


Figure B1. Life story book front page.

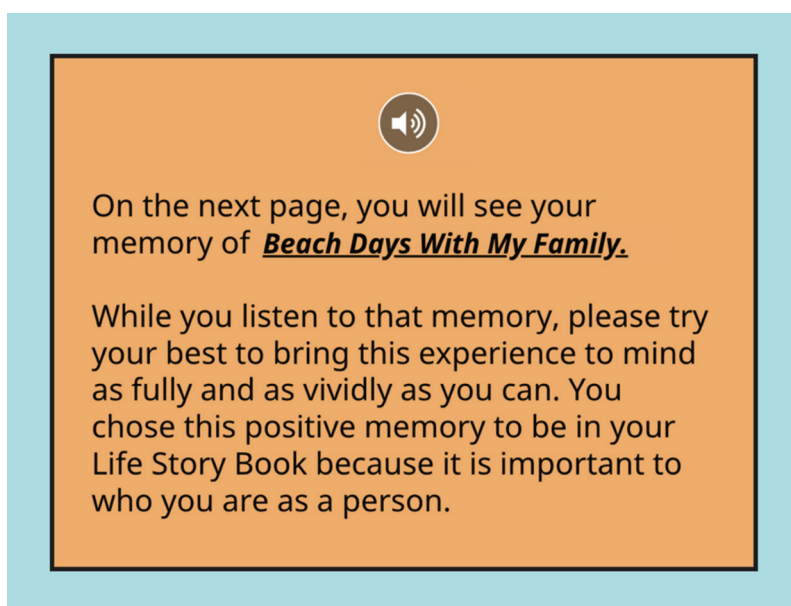


Figure B2. Life story book pre-memory instructions.



Figure B3. Life story book main memory page.

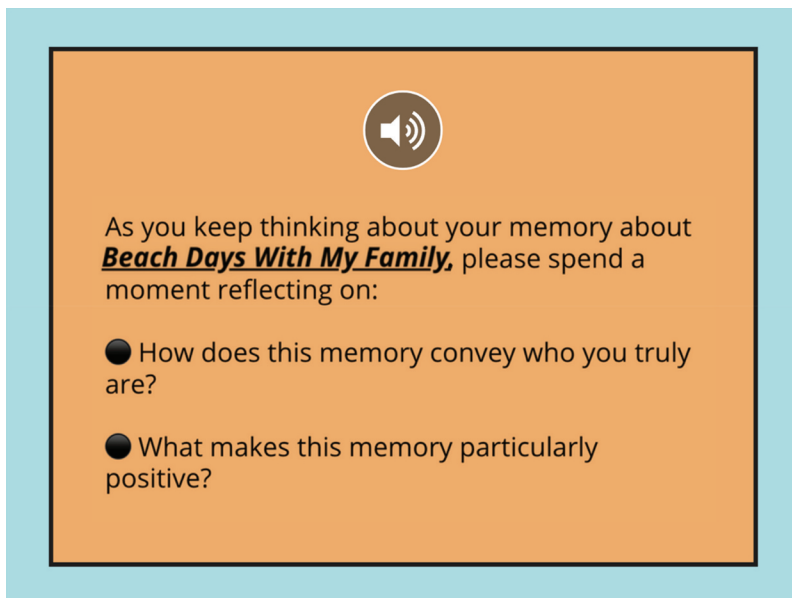


Figure B4. Life story book post-memory instructions.