Archives of Gerontology and Geriatrics Plus 2 (2025) 100199

Contents lists available at ScienceDirect

Archives of Gerontology and Geriatrics Plus

journal homepage: www.sciencedirect.com/journal/archives-of-gerontology-and-geriatrics-plus

Archives and Health program for dementia: A pilot study of a non-pharmacological creative arts-based intervention protocol

Sara Uboldi [a], Lorenza Iannacci [b], Vanda Menon [c], Alessandro Bortolotti [a], Giulia Candeloro [a], Alessandro Crociata [d], Valeria Pica [a], Angelo Romagnoli [e], Maria Tartari [f], Andrea Fabbo [g], Alessandra Marasco [f], Pier Luigi Sacco [a,h,*]

[a] Department of Neurosciences, Imaging and Clinical Studies, University of Chieti-Pescara
[b] State Archive of Modena
[c] Center for Cognitive Impairments and Dementia, AUSL Modena, Department of Carpi
[d] Department of Socio-Economic, Management and Statistical Studies, University of Chieti-Pescara
[e] School of Arts, University of Kent
[f] Institute of Heritage Sciences (ISPC), National Research Council, Naples
[g] Ausl Asti
[h] metaLAB (at) Harvard, Cambridge MA

ARTICLE INFO

Keywords:
Dementia
Alzheimer's disease
Reminiscence therapy
Cultural interventions
Archives
Social prescribing
Non-pharmacological interventions
Mixed-methods research

ABSTRACT

Introduction: The global rise in dementia prevalence necessitates innovative non-pharmacological interventions to enhance cognitive function and the quality of life of affected individuals. This pilot study evaluates the "Archives and Health" program, a creative arts-based initiative that uses archival materials to facilitate reminiscence therapy for individuals with dementia.

Methods: This mixed-methods study involved a total of 50 participants (aged 65-94), divided into three different activities, with varying levels of cognitive impairment, recruited from different care settings. The program featured three interventions: "Memory Box," "My Memory Box," and the "Pre-Texts Protocol," incorporating music to enhance personal engagement. Quantitative emotional well-being was assessed using the RADAR toolkit, while qualitative insights were derived from focus groups, interviews, and ethnographic observations

Results: The "My Memory Box" intervention led to a significant decrease in negative affect (Mean pre = 8.73, Mean post = 7.00, p = 0.007) without altering positive affect. Conversely, the "Pre-Texts Protocol" exhibited consistent increases in positive affect across sessions (p-values ranging from 0.0001 to 0.0023). Qualitative analyses indicated that the program effectively activated autobiographical memories, improved social interactions, and fostered emotional resonance through multisensory engagement, particularly via music. Participants expressed enhanced social connectivity and personal relevance during activities.

The results should be considered preliminary also in light of the mixed qualitative design evaluation, specifically chosen and studied by the researchers as a methodological reflection on the development of mixed qualitative methodologies.

Discussion: The "Archives and Health" program demonstrated potential in improving emotional and social well-being among individuals with dementia. Its ability to evoke positive emotional responses and decrease negative states indicates the utility of archival materials and creative engagement in therapeutic contexts. Future studies with larger samples are necessary to confirm these findings and explore their clinical implications more robustly.

1. Introduction and theoretical background

The global prevalence of dementia represents one of the most pressing public health challenges of the 21st century. With an estimated 55.2 million people living with dementia worldwide and projections suggesting this number could rise to 152 million by 2050 (World Health Organization, 2021), and with an estimated social cost of USD 1.3 trillion in 2019 (Wimo et al, 2023) expected to soar to USD 9.12 trillion by

* Corresponding author at: Department of Neurosciences, Imaging and Clinical Sciences, University of Chieti-Pescara, via Luigi Polacchi, 11, 66100 Chieti, Italy
E-mail addresses: pierluigi.sacco@unich.it, pierluigi_sacco@fas.harvard.edu (P.L. Sacco).

https://doi.org/10.1016/j.aggp.2025.100199
Received 26 April 2025; Received in revised form 1 August 2025; Accepted 10 August 2025
Available online 13 August 2025

2050 (Jia et al, 2018), there is an urgent need for innovative, effective, and scalable interventions. While pharmacological treatments continue to be developed and refined, increasing attention is being paid to non-pharmacological approaches that can enhance quality of life, support cognitive function, and alleviate the burden on caregivers and healthcare systems, including the caregivers' burden from challenging behaviors associated with dementia patients (Leontjevas et al, 2024; Sánchez et al., 2013). Among these non-pharmacological interventions, Reminiscence Therapy (RT) has emerged as a promising approach. RT involves the discussion of past activities, events, and experiences with another person or group of people, usually with the aid of tangible prompts such as photographs, household and other familiar items from the past, music and sound recordings (Rao et al., 2021; Woods et al., 2018). The theoretical underpinnings of RT are rooted in the work of Butler (1963), who proposed that reminiscence is a naturally occurring process in aging that can promote psychological well-being.

Recent studies have shown that the brain regions more closely related to autobiographical memory, which are often relatively preserved in early to moderate stages of dementia, can be activated through reminiscence activities (Kirk & Berntsen, 2018). Furthermore, the multimodal nature of many RT interventions aligns with our growing understanding of the brain's plasticity and the potential for environmental enrichment to support cognitive function in aging and neurodegenerative conditions (Merzenich et al., 2014).

Concurrently, there has been a growing recognition of the potential role of cultural institutions in supporting public health initiatives. The concept of "social prescribing," which involves referring patients to non-medical, community-based services, has gained traction in several countries (Chatterjee et al., 2018). Within this framework, museums, archives, and other cultural heritage institutions are increasingly being considered valuable resources for health and well-being interventions as a specific branch of social prescribing, that is, a form of cultural prescription. Archives, in particular, are systematic collections of records, documents, or materials preserved for their historical, cultural, legal, or informational value. They serve as organized repositories that safeguard the memory of societies, institutions, or individuals, enabling access to evidence of the past for research, education, and reference (Featherstone, 2006). Therefore, archives may play a particularly prominent role in non-pharmacological cultural prescription interventions based on RT.

The intersection of these trends – the need for effective non-pharmacological interventions for dementia, the promise of RT, advances in neuroscientific understanding, and the potential of cultural institutions in health promotion – forms the backdrop for the present study. This paper introduces and evaluates the "Archives and Health" program, an innovative cultural prescription initiative developed in Italy that leverages archival materials as triggers for reminiscence therapy in individuals with dementia. The "Archives and Health" program represents a unique collaboration between the State Archive of Modena, the Center for Cognitive Disorders and Dementia of Modena and Carpi, and the Department of Neuroscience, Imaging and Clinical Studies of the University of Chieti-Pescara. By making use of historical documents and artifacts as stimuli for reminiscence and creative expression, this program aims to support cognitive function, enhance emotional well-being, and foster social engagement among individuals with dementia.

Dementia is a chronic degenerative disorder characterized by the progressive deterioration of cognitive functions, behavioral disturbances, and functional impairment, leading to varying degrees of disability and loss of autonomy. While the predominant diagnostic perspective emphasizes cognitive impairment as a key feature of dementia (Schwertner et al., 2022), recent studies have also highlighted significant implications for psychological and behavioral outcomes, quality of life, and increased caregiver burden (Okabe et al., 2020). Neuropsychiatric symptoms of dementia (BPSD) encompass alterations in behavior, perception, thought content, and mood disturbances (Cerejeira et al., 2012). These symptoms are frequently observed in Alzheimer's disease (AD), vascular dementia (VaD), dementia with Lewy bodies (DLB), Parkinson's disease dementia (PDD), and frontotemporal dementia (FTD) (Srikanth et al., 2005), among others. Quality of life has been identified as a central goal in dementia care, and in recent years there has been increased interest in non-pharmacological interventions to support well-being and life satisfaction (Johnson & Narayanasamy, 2016; Logsdon et al., 2007).

Numerous studies have explored the critical role of the physical environment in promoting habitual activity in people with dementia (Chaudhury et al., 2018; Chen et al., 2023) and in the relationship between place of residence and symptom manifestation (Woodbridge et al., 2018). For instance, research suggests that physical settings have an influence on the prevalence of symptoms belonging to the hyperactivity spectrum (irritability, aberrant motor behavior, euphoria) and appetite disturbances (Zhao et al., 2016). Art-based interventions are considered effective in dementia treatment as tools to support communication (Hendriks et al., 2019), improve emotional well-being and quality of life (Schall et al., 2018), reduce perceived challenging behaviors associated with dementia (Van der Steen, 2017; Waller, 2002), retain skills (Graham & Fabricius, 2018), and encourage the process of reminiscence, leading to improvements in self-esteem, concentration, and memory (Rabin et al., 2010; Seifert et al., 2017). A comparative review of the efficacy of art therapies in patients with dementia (Liu et al., 2023) suggests that reminiscence therapy significantly improves cognitive function compared to usual care, with stronger impacts than music therapy.

Reminiscence Therapy (RT) (Butler, 1963) is a therapeutic resource that essentially involves receptiveness and empathy in listening to the past experiences and memories of elderly patients (Tadaka & Kanagawa, 2004, 2007). It is a non-pharmacological treatment for dementia based on evoking memory by means of cultural artifacts or objects. Among multisensory prompts such as the objects or artifacts, also photographs, music, knitting patterns, smells, and tastes have been used (Kasl-Godley & Gatz, 2000; Lin et al., 2003). Gibson (1994) distinguishes between "general" and "specific" reminiscence, with the latter selecting "memory triggers" carefully chosen to reflect the detailed life history of the person. RT has been widely adopted since the 1980s (Cammisuli et al., 2016), and its theoretical model has been extensively discussed (Webster et al., 2010). It is today generally included in the list of non-pharmacological therapies of common use in dementia care (Moreno, 2025).

For AD patients, recalling still-accessible memories can lead to the re-enactment of positive experiences and to establishing social interactions with others. In particular, the concept of "reminiscence bump" (Rubin et al., 1986; Munawar et al, 2018) explains the tendency for patients to access memories more easily from childhood until about age 30 (Koppel & Rubin, 2016; Scherman, 2013). RT has been shown to affect the psychological well-being of elderly individuals suffering from post-traumatic stress disorder, depression, and anxiety (Bayram, 2024; Pérez-Sáez et al., 2022; Gramaglia et al., 2021; Chen et al., 2021; Park et al., 2019). Systematic reviews indicate that RT has positive effects in the areas of cognition, quality of life, communication, and mood for individuals with dementia, although there is still a lack of high-quality, high-powered studies (Woods et al., 2018; Subramaniam & Woods, 2012; Khait et al., 2021).

Reminiscence practice has effects that are comparable to some extent to drugs and psychosocial approaches, proving particularly useful for elderly people with depressed mood (Bohlmeijer et al., 2003; Pinquart, 2024; Romaniuk and Romaniuk, 1981), in the prevention of depression in the elderly (Pot et al., 2010), as well as in improving elderly life satisfaction and quality of life (QoL) (Bohlmeijer et al., 2007). Effects are also specifically observed in depressed elderly people in long-term care settings (Zhang et al., 2015). Recent fMRI data (Viard et al, 2024) indicate the effect that RT has on the Autobiographical Memory Network (AMN) (Svoboda, 2006). After RT sessions, an increase in activation of the right posterior hippocampus (critical for memory

consolidation) has been recorded, consistent with the multiple trace theory (Nadel & Moscovitch, 1997), suggesting that the therapy strengthens mnemonic traces and improves recall. RT has been found to be more effective when conducted in group settings over individualized therapy for its socialization benefits (Mikkelsen et al., 2019; Haslam et al., 2010). A systematic review of randomized controlled trials (Woods et al., 2018) notes that the wide range of RT interventions makes it difficult to compare studies and assess their relative benefits. However, the authors conclude by identifying some positive effects of RT on people with dementia in the domains of QoL, cognition, communication, and mood. Both music therapy and RT are currently used to enhance aspects of well-being in elderly people (Engelbrecht et al., 2024) and people living with dementia, as alternatives to pharmacological treatments. There is growing evidence that combining these therapies in a targeted way would provide unique well-being outcomes for this population, particularly in terms of mental well-being.

Our study is not hypothesis-based but is a pilot exploration to respond to some research questions that are especially relevant for arts-based interventions in dementia care, and which consequentially arise from the review of the current state of the art presented in this section: i) What are the specific impacts of the three cultural interventions implemented within the "Archives and Health" program (“Memory Box”, “My Memory Box” and “Pre-texts Protocol”)? ii) How do such interventions influence various dimensions of the program goals, particularly in fostering community engagement, emotional resonance, and cultural participation? iii) How do the outcomes differ in terms of specific impacts on the holistic well-being of older adults with dementia? iv) What are the observable variations across physical, emotional, cognitive, and social dimensions of well-being? v) Moreover, what role does the integrated musical activity play in the cultural and creative interventions proposed by the "Archives and Health" program? vi) How does the use of music enhance or complement other elements of the interventions? vii) To what extent does the musical activity contribute to participants’ emotional engagement, memory recall, or social interaction?

This pilot study employs a mixed-methods approach to evaluate the efficacy of the "Archives and Health" program, combining quantitative measures of emotional well-being with in-depth qualitative analysis of participant experiences. Through this comprehensive assessment, we aim to contribute to the growing body of evidence on non-pharmacological interventions for dementia and to explore the potential of cultural heritage as a resource for health and well-being.

The findings of this study have implications not only for the care and support of individuals with dementia but also for the broader fields of public health, cultural policy, and neuroscience. By bridging the gap between cultural institutions and healthcare, and by grounding creative interventions in neuroscientific principles, the "Archives and Health" program offers a model for innovative, interdisciplinary approaches to address the complex challenges posed by dementia in the 21st century.

The "Archives and Health" program is grounded in neuroscientific evidence demonstrating the brain’s plasticity even in aging and dementia. While aging and conditions such as AD involve brain volume loss, synaptic decline, and neuropathological changes (Fjell et al., 2014; Selkoe & Hardy, 2016), research shows that non-pharmacological interventions can activate preserved cognitive and emotional circuits (Merzenich et al., 2014).

A key rationale for RT lies in the relative preservation of autobiographical memory, particularly remote memories, in early to moderate stages of dementia (Müller et al., 2013; Gilboa et al., 2005). These memories activate a distributed brain network that remains partially functional (Svoboda et al., 2006), offering an accessible pathway to engage patients in meaningful cognitive activity.

The multisensory nature of the program (visual, tactile, auditory) leverages multimodal stimulation, which enhances memory recall by engaging extensive neural networks and supports compensatory mechanisms across sensory and cognitive domains (Sepulcre et al., 2012; Hsieh et al., 2024). Similarly, emotional memory, supported by relatively spared brain regions such as the amygdala, can be effectively engaged through emotionally meaningful content, enhancing mood and recall (Klein-Koerkamp et al., 2012; Woods et al., 2018).

The inclusion of music is supported by findings that musical memory often persists even in advanced dementia, thanks to preserved regions like the supplementary motor area and anterior cingulate (Jacobsen et al., 2015). Music also enhances attention, executive function, and emotional regulation through mechanisms such as dopaminergic activation and neural synchronization (Chanda & Levitin, 2013; Särkämö et al., 2014).

Finally, the program’s emphasis on social engagement contributes to building cognitive reserve, a protective factor against cognitive decline. Group-based reminiscence activates brain regions involved in social cognition, potentially stimulating neuroplasticity and supporting emotional well-being (Stern, 2012; Adolphs, 2009).

Together, these neuroscientific insights provide a robust foundation for the therapeutic value of RT and culturally informed interventions for elderly individuals with cognitive impairment.

2. Materials and methods

The "Archives and Health" prescription program includes three distinct activities, each tailored to address the unique needs of individuals with varying degrees of cognitive impairment. It started with a first co-design phase in 2020, followed by the Memory Box toolkit experimentation in 2021, The My Memory Box toolkit followed in 2022-2023, and the Pre-texts Protocol in 2024. The program is currently ongoing and includes training for geriatricians and occupational therapists on social prescription and the use of cultural and creative resources in clinical practice topics.

In this pilot experimentation, the intervention was implemented across nine diverse care settings, including hospitals, residential care centers, day centers, and home environments. The target population consisted of 50 elderly individuals with cognitive disorders ranging from Mild Cognitive Impairment (MCI) to severe dementia. The participant, aged 65-94, were directed to the cultural program through the prescription of geriatricians. Inclusion criteria (being able to give informed consent) and exclusion criteria (inability to function in a group situation; inability to take part in interviews, and to complete questionnaires, even with the mediation of the geriatrician or caregiver in compiling the questionnaires) were applied. The prescription program included 3 activities, which are described in more detail as follows. The readers who are interested in the details of the technical implementation of the interventions are invited to contact the authors directly.

a) The Memory Box Toolkit (MB) is a collection of meaningful items designed to stimulate memories, evoke positive emotions, and provide comfort for individuals living with dementia (Galbraith et al., 2008). This therapeutic tool is rooted in RT and includes reproductions of archive documents (images, maps, historical documents, etc.), materials and objects for conducting creative exercises (which have been developed starting from the Manchester Cultural First Aid Protocol), as well as a toolkit of self-assessment of perceived emotional well-being (based on the PANAS Scales; Watson et al., 1988). Items are carefully selected to stimulate multiple senses and encourage engagement, fostering moments of joy, recognition, and clarity. In RT, Memory Boxes help reduce anxiety, improve communication, and preserve a sense of identity for dementia patients. They also strengthen bonds between caregivers and loved ones by facilitating meaningful interactions. Regular updates ensure the box remains relevant and effective. Ultimately, these collections enhance emotional well-being while supporting person-centered dementia care. The MB toolkit sessions were held in one hospital, 7 residential care centers, and 2 daycare centers or domestic settings. The population sample was 24 elderly people with cognitive

disorders of varying entities: Mild cognitive impairment (MCI), low, or medium-high dementia levels.

b) The My Memory Box Toolkit (MMB) is a development of the previous one and is based on the same premises (RT and Manchester Cultural First Aid Protocol), to which it adds activities of construction and creative customization of the box, as well as music elements, thoughtfully integrated to complement and enhance the creative activities, with selections carefully chosen to resonate with both the nature of each activity and the personal memories they evoked in patients. In this case, the tool for self-assessment of emotional well-being and sense of connection through creativity is RADAR (see below). The MMB sessions were carried out in two settings: inside the State Archives of Modena with citizens, and inside a residential care center for elderly people with dementia at different levels, with a population sample of 10 with analogous characteristics.

c) Pre-Texts (https://pre-texts.org) is an innovative protocol designed to promote a variety of flourishing-related goals such as critical thinking, literacy, creativity, well-being, and civic engagement among others, by integrating arts into learning (Sommer, 2021). Grounded in a flexible five-step methodology, it begins with participants listening to a text read aloud while engaging in an art-making activity to foster focus and creativity. Next, participants interrogate the text by asking questions, sparking critical inquiry and diverse interpretations. The group then collaboratively engages in artistic co-creation, exercising and developing their creative skills in non-competitive, non-judgmental ways. Creative expression follows, using the text as inspiration for various art forms such as drama, comics, or fashion, to deepen understanding while embracing cultural diversity and local traditions. In the application of the protocol within the Archives and Health program, musical elements were thoughtfully integrated to complement and enhance the creative activities, with selections carefully chosen to resonate with both the nature of each activity and the personal memories they evoked in patients. After each creative activity, a closing collective round of thoughts where every participant shares their views sparks a meta-cognitive reflection on the activity just made, while the final step invites participants to explore tangential connections, by freely associating the experience of the whole session to personal thoughts, ideas, or recollections as documented in a personal drawing or text, a personal object, etcetera. Through this process, Pre-Texts nurtures creative and interpretive skills, self-confidence and sense of agency, and community engagement for diverse audiences, including, among others, youth, ESL learners, seniors, and intergenerational groups. The “Pre-texts” protocol was carried out in a residential center, with a population sample of 16 elderly people with cognitive disorder and their caregivers.

Finally, the RADAR instrument is an intuitive and accessible tool designed to evaluate the emotional impact and sense of connection individuals experience through cultural and creative activities (Uboldi & Marasco, 2023). It enables participants to reflect on their emotional states and their perceived connection with art and cultural heritage, both before and after an experience. The toolkit includes measures for assessing positive and negative emotions through self-evaluation, as well as personal sense of connection to art and heritage. Participants use visual scales to rate their feelings, with intensity ranging from “not at all” to “very much” for emotional states, and levels of connection spanning from “not at all connected” to “completely connected.” RADAR is easy to fill out and can be used independently by participants or with the support of a facilitator, offering a simple way to capture reflections on cultural experiences that is user-friendly also for suitably assisted young children or for seniors with cognitive impairment issues. In addition to fostering awareness among participants about the changes they experience, the data collected through the toolkit can support cultural professionals, educators, and healthcare practitioners in evaluating the broader impact of creative and cultural activities. When in use, the RADAR instrument was administered pre- and post-session. In addition to quantitative measures, participants, and chaperones, where present, took part in in-depth interviews. Researchers also used field diaries and recordings for the qualitative analysis.

The research design is informed by the co-design approach adopted in the study, which involves the participation of different actors in line with the social prescription model. Specifically, the interventions were identified and co-created with the cultural operators, the patients and their caregivers, health and assistance operators in the context of a human-centered approach that informed all the stages of the research. This is also reflected in the selection of participants that includes patients involved from the beginning of the research as co-creators of the interventions.

The program’s tools and impact areas are synthetically depicted in Fig. 1.

The "Archives and Health" intervention has been deployed through a rigorous five-step process:

1. Literature Review: An extensive review of RT literature was conducted to identify validated formats and their impacts on cognitive dimensions and holistic well-being. The review yielded encouraging evidence for RT efficacy.
2. Multidisciplinary Development: A diverse team of researchers, geriatricians, archivists, and occupational therapists from the "Archives and Health" project developed since 2020 an RT program based on the MB concept and the creative protocol developed by the University, Museums, and Hospitals of Manchester (Thompson et al., 2020). This initiative represents to our knowledge the first systematic experimentation of social prescription in Italy.
3. Initial Implementation: Launched in 2021, the first project phase involved administering the MB in 10 elderly care facilities of different types for individuals with Alzheimer’s Disease, as detailed above. The initial setting involved 24 individuals with MCI and moderate dementia in both group and individual sessions. The box contained reproductions of archival documents, sensory stimuli, and materials to support creative sessions following the Manchester creative protocol for art therapy, to be described in more detail below. The impact assessment adopted a mixed-methods approach, combining preliminary quantitative evaluation of emotional well-being impacts with qualitative depth through focus groups involving geriatricians and occupational therapists. Participants were invited to voluntarily engage in sessions, supported by geriatric and occupational therapists and caregivers. Each session lasted approximately 60 minutes and was conducted in a format adaptable to individual needs and rhythms. Evaluation methods included PANAS questionnaires, observational sheets and focus groups with geriatricians and therapists. Given the preliminary nature of this intervention, PANAS data were not directly used for quantitative ex ante-ex post evaluation but only as a supplement to qualitative data.
4. Expansion: The second research phase in 2022 introduced MMB, a customized development of the original memory box also including musical stimulation, involving a group of 10 older adults with dementia in a residential center. All 10 participants provided complete RADAR evaluation sheets that were usable for the quantitative analysis. Evaluation methods also included ethnographic observation, computational discourse analysis, and video analysis.
5. Pre-texts Cultural Protocol: The third step was about the introduction of the Pre-texts Cultural Protocol in a residential center using a mixed research design. This approach combined a preliminary quantitative phase with interviews of elderly participants and focus groups with medical professionals. The Pre-texts cultural protocol, grounded in arts and reading (de Oliveira et al., 2021; Osborn et al., 2023), incorporated elements of reminiscence therapy, initiating the creative experience with an archival document from the 1603 Inquisition Archive as an evocative source of memories and narratives. The experience included music to support mood and verbal fluency. A

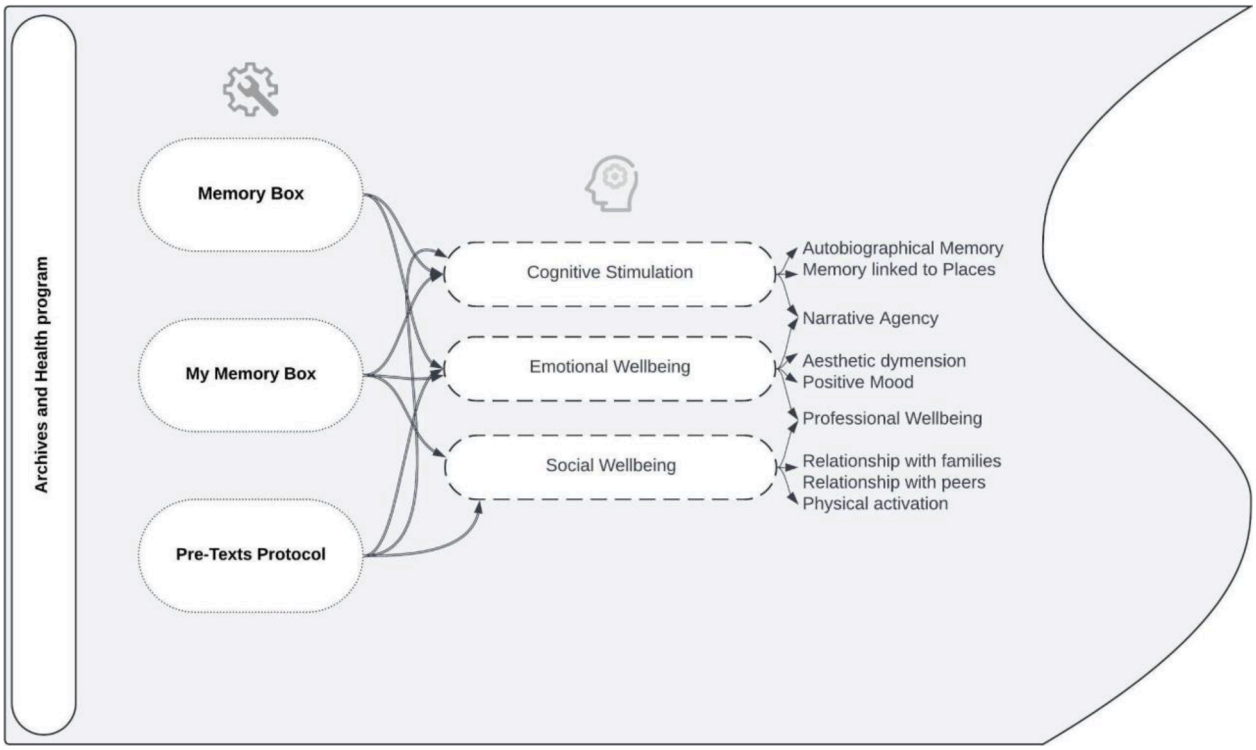

Fig. 1. The program tools and impact areas. The Fig. illustrates how the program consists of three interventions, MB, MMB, and the Pre-Texts Protocol. Each of them addresses three different objectives: cognitive stimulation, emotional wellbeing, and social wellbeing of the patients. In turn, cognitive stimulation promotes the conservation of autobiographical memory and of place-related memory; emotional wellbeing promotes sense of aesthetics and stimulates positive mood; and social wellbeing promotes relational connection with the family of the patient, with peers, and stimulates physical activity through social interaction. Finally, the joint effect of cognitive stimulation and emotional wellbeing promotes patients' narrative agency, whereas the joint effect of emotional and social wellbeing promotes the professional wellbeing of caregivers.

group of 16 elderly adults with dementia and their caregivers took part in the Pre-Texts sessions in the care center, with each session lasting approximately 90 minutes. Only 10 participants provided complete RADAR evaluation sheets that were usable for the quantitative analysis. Evaluation methods also included ethnographic observation, computational discourse analysis, and video analysis.

Our study employs a qualitative-mixed methodology to evaluate a cultural prescription program rooted in RT. The approach is informed by neuroscientific literature on memory in dementia and Alzheimer's disease, which is crucial for understanding the impacts and efficacy of the cultural intervention. This research design aligns with the idea of bridging the "two cultures" divide between the humanities and social sciences, and cognitive neuroscience (Snow, 2012; Kandel & Squire, 2000). Our study employs an integrated mixed-methods approach that goes beyond the simple collection of multiple data types. This methodological choice reflects our understanding that the complementary strengths of quantitative and qualitative approaches, when thoughtfully combined, can provide deeper insights than either method alone. Rather than maintaining separate quantitative and qualitative analyses, we deliberately integrated these methodological perspectives for a more comprehensive understanding of our research questions. The integration of quantitative and qualitative data can take three primary forms, as established in the methodological literature (Creswell & Plano Clark, 2011; O'Cathain, Murphy, & Nicholl, 2010): merging, connecting, and embedding. Our study employed the merging approach, which systematically combines textual and numerical data through integrated analysis frameworks.

We implemented this integration through the Atlas.ti software platform, which allowed us to synthesize quantitative metrics with qualitative insights in unified analytical displays. The mixed-methods research design places in particular a strong emphasis on qualitative data collection and analysis, allowing for a comprehensive, in-depth exploration of the experiences of participants with dementia, their caregivers, and healthcare professionals involved in the cultural prescription program. These qualitative findings complement quantitative data collected through standardized measures such as the RADAR toolkit (Uboldi & Marasco, 2023), an accessible, comprehensive instrument for evaluating the emotional well-being and sense of connection that individuals may experience through participation in cultural and creative activities. Developed on the basis of international best practices and measurement frameworks, the toolkit draws inspiration from resources such as the Museum Wellbeing Measures Toolkit developed at the University College London (Thompson & Chatterjee, 2013) and the Inclusion of Nature in Self Scale (Schultz, 2002; Mayer & Frantz, 2004).The RADAR toolkit features three primary tools for measuring the impact of cultural experiences:

1. Self-assessment tools for emotional states, which evaluate perceived positive and negative affect both before and after the cultural experience, based on the Positive and Negative Affect Schedule (PANAS) scales (Watson et al., 1988; Terracciano et al., 2003).
2. Self-assessment of perceived connection to art and cultural heritage, which evaluates the sense of connection using a 1-5 Likert scale, where 1 indicates no connection and 5 indicates a strong sense of being "one with the art," based on the Inclusion of Nature in Self Scale (Schultz, 2002; Mayer & Frantz, 2004).
3. Visual Analogue Scale (VAS) (EuroQol Group, 1990) and Wong-Baker Faces Pain Rating Scale (WBFPRS) (Garra et al., 2010), which serve as intuitive legends or visual guides to help participants rate the intensity of their emotional states or connection to art.

The data collected using the RADAR Toolkit were analyzed with descriptive statistics (mean, median, and standard deviation) and an inferential statistical test (t-test). The RADAR quantitative data were collected in the MMB and Pre-Texts Protocol interventions. In the latter case, only Positive Affect scales were collected, whereas in the MMB intervention both Positive and Negative Affect scales were collected. In the MB intervention, PANAS quantitative data were collected, but in view of the preliminary phase of the intervention they were not used for a quantitative evaluation but as a complement to qualitative evaluation in a mixed-methods context following the merging approach described above. The qualitative side of the study is structured around a case study approach, focusing on the different settings where interventions are administered. Each setting, including hospitals, residential care centers, day centers, and home environments, serves as a distinct case study, allowing for detailed exploration of the interventions' effects within diverse contexts. The primary data collection methods for the qualitative component include:

1. Participatory observation;
2. In-depth interviews and focus groups conducted with participants, caregivers, and healthcare professionals;
3. Direct observation of the sessions, recording behaviors, interactions, and environmental factors;
4. Detailed field diaries documenting observations, reflections, and significant events during the sessions;
5. Video and discourse analysis of each session, using software such as Atlas.ti (Friese, 2019).

The methodology in its entirety provides opportunities to capture nuanced, context-specific data that can illuminate the complex impacts of these interventions on cognitive function, emotional well-being, and social engagement, enabling the detailed examination of verbal and non-verbal communication, group interactions, and emotional expressions.

We chose Atlas.ti for the textual analysis of qualitative data in view of its effectiveness in detecting, interpreting, and modeling the complex, emergent patterns of meaning in the feedback of participants. The software was designed to facilitate the development of a theoretical model firmly anchored in the text, allowing the different categories of analysis to interact with the emergent meanings constructed by the subjects in the discourse (Muhr 2006). All collected resources, namely the notes on participant observation (Glaser, Strauss 1978), transcripts of informal conversations and focus groups, were consequently analyzed through Atlas.ti, which proves particularly helpful to identify communicative structures within verbal accounts as well as textual signatures of human interactions. This makes it especially valuable in fields that call for a nuanced understanding of how individuals and groups communicate and interact (Townend, 2003).

Thanks to qualitative data analyses, using Thematic Coding and Discourse Analysis where patterns and themes are identified across the interviews, observations, and video recordings, we were able to single out a few key themes. The analysis focuses on the emotional and cognitive responses of participants, the role of creative activities in enhancing engagement, and the experiences of caregivers and healthcare professionals. Combining inputs such as the emotional impact of reminiscence activities, the role of sensory stimuli in evoking memories, and the influence of social interaction on participants' well-being, we can identify three main impact areas: Cognitive Stimulation, Emotional Wellbeing, and Social Well-being.

The research design is informed by the co-design approach adopted in the study, which involves the participation of different actors in line with the social prescription model. All the interventions were negotiated and co-created with the cultural operators involved, as well as with the participating patients and their caregivers, health and assistance operators, in the context of a human-centered approach that informed all the stages of the research. This is also reflected in the selection of participants that includes patients involved from the beginning of the research as co-creators of the interventions. Ethical approval was not required because the methodological process was entirely co-designed with the associations and institutions involved in the social prescription system, which includes health workers, geriatricians, family members and patients themselves. The selection of the sample is also closely related to the in-built participation of associations and institutions in the co-design process, so that participants were selected, as described above, in view of their capacity of understanding and giving their informed consent among all those covered by the service provided by the involved institution in the precinct where the intervention took place. In the case of patients with severe dementia, they were asked whether they would like to participate in the activity, and, in the affirmative case, the informed consent was examined and signed by their tutors. All participants or their tutors signed the information consent for participation in the research, and they also signed a waiver authorizing the researchers' team to take photographs and videos of the activities in the various settings and to use them as documentation for scientific purposes, thus overcoming the issue of indirect identification of the persons involved in the study.

3. Results

3.1. MMB intervention

In the MMB setting, the RADAR toolkit was used to evaluate the MMB intervention. The analysis focused on variations in the Positive Affect and Negative Affect scales before and after intervention. The results are presented in Table 1:

The Positive Affect scale maintained the same median (23) both pre- and post-intervention, suggesting stability in the central tendency of the scores. However, the t-test yielded a non-significant p-value > 0.05), indicating that there is insufficient evidence to reject the null hypothesis. This indicates that any observed difference between the groups could be due to chance rather than being a true effect. Therefore, we cannot conclude that there is a statistically significant difference between the means of the pre-intervention and post-intervention group.

For the Negative Affect scale, the analysis revealed instead a statistically significant decrease from pre-intervention to post-intervention. The t-test produced a significant p-value ($p = 0.007$), indicating strong evidence to reject the null hypothesis. This suggests that the intervention was effective in reducing negative emotional states among participants.

These results paint an interesting picture of the intervention's emotional impact: while changes in positive affect were not statistically significant, there was a substantial, statistically significant reduction in negative affect. This pattern suggests that the MMB intervention may be particularly effective at alleviating negative emotional states, even when it does not necessarily increase positive emotions to a statistically significant degree. Such a finding aligns with the current understanding of the relative independence of positive and negative affect systems (Watson and Tellegen, 1985) and suggests that the intervention might be especially valuable for individuals experiencing high levels of negative

Table 1
Positive and Negative Affect Scale variations in the administration of the MMB intervention.

Positive Affect Scale	- Pre-intervention: Mean = 21.73, Median = 23, Standard Deviation = 3.38 - Post-intervention: Mean = 22.45, Median = 23, Standard Deviation = 4.97 - T-test: p-value =0,225
Negative Affect Scale	- Pre-intervention: Mean = 8.73, Median = 9, Standard Deviation = 2.05 - Post-intervention: Mean = 7.00, Median = 6, Standard Deviation = 1.67 - T-test: p-value =0,007

emotions. This differential impact on positive versus negative affect merits further investigation in future studies and may have important implications for how the intervention is targeted and implemented in clinical settings.

3.2. Interpretation and Limitations

Our preliminary quantitative results provide interesting insights into the immediate effects of the interventions on participants' emotional states; however, several limitations must be acknowledged. One significant issue is the small sample size, as the limited number of participants in each setting could affect the generalizability of the findings. Additionally, the absence of a control group in the MMB setting makes it challenging to attribute observed changes solely to the interventions. Another limitation lies in the short-term nature of the assessment: while the RADAR toolkit captures immediate pre- and post-intervention measurements, it does not account for long-term effects. Potential confounding variables, such as participants' mood on the day of the intervention, environmental conditions, or group dynamics, were also not controlled in this analysis, introducing further uncertainty. Moreover, the RADAR toolkit's scope is primarily focused on emotional states and does not directly measure cognitive function or social engagement, which are also critical aspects of dementia interventions. Despite these limitations, the findings provide an important first step for further research. The different outcomes observed between the MMB setting and the Pre-Texts Protocol setting as to Positive Affect suggest that different types of cultural interventions may influence participants' emotional states in distinct ways. This highlights the importance of tailoring interventions to the specific needs and contexts of different populations. It also underscores the necessity of conducting more comprehensive and long-term studies to fully understand the effectiveness and broader implications of cultural prescription programs. The next sections will present the qualitative analysis results, which provide a more in-depth exploration of the interventions' impacts and complement these preliminary quantitative findings.

3.2.1. MB intervention

For the MB toolkit evaluation, we triangulated data from three primary sources. First, we conducted focus groups with clinical professionals (two geriatricians and two occupational therapists) to gather expert perspectives on intervention outcomes. Second, we collected observational data through detailed clinical annotation sheets, providing systematic documentation of patient responses and behavioral changes. Third, we incorporated quantitative measures from the PANAS scales (PWMT and NWMT), analyzing pre- and post-session changes in both positive and negative emotional well-being dimensions. This triangulated approach allowed us to examine intervention effects from multiple complementary perspectives, strengthening the validity of our findings through methodological cross-validation. By integrating these diverse data streams, we were able to develop a more nuanced and robust understanding of the intervention's impacts than would have been possible through any single methodological approach.

The qualitative analysis process systematically followed the phases envisioned by the Atlas.ti methodology. The content analysis followed the three steps of pre-analysis, exploration of the material and treatment of the results, inference and interpretation. The pre-analysis dealt with the choice of the documents to be analyzed which include the transcription of 2 focus groups with geriatricians, occupational therapists and caregivers, and 9 clinical records with field notes, all from both the MB and MMB settings. In addition, all the audio-video documentation from both settings was analyzed and linked to the field notes collected during the activities. As the two settings are variants of the same intervention typology, and as we are not interested in comparatively testing their efficacy in this phase but rather in assessing their broad suitability as part of a cultural prescription program for dementia care, their joint qualitative analysis is methodologically appropriate. This phase included the complete reading of the empirical data, that is, both the transcribed data, such as field notes and clinical records, as well as images, audio and video. All the data collected from the interviews and focus groups, and observation notes were evaluated. All the empirical data that the researchers deemed useful for the analysis were added to the hermeneutic unit in the software. During the phase of exploration of the material, aimed at reaching an in-depth understanding, the operations of coding, decomposition and numbering were carried out. In this phase, the quotes were selected and categorized to be traced back to the research goals and the theoretical framework. Moreover, indicators such as the visibility of the code frequency were evaluated, proceeding through data checks to assess and validate the codes. Groups were then created to build the final coding structure. In the third phase prescribed by the methodology, the "raw data is processed to be meaningful and valid", allowing the researcher to "establish the results of tables, diagrams, Figs." (Friese 2019). In this phase, the coded data were interrogated, using the matrix of code occurrences, through the tables that quantify the results, and the quotations.

In summary, the 33 codes that emerged were divided into three groups: Impact indicators; Triggers; Evaluation toolkit, as shown in Table 3.

The individual categories, their density and groundness were moreover examined in relation to the peculiarities of the associated quotations, as shown in Table 4.

In addition, Figs. 2 and 3 provide a graphical representation of the most represented semantic indicators by area and frequency, respectively, whereas Fig. 4 reports the groundness value of the groups.

At the end of the process, the indicators related to well-being and health were grouped and returned with reference to three macro categories with respective subcategories (as reported in the qualitative analysis below).

We will discuss the findings of the Atlas.ti analysis after having presented the qualitative results from the interviews and field observations below, to appreciate to what extent such findings align with the observations and to derive some implications of interest.

3.2.2. The " Memory Box" and "My Memory Box": qualitative results

The qualitative analysis of MB and MMB toolkit interventions yielded significant insights into their efficacy in stimulating autobiographical memory and place-related memories in elderly individuals with dementia. As already remarked, both toolkits are based on RT and the Manchester Creative Protocol. The data revealed several key themes, that we present below.

3.3. Autobiographical Memory Stimulation

Geriatricians involved in the focus group emphasized the potent mnemonic effects of the box:

> "The box is not just a symbol, it has triggered many things in the elderly, many memories, many pieces, fragments of the private life of these people or families" (Geriatrician 1, MB Focus group).

This observation highlights the toolkit's capacity to evoke personal memories, potentially enhancing the sense of self and continuity in individuals with dementia.

From the analysis of the co-occurrences, narrative agency appears to be strongly correlated with memory recall. For example, in the case of M., the occupational therapist noted in the observation sheet:

> "The patient showed greater interest in observing the photographs, inventing stories and hypothesizing events that had happened. From there, a long conversation began, also in the presence of his daughter and wife, on the patient's history, on the period of fascism, the Second World War and the day of liberation, and it was a fascinating and emotional moment for everyone present". (Intervention in a home context, MB, exercise no. 3).

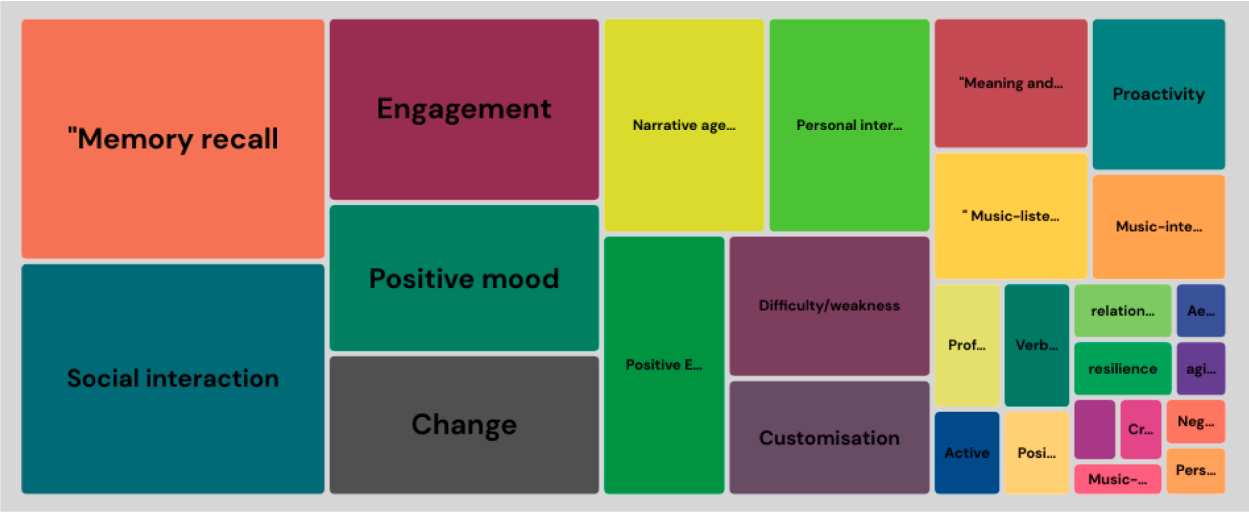

Fig. 2. Graphical depiction of the most represented semantic indicators.

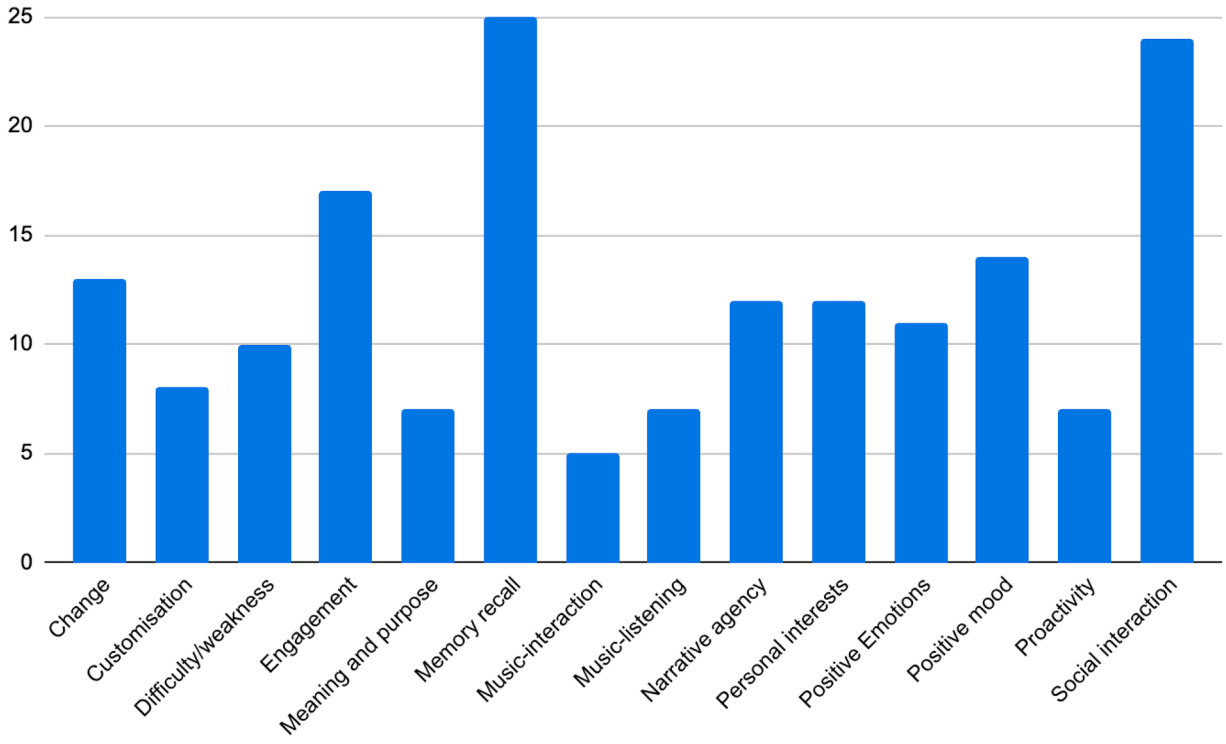

Fig. 3. Graphical illustration of the most represented semantic indicators.

Another category associated with recall is personal interest, which is the crucial condition for the activity's success. When the exercise did not find a connection with the person's interest, this was abandoned. In the case of A, the therapist notes:

> "A. he suffers from spasms in his upper limbs and I always avoid creating unnecessary humiliation in him because he is perfectly aware of it, creating nervousness and disappointment in him for not being able to fully manage his hands". (Co-housing, group of 6 elderly people with dementia, MB, exercise no. 4).

The therapist's choice to interrupt the part of the activity that required excessive effort in terms of fine motor skills reflects the current consensus. Studies show that people with dementia prefer not to engage in activities that remind them of their weaknesses (Holthe et al. 2007; Pöllanen, Hirsimäki 2014). Moreover, the literature reports that elderly people with dementia often lose their inner drive and tend to abandon even activities that were previously appreciated, adopting a passive stance. However, Sherratt et al. (2004) indicate that activities that are not too cognitively demanding and that involve social interaction can activate participation and social behavior. Furthermore, Gitlin et al. (2019) indicate that the well-being of patients with AD improved if they were engaged in purposeful activities. In our case, out of a total of 26 activities proposed to 24 elderly people, only for 3 proposed activities some participants quit.

3.4. *Aesthetic and multisensory engagement*

Beyond its cognitive stimulation benefits, the toolkit demonstrated

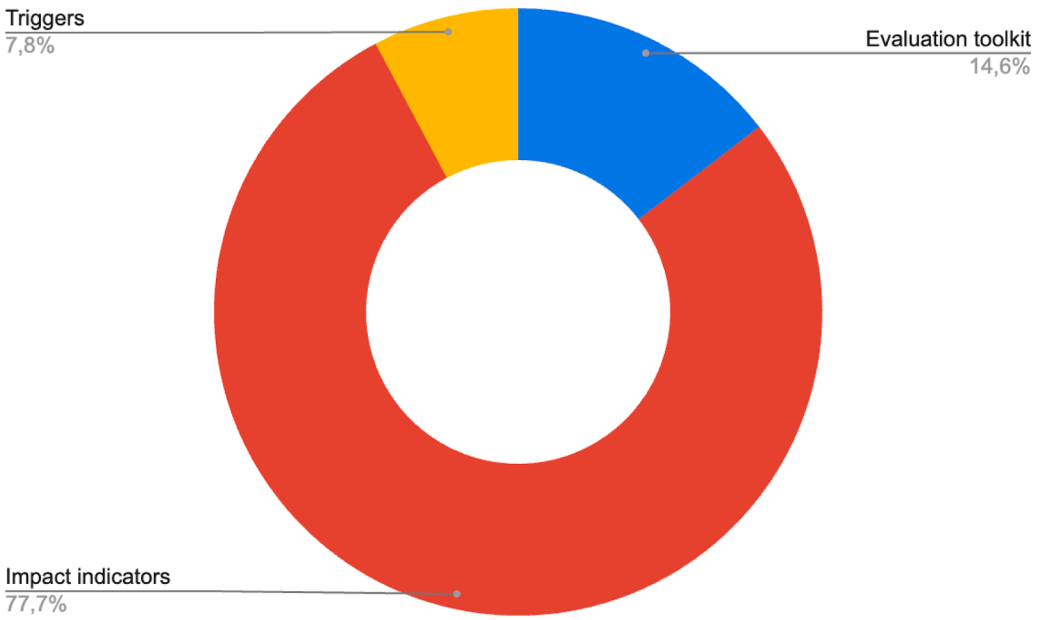

Fig. 4. Graphical representation of the groups and their groundness value.

significant aesthetic value, providing a multisensory engagement:

> "The box has proven itself to be a very powerful cognitive simulation exercise. The experience has also been shaped, as one might say... in an aesthetic way... because you enter the house with a beautiful box, a beautiful, closed box, and you put it there and you don't open it, and you wait a moment because people often ask what's inside that box.... and an expectation is created... and then you open the box, and the scent comes out and there is immediately a 'Wow!' and then the creative exercises that become fun and allow you to enter into a relationship with the other" (Geriatrician 2, MB).

This multisensory approach aligns with current research on the benefits of sensory stimulation in dementia care (Strøm et al., 2016).

3.5. Evocation of specific memories

The toolkit's effectiveness in triggering specific, detailed memories was evident in the occupational therapists' observations:

> "Perfect exercise, it has triggered what I call the "journeys of good memories". Example: Gianni Morandi [very popular Italian singer in the 60s]: called up for military service: pink postcard: military differences, places and barracks: ranks: Bersaglieri etc..." (Co-housing, group of 6 elderly people with dementia, MB, exercise no. 2)

> "The beautiful and historical photos helped the group a lot to open up in memories, opinions and comments and also to "build" a story as requested even just verbally". (Co-housing, group of 6 elderly people with dementia, MB, exercise no. 4)

This level of detail in recalled memories shows the toolkit's potential in accessing and reinforcing long-term memory structures, which are often better preserved in individuals with certain types of dementia such as Alzheimer's (Hulme et al, 1993).

3.6. Emotional engagement and interaction

The toolkit also facilitated emotional engagement and social interaction:

> "M. is involved in the activity, she seeks a lot of interaction with me to speak to me, while doing the activity she evokes memories of her past and her family. At the end she is very gratified: "I hope I told you interesting things... it was also fun"". (Hospital, 93-year-old woman, MB, exercise no. 2).

> "No one seemed bored, nervous, isolated, sad or detached because based on the group's abilities we tried to open a conversation about memories that had a positive outcome" (Hospital, MB, group of 5 elderly people, exercise no. 1).

The dimension of social interaction promoted by the activity appears significant. For example, an OT, referring to the 93-year-old male with dementia, says:

> "When I saw the Carpi map, he wanted to cut it out, he wanted to make a collage and he didn't even want to be helped... In short, he wanted to do it himself and his daughter also joined him. In particular with her... they recognized the church of San Francesco among the various churches. Little by little the whole family was there with him, his wife and daughter... They were there watching what he was doing and he was very happy. When I left he continued his work. (...) So let's say that even that activity became a bit of a center for comparison, for dialogue together with the other members of the family context. It wasn't an exercise, an isolated activity from their dialogues and new activities arose, in particular the memories linked to the different parts of the city" (OT1, focus group).

The intervention relevance, in terms of supporting relationships within the family context and intergenerational dialogue, also emerges from the words of the geriatrician:

> "We used the images as stimuli to talk about family and war so he told me about the Day of Liberation and he told me that he remembered when the allies arrived to liberate the city and his eyes were shining and it was beautiful. His daughter also said that she had never heard those things, he had never told them to her or to his wife, that is, his wife already knew them but it had really been many years since she had heard him talk about those memories" (G2, focus group).

These observations align with research on the social benefits of RT in dementia care (Woods et al., 2018). Reminiscence that solicits life stories and autobiographical aspects can also be useful to help rediscover values and roles from the past (Harmer & Orrell 2008). Furthermore, listening to the memories of others in a group can trigger the activation of semi-forgotten memories and generate a collective sense of

shared experience (Gibson et al., 2004a, 2004b). It is no coincidence that, within our research, it is precisely in the context of group care that the following aspects related to the dimension of social well-being emerge from the focus group:

> "As regards the group in the day centers, we were able to observe that, when we arrived with the box, even if three elderly people had joined the activity, the others who were busy with other activities, for example they were playing cards or talking to each other or were simply isolated, were attracted by the box and then by the conversations that arose around it. Little by little the tables began to fill up with new participants, this aspect of the questioning of involvement also turned out to be particularly significant compared to other activities that occupational therapists normally bring into the day centers. (Geriatrician 2, focus group).

In the literature, Cunningham et al (2019) demonstrated the importance of assessing well-being, understood in a multifaceted and holistic perspective, not only in older people with dementia, but also in caregivers involved in occupational activities, indicating how focused interventions are needed to improve research in this area.

Professional well-being also emerges, as one of the geriatricians tells, referring to the team meetings conducted following the interventions with the MB toolkit:

> "Another aspect in my opinion is that it is very beautiful and pleasant, so the sense of well-being also in the operators is true? I remember when we talked together like this we were all smiling. Sometimes after the sessions we are just disconnected and we try to do some things but not all the interventions always work and we are tired.... After the meeting to include the design of the memory box within our intervention protocols there is satisfaction among us, among the operators and we also talked about it afterwards about the results. In my opinion it was good for us too so we can talk about professional well-being" (G2, focus group).

3.7. Musical stimulation

The incorporation of musical elements proved particularly effective in supporting autobiographical memory and encouraging interaction:

> "Listened to and sang "Fatti mandare dalla mamma" [very successful 60s song by Gianni Morandi] but it was difficult for them to follow the rhythm of the sticks (I made them use wooden spoons, for a better grip). I changed the song, and they were very good at following the rhythm of "La fisarmonica" [other successful 60s song by Gianni Morandi with a slower and simpler rhythm]. They had a lot to say about this exercise: Poker danza di Sassuolo: historical places: dance halls: mazurka: Casadei [musician], etc... A whole afternoon listening to each other, having fun!" (Co-housing, group of 6 elderly people with dementia, MMB)

The importance of associated stimuli was also highlighted by the geriatricians and occupational therapists themselves during the focus group:

> "In my opinion, memory through music is a path to follow… For example, my elderly people remembered the music of "Carosello" and also the advertising inserts of the 60s" (G2, focus group).

In some cases, the responses induced by the associated musical stimulus seem to persist even after the end of the inteervention. This is the case described by one of the TOs, at the end of exercise no. 1 of the toolkit:

> "Starting from the poster, the Lady began to talk about when she was young and went dancing, plus other memories of the past. Furthermore, after the first song she continued to listen to the music for most of the morning, dancing while sitting and keeping time with her legs. (Co-housing Context, MMB, exercise no. 1).

These observations align with research insights on the efficacy of music therapy in dementia care (Zhang et al., 2017).

The case of G.M., a 99-year-old woman with severe dementia, further illustrates the toolkit's potential:

> "For the activity, I used tools such as a tablet to listen to the song and watch the video, furthermore the song proposed by the protocol was the starting point to roam across the other songs and memories. While we were listening to the song "Fatti mandare dalla mamma", I guided G.M. through more or less specific questions. She immediately recognized the song and began to tell me how much she liked Gianni Morandi and how passionate her daughters were about him. When asked "what does this song remind you of? Does anything come to mind from when you used to listen to it (where, with whom)?", she replies: "all his songs come to mind, they remind me of joy and all the beautiful things from the past. From when I was in love with my husband, when we went dancing together! You know, he was Swiss and at the beginning it was very hard because he worked in Switzerland and I was in Milan." From here, she started to evoke memories of her past life and especially of the boyfriends, of her engagement to her husband, of daughters and grandchildren. Later we listen to other songs by the same singer and the patient continues with stories of her past life. At the end of the activity, she defines herself as "happier! I feel better, Gianni Morandi gives you joy just by looking at him" (Hospital, MMB, Exercise no. 1 of the " Memory Box" toolkit).

This detailed account demonstrates the toolkit's capacity to evoke rich, emotionally resonant memories and improve mood, even in individuals with severe dementia.

The qualitative analysis also revealed the importance of tailoring the toolkit to individual interests and capabilities, as well as its potential to support relationships within family contexts and facilitate intergenerational dialogue. These findings align with the person-centered approach to dementia care (Kitwood, 1997) and highlight the toolkit's versatility in various care settings.

3.7.1. Integration with qualitative findings

The code distribution across different data sources (Focus Groups, Clinical Records, and Field Notes) reveals interesting patterns that complement the qualitative findings:

1. *Clinical Records and Field Notes* emerged as the richest source of coded segments (Gr=48), suggesting that direct observational data captured the most detailed and varied responses to the interventions. This aligns with the qualitative findings that showed how participants' responses were often complex and multifaceted.
2. *Music-related codes* (Music-dance, Music-interaction, and Music-listening) showed significant presence particularly in clinical records, supporting the qualitative observations about music's effectiveness as a therapeutic tool. This quantitative pattern reinforces the qualitative finding regarding music's role in facilitating memory recall and emotional engagement.
3. The high frequency of *Narrative agency codes* (Gr=12) in clinical records supports the qualitative observation that participants maintained the ability to construct and share meaningful narratives, even those with more advanced cognitive impairment.

The analysis revealed three primary impact areas that emerged from the coding structure:

1. *Cognitive stimulation*: Represented by codes such as "Memory recall" and "Cognitive process", this impact area showed strong presence across all data sources. The high groundedness (Gr) values for these

codes support the qualitative findings regarding participants' preserved ability to engage with complex materials and metaphorical thinking.
2. *Emotional well-being*: Codes related to emotional states ("Positive mood", "Positive emotions", "Pleasure") showed a consistent presence across data sources, with a particularly strong showing in clinical records. This pattern supports the qualitative observations about improved mood and emotional engagement during interventions.
3. *Social Connection*: The high frequency of "Social interaction" codes, coupled with related codes like "Less isolation" and "relation patient/caregiver", provides quantitative support for the qualitative findings about improved social connections and community building.

The Atlas.ti analysis of the MB and MMB settings revealed several key patterns that align with and deepen the qualitative findings from the study. The coding process identified 33 distinct codes organized into three main groups: Impact Indicators, Triggers, and Evaluation Toolkit. The frequency and distribution of these codes provide valuable insights into the effectiveness and dynamics of the interventions. The analysis revealed that "Memory recall" (Gr=25) and "Social interaction" (Gr=24) emerged as the most frequently occurring codes, accounting for a significant portion of the total observations. This quantitative finding supports the qualitative observations regarding the program's efficacy in stimulating autobiographical memory and fostering social connections. For instance, the high frequency of memory recall codes aligns with the qualitative observation where participants demonstrated detailed recall of specific memories, as exemplified by the response to Gianni Morandi's music, triggering detailed recollections of military service experiences. The "Engagement" code (Gr=17) and "Positive mood" code (Gr=14) also showed high frequency, suggesting that the interventions successfully promoted active participation and emotional well-being. This pattern is particularly noteworthy when considering the distribution across different data sources, with engagement being strongly represented in both focus groups (7 occurrences) and clinical records (9 occurrences). In conclusion, the qualitative analysis of the MB and MMB toolkits reveals its efficacy in stimulating autobiographical memory, enhancing emotional well-being, and facilitating social interaction among elderly individuals with dementia. In particular, in the MMB setting, musical stimulation proved to be a relevant element for eliciting cognitive and emotional responses in patients. These findings provide a promising foundation for further development and implementation of such interventions in dementia care.

The distribution of codes across different data sources also provides valuable methodological insights. The complementary nature of focus group data (strong in capturing professional perspectives) and clinical records (rich in observational detail) supports the study's mixed-methods approach. The relatively high frequency of "Evaluation toolkit" codes (Gr=15) suggests that the assessment tools were consistently applied and yielded meaningful data.

These Atlas.ti findings not only validate the qualitative observations but also provide a quantitative framework for understanding the relative importance and interrelation of different aspects of the interventions. The analysis particularly highlights the multifaceted nature of the program's impacts, supporting the qualitative conclusion that the "Archives and Health" program successfully engaged multiple domains of participant well-being.

3.8. Pre-texts protocol intervention

In the Pre-Texts Protocol setting, participants completed only the Positive Affect scale of the RADAR toolkit, and moreover they took part in five sessions of administration of the protocol. The results are presented in Table 2:

In this case, the descriptive statistics revealed a consistent and statistically significant upward shift in the majority of sessions. In Session 1, the t-test p-value was not statistically significant ($p = 0.4213$), indicating that the initial intervention may not have had an immediate impact on positive affect. However, from Session 2 onward, the results suggest a statistically significant increase in positive affect ($p < 0.05$), with mean values exhibiting a gradual and consistent rise across

Table 2
Positive Affect Scale results in the five sessions of the Pre-Texts protocol vs. the control group.

Positive Affect Scale: Session 1	- Pre-intervention: Mean = 23,2, Median = 24,5, Standard Deviation = 6,338594306 - Post-intervention: Mean = 23,7 Median = 27, Standard Deviation = 8,794569031 - T-test: p-value= 0,4213
Positive Affect Scale: Session 2	- Pre-intervention: Mean = 19,6, Median = 20,5, Standard Deviation = 5,501514943 - Post-intervention: Mean = 27,4, Median = 27, Standard Deviation = 1,577621275 - T-test: p-value= 0,0002
Positive Affect Scale: Session 3	- Pre-intervention: Mean = 21,4, Median = 23, Standard Deviation = 6,703233051 - Post-intervention: Mean = 27,1, Median = 29, Standard Deviation = 4,433458645 - T-test: p-value= 0,0001
Positive Affect Scale: Session 4	- Pre-intervention: Mean = 21,7, Median = 23,5 Standard Deviation = 6,650814486 - Post-intervention: Mean = 25,2, Median = 25,5, Standard Deviation = 5,050852513 - T-test: p-value= 0,0023
Positive Affect Scale: Session 5	- Pre-intervention: Mean = 23,4, Median = 23,5, Standard Deviation = 4,402019738 - Post-intervention: Mean = 28,5, Median = 29,5, Standard Deviation = 1,900292375 - T-test: p-value=0,0003
Positive Affect Scale: Control group	- Pre: Mean = 14,375, Median = 14 Standard Deviation = 5,705573716 - Post: Mean = 19,5, Median = 22, Standard Deviation = 8,766820567 - T-test: p-value=0,0180

Table 3
Codes and groups table.

Code	*Code Group*
active	*Impact indicators*
Aesthetic process	*Impact indicators*
agitation presence/change/agitation absence	*Impact indicators*
Change	*Impact indicators*
Cognitive process	*Impact indicators*
Covid reference	*Impact indicators*
Creativity	*Impact indicators*
Customisation	*Evaluation toolkit*
Difficulty/weakness	*Evaluation toolkit*
Engagement	*Impact indicators*
lack or little interest	*Impact indicators*
Less isolation	*Impact indicators*
Meaning and purpose	*Impact indicators*
Memory recall	*Impact indicators*
Music-dance	*Triggers*
Music-interaction	*Triggers*
Music-listening	*Triggers*
Narrative agency	*Impact indicators*
Negative mood	*Impact indicators*
Personal interests	*Impact indicators*
Personal Well-being	*Impact indicators*
Pleasure	*Impact indicators*
Positive Emotions	*Impact indicators*
Positive mood	*Impact indicators*
Positive Wellbeing	*Impact indicators*
Proactivity	*Impact indicators*
Professional well-being	*Impact indicators*
relation patient/caregiver	*Impact indicators*
Resilience	*Impact indicators*
Self-expression	*Impact indicators*
Social inclusion	*Impact indicators*
Social interaction	*Impact indicators*
Verbal fluency	*Impact indicators*

Table 4
Codes, groups, and selected Documents.

	Focus Group Gr=28	Clinical records and field notes Gr=48	Focus group Gr=17	Totals
● active Gr=2	0	0	2	2
● Aesthetic process Gr=1	1	0	0	1
● agitation presence/ change/agitation absence Gr=1	0	1	0	1
● Change Gr=13	1	5	7	13
● Cognitive process Gr=4	3	1	0	4
◦ Covid reference Gr=1	1	0	0	1
● Creativity Gr=1	1	0	0	1
◦ Customisation Gr=8	3	5	0	8
◦ Difficulty/weakness Gr=10	0	10	0	10
● Engagement Gr=17	7	9	1	17
◦ lack or little interest Gr=4	1	3	0	4
● Less isolation Gr=4	3	1	0	4
● Meaning and purpose Gr=7	2	3	2	7
● Memory recall Gr=25	8	16	1	25
● Music-dance Gr=1	0	1	0	1
● Music-interaction Gr=5	0	5	0	5
● Music-listening Gr=7	2	5	0	7
● Narrative agency Gr=12	2	10	0	12
● Negative mood Gr=1	0	1	0	1
● Personal interests Gr=12	4	7	1	12
● Personal well-being Gr=2	0	0	2	2
● Pleasure Gr=4	3	1	0	4
● Positive emotions Gr=11	2	7	2	11
● Positive mood Gr=14	5	9	0	14
● Positive well-being Gr=2	0	0	2	2
● Proactivity Gr=7	3	3	1	7
● Professional well-being Gr=3	2	0	1	3
● relation patient/ caregiver Gr=2	0	0	2	2
● Resilience Gr=1	0	0	1	1
● Self-expression Gr=4	1	3	0	4
● Social inclusion Gr=4	2	0	2	4
● Social interaction Gr=24	12	9	3	24
● Verbal fluency Gr=3	1	2	0	3
Evaluation toolkit Gr=15; GS=2	3	12	0	15
Impact indicators Gr=80; GS=22	26	40	14	80
Triggers Gr=8; GS=3	2	6	0	8
Totals	101	175	44	320

subsequent sessions (Session 2: $p = 0.0002$; Session 3: $p = 0.0001$; Session 4: $p = 0.0023$; Session 5: $p = 0.0003$). This indicates that the intervention had a cumulative and enduring effect, with progressively more favorable impacts on participants' affective well-being. While the control group also demonstrated a significant improvement ($p = 0.0180$), the mean values were lower than those of the intervention group, thereby emphasizing the particular efficacy of the protocol in the Pre-Texts Setting. This result is consistent with the expected goals of the instrument, as Pre-Texts is a cultural protocol that has previously yielded positive impacts on participants' emotional states (Osborn et al., 2023). The Pre-Texts protocol, implemented in a high-care rehabilitation community, focused upon a document dating back to 1603 as a stimulus for RT. This historical artifact, a judicial act related to an Inquisition trial accusing a woman, Ginevra Gamberini, of witchcraft, served as a catalyst for various creative activities.

The protocol invited participants to reinterpret the document through various creative activities, specifically:

1. A drawing of a flower or plant;
2. A poster using collage techniques;
3. A large canvas for collective painting with visual and written references to the text;
4. A dance using a balloon;
5. A fashion show.

Each session included, as prescribed by the protocol, moments of reflection on the experience and on the text, guided by the shared meta-cognitive question "What have we done?"

Despite concerns that the metaphorical cognitive processes underlying the Pre-Texts protocol might be challenging for individuals with even mild dementia (Fujimoto et al., 2019), observations revealed that all participants were able to engage with the instructions and participate in the meta-reflection process. This unexpected level of engagement suggests that the protocol may tap into preserved cognitive abilities or stimulate alternative cognitive pathways in individuals with dementia. Here, to expand the pilot exploration of the potential of the various settings, we directly analyze the written and video documentation of the patients' reactions, in addition to the reports from the geriatricians and caregivers, to get a first-hand appreciation of how the cognitive and aesthetic stimulation prompted complex, articulate responses.

The use of flowers and plants as triggers in the first session proved particularly effective:

"Ginevra is like a flower that blooms, despite having been torn up".

In addition to a basic understanding of the text, this poetic imagery demonstrates the participants' capacity for metaphorical thinking and emotional expression, challenging assumptions about cognitive limitations in dementia. The second session, focused on the rendering of Ginevra's story as a poster through collages of images from fashion magazines, elicited discussions about societal treatment of women and personal reflections on style:

"See how I dressed Ginevra up? Elegant with a white jacket, trousers, that's how I imagine her.... Elegant and distinguished".

This activity not only stimulated memory but also encouraged self-expression and identity affirmation, which are crucial aspects of

person-centered dementia care (Kitwood, 1997).

The third session, involving collective painting on canvas, promoted collaboration and emotional expression through color:

> "Here it is black because this is the night of the trial...".
>
> "I made a crown because Ginevra reminded me of Arthur, Ginevra is Arthur's wife and Lancelot's lover, so the golden crown...".

These responses demonstrate the participants' ability to engage in symbolic thinking and draw connections between the historical narrative and their own knowledge or experiences.

The balloon activity in the fourth session proved particularly effective in mobilizing participants and stimulating sensory and emotional responses. This activity's success aligns with research on the benefits of multisensory stimulation in dementia care (Sánchez et al., 2016). Music played a crucial role throughout the sessions, with Ryuichi Sakamoto's music effectively supporting the relational and engagement processes which, as already remarked, aligns with existing research on the positive effects of music in dementia interventions (Zhang et al., 2017).

The final session, featuring a fashion show, activated both the elderly participants and their families and caregivers, fostering joy and improving relationships, particularly between daughters and mothers. This outcome highlights the potential of creative activities to enhance social connections and emotional well-being in dementia care settings (Robertson & McCall, 2020). The focus group conducted with the operators (including a geriatrician, a therapist, a facility entertainer, a musician, and a facilitator) revealed significant impacts on the relationships between elderly participants and their family members/caregivers, as well as improved well-being for the caregivers themselves. One particularly poignant comment from a daughter of a participant encapsulates this effect:

> "I finally feel like I had fun with my mother, something I never manage to do".

The operators noted the intervention's effectiveness in complex cases, such as integrating a patient into the care center facility:

> "we noticed with V. (The geriatrician), how the attitude of E.'s daughter has changed a lot, in the sense that today she was the one who said let's get dressed, let's start the fashion show and she was a person who was distrustful at the beginning, so much so that she hadn't signed the letter of consent... She gave consent for the research, not for the images, but in a very distrustful, very detached way and instead today it was her who was pulling it...".

The Pre-Texts protocol also appeared to address feelings of isolation among family members, fostering a sense of community:

> "E.'s daughter used beautiful words, she said: "a community was created in doing things together because many times we feel isolated, single, we come to visit our patient"... Then she corrected herself and said "our family members, but we have no relationships with each other. So about this aspect of the community...".

This observation aligns with research on the importance of social support and community engagement in dementia care (Han et al., 2016). The intervention's impact on the well-being of elderly participants was notable, with observations of increased activity and engagement:

> "Researcher: The lady was very active today...
>
> Animator: very active...
>
> Researcher: when I went to do the rounds what did we do? The daughter said you tell me! And in fact she spoke...
>
> Musician: Mrs. E. changed her face...she was enlightened
>
> Researcher: This was observed by her daughter herself who called me and said "look how relaxed her face has become"
>
> Musician: And L. who was singing, recognized and remembered all the words of the emotions...
>
> Researcher: Not only that, they wanted to dance in the end... despite the trolleys and wheelchairs they spontaneously decided to move and dance!"

These observations suggest that the Pre-Texts protocol may have positive effects on mood, cognitive function, and physical engagement, even in individuals with limited mobility.

Notably, the intervention also appeared to stimulate a sense of well-being in the operators and professionals involved:

> "Geriatrician: this is the fourth time, I as a geriatrician am surprised because I do, I have done, many groups with professionals, with trainers for the well-being of elderly people, but here we are beyond, in the sense that it is not the elderly but also family members who express incredibly positive opinions and I dare say also the operators, including myself... I leave these sessions feeling better than when I arrived..."

This finding stresses the potential broader benefits of such interventions, extending beyond primary participants to include caregivers and healthcare professionals.

In conclusion, the Pre-Texts protocol demonstrated significant potential in enhancing cognitive engagement, emotional well-being, and social interaction among elderly individuals with dementia. Its multifaceted approach, combining historical stimuli with creative activities and music, appeared to tap into preserved cognitive and emotional capacities, while also fostering a sense of community among participants, family members, and care providers. These findings suggest that such innovative, arts- and culture-based interventions may offer valuable complementary approaches in dementia care.

4. Discussion

Our pilot study posed seven research questions aimed at understanding the impacts of cultural interventions on individuals with dementia within the "Archives and Health" program. Here we evaluate how our findings address each question and identify areas requiring further investigation. This kind of analysis is of particular relevance in view of the follow-up studies that will build on this pilot to systematically remove many of its current limitations, some of which are almost inevitable in a first, exploratory program of interventions.

Regarding questions (i) and (ii) about the specific impacts of the three cultural interventions and their influence on program goals, our results provide substantial but not complete answers. The MB toolkit, when implemented in hospital and residential care settings, demonstrated particular effectiveness in stimulating autobiographical memory, as evidenced by participants' detailed recall of specific memories and life events. The qualitative analysis revealed that this intervention was especially powerful in evoking place-related memories and fostering initial social connections. The MMB toolkit, which incorporated additional creative customization activities and music listening, demonstrated a particularly notable impact on emotional regulation. The quantitative analysis revealed its significant effectiveness in reducing negative affect ($p = 0.007$), while maintaining stable levels of positive affect. This pattern suggests that the intervention may be especially valuable for managing negative emotional states in dementia patients. The addition of personalization activities and music appeared to enhance emotional engagement and facilitate deeper social interactions, particularly between participants and their caregivers. This was especially evident in the State Archives setting, where the creative activities provided additional channels for self-expression and social connection. The Pre-Texts Protocol demonstrated yet another distinct pattern, showing significant success in enhancing positive affect across multiple sessions, with consistent improvements in RADAR toolkit scores from the second session onward. This intervention proved particularly

effective at engaging participants in complex metaphorical thinking and creative expression, challenging assumptions about cognitive limitations in dementia. However, since no Negative Affect scale measurements were carried out for this intervention, we cannot draw conclusions on the protocol's efficacy in addressing negative emotions. The choice not to administer the negative scale was made in relation to the context. After evaluating the group of elderly people involved and the density of the Pre-Texts sessions, in agreement with the geriatricians, the researchers decided not to cognitively overburden the patients with all the scales, but to administer only the positive and the sense of connection scales. The choice was also supported by the evidence collected in the RADAR trial which indicates, for some patients, that living with AD and with severe cognitive decline entails difficulty in decoding negative semantic categories. Furthermore, an analogous tool developed by UCL provided only a positive evaluation scale for the elderly, unlike other groups of users (Thomson & Chatterjee, 2013, 2015). However, this is certainly a point to address in future research in view of its potentially relevant implications for clinical practice.

In spite of the significant impacts observed in the administration of the interventions, we still lack precise quantification of the relative effectiveness of each intervention type. The RADAR toolkit results have been promising for both the MMB and the Pre-Texts Protocol, that is, for both interventions subject to quantitative ex ante-ex post measurement. However, none of the measurements carried out has been useful for comparative evaluations across the interventions, as in each case different designs and/or tools and/or measurements were implemented, consistently with the pilot nature of the study aimed at exploring possibilities rather than at fine tuning interventions and tools. Future research should enable such comparative analysis, possibly using standardized outcome measures across all three interventions to better understand their relative strengths and optimal applications for different participant needs and contexts. Our findings partially address question (iii) concerning differential outcomes in holistic well-being. The Atlas.ti analysis identified multiple impact dimensions, with particularly strong evidence for improvements in social interaction (Gr=24) and memory recall (Gr=25) in the MB and MMB settings. However, the holistic nature of well-being demands far more comprehensive measurement. Future studies should incorporate validated quality-of-life measures and consider longer-term follow-ups to better assess the durability of the impacts.

Question (iv) regarding variations across physical, emotional, cognitive, and social dimensions received uneven coverage in our results. While we gathered robust data on emotional and social dimensions through the RADAR toolkit and qualitative observations, physical impacts were less systematically documented. The cognitive dimension, while observed through memory recall and narrative agency, would benefit from more standardized cognitive assessment tools. This suggests a need for more balanced and thorough measurement across all four dimensions in future research.

Questions (v), (vi), and (vii) concerning the role of music in the interventions yielded interesting but preliminary findings. Our qualitative data demonstrated music's effectiveness in supporting mood regulation, enhancing memory recall, and facilitating social interaction, an outcome that was particularly evident in the Pre-Texts Protocol sessions. However, we lack systematic comparison of music-enhanced versus non-musical components of the interventions. Future research should employ more controlled comparisons to isolate music's specific contributions and mechanisms of impact.

Several cross-cutting limitations affect our ability to fully answer these questions. First, while our mixed-methods approach provided rich insights, the relatively small sample size limits their generalizability. Second, the lack of long-term follow-up data constrains our understanding of impacts durability. Third, while we observed positive outcomes, we need more rigorous control conditions to definitively attribute these to specific intervention components.

To sum up, to address our research questions more fully, future follow-up studies should:

1. Implement standardized outcome measures across all intervention types;
2. Use larger sample sizes with matched control groups;
3. Conduct longitudinal follow-ups to assess impact durability;
4. Carry out comparative analyses across interventions and their components;
5. Make use of neuroimaging and biomarker data to understand the underlying mechanisms;
6. Develop more precise measurement toolkits for physical and cognitive impacts;
7. Design controlled studies specifically examining the role of musical elements.

Despite these limitations, our findings provide some encouraging initial evidence for the potential of archive-based cultural interventions in dementia care. The robust qualitative findings and promising quantitative trends suggest that this approach merits further investigation through more controlled, larger-scale studies. The identified gaps in our current understanding provide a clear roadmap for future research priorities in this emerging field.

The selection of our mixed-methods approach was guided by several key considerations that aligned with the complex nature of dementia care and cultural interventions. First, the combination of quantitative and qualitative methods was chosen to capture both the measurable impacts of the interventions and the rich, nuanced experiences of participants that might not be fully captured through quantitative measures alone. The RADAR toolkit was specifically selected for its validated approach to measuring emotional well-being in cultural contexts, while Atlas.ti analysis was chosen for its capacity to systematically analyze complex, multimodal data while maintaining methodological rigor. The choice of ethnographic observation and focus groups was driven by the need to understand how participants with varying levels of cognitive impairment engaged with cultural materials in real-world settings. This approach allowed us to capture spontaneous responses and interactions that might be missed in more structured assessment formats. Furthermore, the Pre-Texts protocol was selected for its proven effectiveness in fostering creative engagement with historical materials, making it particularly suitable for our archive-based intervention. The co-design elements of our methodology were instrumental in ensuring that the intervention remained sensitive to participant needs while maintaining scientific validity. This approach allowed us to incorporate insights from healthcare providers, cultural professionals, and participants themselves, leading to more robust and applicable findings.

5. Conclusions

The "Archives and Health" cultural program represents a novel and promising approach to non-pharmacological intervention for individuals with dementia. By leveraging the vast resources of archival institutions and integrating principles of RT with creative activities, this program has shown differentiated effectiveness across its various components. The MMB intervention turned out successful in reducing negative affect, while the Pre-Texts Protocol proved effective at enhancing positive emotional states. This complementarity of emotional impacts suggests the potential value of deploying these interventions in targeted ways to address specific emotional and behavioral needs of individuals with cognitive impairment.

Our findings have several implications of interest. In a cultural prescription perspective, our program provides a new instance of social prescribing and demonstrates how different cultural interventions can be matched to specific therapeutic needs. The evidence of varied emotional impacts, with some interventions potentially better suited to reducing negative affect and others to enhancing positive affect, although more evidence is needed for more robust assessments in this

regard, suggests that cultural institutions can play a nuanced and targeted role in public health initiatives.

Another element of value is the interdisciplinary collaboration that has made the program possible. Specifically, the collaboration between archives, healthcare providers, and researchers that unfolded in this project offers a useful pilot for interdisciplinary approaches to complex health challenges.

Moreover, the program offers a specific instance of person-centered care. Its flexibility in adapting to individual needs reaffirms the importance of personalized interventions in dementia care that take personal histories of patients and their families into account. Another important implication is how such interventions may bring about observable benefits for caregivers. They may be useful in alleviating their burden, a critical factor in dementia care, thus qualifying as potentially valuable preventive and coping tools. This study contributes to the growing body of evidence supporting the value of arts and culture in the promotion of health and well-being. It stresses the potential of public policy to foster greater integration between cultural and health sectors in the exploration and testing of more holistic approaches to complex health issues such as dementia. It should be emphasized clearly that a large amount of further research is needed to fully establish the efficacy and optimal delivery of such programs. The potential of cultural resources for the design of meaningful, evidence-based interventions contributing to a richer, personalized approach to complex diseases with vast societal implications like dementia in its variety of forms, is still largely untapped despite the growing number of studies and experimentations under way.

In this vein, the "Archives and Health" program might spark a process of gradual conceptual and therapeutic refinement that can be conducive to more systematic, innovative, interdisciplinary approaches to dementia care.

CRediT authorship contribution statement

Sara Uboldi: Writing – original draft, Software, Methodology, Investigation, Data curation, Conceptualization. **Lorenza Iannacci:** Writing – original draft, Project administration, Investigation, Funding acquisition. **Vanda Menon:** Writing – original draft, Investigation. **Alessandro Bortolotti:** Writing – original draft, Investigation, Formal analysis. **Giulia Candeloro:** Writing – original draft, Investigation. **Alessandro Crociata:** Writing – original draft, Investigation. **Valeria Pica:** Writing – original draft, Investigation. **Angelo Romagnoli:** Writing – original draft, Investigation. **Maria Tartari:** Writing – original draft, Investigation. **Andrea Fabbo:** Writing – original draft, Validation. **Alessandra Marasco:** Writing – original draft, Investigation. **Pier Luigi Sacco:** Writing – original draft, Supervision, Methodology, Investigation, Conceptualization.

Declaration of competing interests

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Lorenza Iannacci reports financial support was provided by Government of Italy Ministry of Heritage Cultural Activities and Tourism. The other authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

Lorenza Iannacci acknowledges funding from the Italian Ministry of Culture, Mission 1, Component 3 of the PNRR funding program, CUP F94H21000290006.

Data availability

Data will be made available on request.

References

Adolphs, R. (2009). The social brain: Neural basis of social knowledge. *Annual Review of Psychology, 60*, 693–716.

Bayram, S. (2024). Effects of reminiscence therapy on cognition, agitation, and quality of life in older adults with dementia receiving long-term care. *Psychogeriatrics, 24*(2), 155–164.

Bohlmeijer, E., Roemer, M., Cuijpers, P., & Smit, F. (2007). The effects of reminiscence on psychological well-being in older adults: A meta-analysis. *Aging & Mental Health, 11*(3), 291–300.

Bohlmeijer, E., Smit, F., & Cuijpers, P. (2003). Effects of reminiscence and life review on late-life depression: A meta-analysis. *International Journal of Geriatric Psychiatry, 18*(12), 1088–1094.

Butler, R. N. (1963). The life review: An interpretation of reminiscence in the aged. *Psychiatry, 26*(1), 65–76.

Cammisuli, D. M., Danti, S., Bosinelli, F., & Cipriani, G. (2016). Non-pharmacological interventions for people with Alzheimer's Disease: A critical review of the scientific literature from the last ten years. *European Geriatric Medicine, 7*(1), 57–64.

Cerejeira, J., Lagarto, L., & Mukaetova-Ladinska, E. B. (2012). Behavioral and psychological symptoms of dementia. *Frontiers in Neurology, 3*, 73.

Chanda, M. L., & Levitin, D. J. (2013). The neurochemistry of music. *Trends in Cognitive Sciences, 17*(4), 179–193.

Chatterjee, H. J., Camic, P. M., Lockyer, B., & Thomson, L. J. (2018). Non-clinical community interventions: A systematised review of social prescribing schemes. *Arts & Health, 10*(2), 97–123.

Chaudhury, H., Cooke, H. A., Cowie, H., & Razaghi, L. (2018). The influence of the physical environment on residents with dementia in long-term care settings: A review of the empirical literature. *The Gerontologist, 58*(5), e325–e337.

Chen, J., Gramegna, S. M., Biamonti, A., & Cao, Y. (2023). Habitual activities for people with dementia: The role of interiors in supporting their development after relocating to a care environment. *Sustainability, 15*(16), Article 12324.

Chen, Y. J., Li, X. X., Pan, B., Wang, B., Jing, G. Z., Liu, Q. Q., … Wang, X. (2021). Non-pharmacological interventions for older adults with depressive symptoms: A network meta-analysis of 35 randomized controlled trials. *Aging & Mental Health, 25*(5), 773–786.

Creswell, J. W., & Plano Clark, V. L. (2011). *Designing and conducting mixed methods research* (2nd ed.). Thousand Oaks, CA: Sage.

Cunningham, N. A., Cunningham, T. R., & Roberston, J. M. (2019). Understanding and measuring the wellbeing of carers of people with dementia. *The Gerontologist, 59*(5), e552–e564.

de Oliveira, C., Balcells, M., & Sommer, D. (2021). The disruptive innovation and the pretexts methodology. *Revista Brasileira de Educação Médica, 45*(3), e081.

Engelbrecht, R., Bhar, S., Shoemark, H., Elphinstone, B., & Ciorciari, J. (2024). Reminiscence therapy and music with older adults: A descriptive study investigating the current views and practices of Australian aged care providers and volunteers. *Journal of Applied Gerontology, 43*(9), 1305–1314.

EuroQol Group. (1990). EuroQol-a new facility for the measurement of health-related quality of life. *Health Policy, 16*(3), 199–208.

Featherstone, M. (2006). *Archive. Theory, Culture & Society, 23*(2-3), 591–596.

Fjell, A. M., McEvoy, L., Holland, D., Dale, A. M., & Walhovd, K. B. (2014). What is normal in normal aging? Effects of aging, amyloid and Alzheimer's disease on the cerebral cortex and the hippocampus. *Progress in Neurobiology, 117*, 20–40.

Friese, S. (2019). *Qualitative data analysis with ATLAS.ti*. Sage Publications.

Fujimoto, N., Nakamura, H., Tsuda, T., Wakutani, Y., & Takao, T. (2019). Impaired comprehension of metaphorical expressions in very mild Alzheimer's disease. *Neuropsychiatric Disease and Treatment, 15*, 713–720.

Galbraith, A., Subrin, R., & Ross, D. (2008). Alzheimer's disease: Art, creativity and the brain. *Art therapy and clinical neuroscience* (pp. 254–269). Jessica Kingsley.

Garra, G., Singer, A. J., Taira, B. R., Chohan, J., Cardoz, H., Chisena, E., & Thode, H. C., Jr (2010). Validation of the Wong-Baker FACES pain rating scale in pediatric emergency department patients. *Academic Emergency Medicine, 17*(1), 50–54.

Gibson, F. (1994). What can reminiscence contribute to people with dementia? In J. Bornat (Ed.), *Reminiscence reviewed: Evaluations, achievements, perspectives* (pp. 46–60). Open University Press.

Gibson, G., Timlin, A., Curran, S., & Wattis, J. (2004b). The scope for qualitative methods in research and clinical trials in dementia. *Age and Ageing, 33*(4), 422–426.

Gibson, M. C., MacLean, J., Borrie, M., & Geiger, J. (2004). Orientation behaviors in residents relocated to a redesigned dementia care unit. *American Journal of Alzheimer's Disease & Other Dementias®, 19*(1), 45–49.

Gilboa, A., Ramirez, J., Köhler, S., Westmacott, R., Black, S. E., & Moscovitch, M. (2005). Retrieval of autobiographical memory in Alzheimer's disease: Relation to volumes of medial temporal lobe and other structures. *Hippocampus, 15*(4), 535–550.

Graham, M. E., & Fabricius, A. (2018). Painting in situ: The benefits of live mural painting for residents on two secure long-term care dementia units. *Arts & Health, 10*(3), 257–273.

... & Gramaglia, C., Gattoni, E., Marangon, D., Concina, D., Grossini, E., Rinaldi, C., & Zeppegno, P. (2021). Non-pharmacological approaches to depressed elderly with no or mild cognitive impairment in long-term care facilities. A systematic review of the literature. *Frontiers in Public Health, 9*, Article 685860.

Han, A., Radel, J., McDowd, J. M., & Sabata, D. (2016). The benefits of individualized leisure and social activity interventions for people with dementia: A systematic review. *Activities, Adaptation & Aging, 40*(3), 219–265.
Harmer, B. J., & Orrell, M. (2008). What is meaningful activity for people with dementia living in care homes? A comparison of the views of older people with dementia, staff and family carers. *Aging and Mental Health, 12*(5), 548–558.
Haslam, C., Haslam, S. A., Jetten, J., Bevins, A., Ravenscroft, S., & Tonks, J. (2010). The social treatment: The benefits of group interventions in residential care settings. *Psychology and Aging, 25*(1), 157–167.
Hendriks, I., Meiland, F. J., Gerritsen, D. L., & Dröes, R. M. (2019). Implementation and impact of unforgettable: An interactive art program for people with dementia and their caregivers. *International Psychogeriatrics, 31*(3), 351–362.
Holthe, T., Thorsen, K., & Josephsson, S. (2007). Occupational patterns of people with dementia in residential care: an ethnographic study. *Scandinavian Journal of Occupational Therapy, 14*(2), 96–107.
Hsieh, S. W., Hsiao, S. F., Liaw, L. J., Huang, L. C., & Yang, Y. H. (2024). Effectiveness of Early Multimodal Non-pharmacological Interventions in Cognitive Preservation in the Elderly. *American Journal of Alzheimer's Disease & Other Dementias®, 39*, 15333175241256803.
Hulme, C., Lee, G., & Brown, G. D. (1993). Short-term memory impairments in Alzheimer-type dementia: Evidence for separable impairments of articulatory rehearsal and long-term memory. *Neuropsychologia, 31*(2), 161–172.
Jacobsen, J. H., Stelzer, J., Fritz, T. H., Chételat, G., La Joie, R., & Turner, R. (2015). Why musical memory can be preserved in advanced Alzheimer's disease. *Brain, 138*(8), 2438–2450.
... & Jia, J., Wei, C., Chen, S., Li, F., Tang, Y., Qin, W., & Jia, L. (2018). The cost of Alzheimer's disease in China and re-estimation of costs worldwide. *Alzheimer's & Dementia, 14*(4), 483–491.
Johnson, 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), 77.
Kandel, E. R., & Squire, L. R. (2000). Neuroscience: Breaking down scientific barriers to the study of brain and mind. *Science, 290*(5494), 1113–1120.
Kasl-Godley, J., & Gatz, M. (2000). Psychosocial interventions for individuals with dementia: An integration of theory, therapy, and a clinical understanding of dementia. *Clinical Psychology Review, 20*(6), 755–782.
Khait, A. A., Reagan, L., & Shellman, J. (2021). Uses of reminiscence intervention to address the behavioral and psychosocial problems associated with dementia: An integrative review. *Geriatric Nursing, 42*(3), 756–766.
Kirk, M., & Berntsen, D. (2018). A short cut to the past: Cueing via concrete objects improves autobiographical memory retrieval in Alzheimer's disease patients. *Neuropsychologia, 110*, 113–122.
Kitwood, T. (1997). *Dementia reconsidered: The person comes first*. Open University Press.
Klein-Koerkamp, Y., Baciu, M., & Hot, P. (2012). Preserved and impaired emotional memory in Alzheimer's disease. *Frontiers in Psychology, 3*, 331.
Koppel, J., & Rubin, D. C. (2016). Recent advances in understanding the reminiscence bump: The importance of cues in guiding recall from autobiographical memory. *Current Directions in Psychological Science, 25*(2), 135–149.
Leontjevas, R., Klaver, M., Smalbrugge, M., & Gerritsen, D. L. (2024). Treatment of Challenging Behavior in Dementia. *Psychogeriatrics: A Clinical Guide*, 57–79.
Lin, Y. C., Dai, Y. T., & Hwang, S. L. (2003). The effect of reminiscence on the elderly population: A systematic review. *Public Health Nursing, 20*(4), 297–306.
Liu, Q., Wang, F., Tan, L., Liu, L., Cheng, H., & Hu, X. (2023). Comparative efficacy of various art therapies for patients with dementia: A network meta-analysis of randomized controlled trials. *Frontiers in Psychiatry, 14*, Article 1072066.
Logsdon, R. G., McCurry, S. M., & Teri, L. (2007). Evidence-based interventions to improve quality of life for individuals with dementia. *Alzheimer's Care Today, 8*(4), 309–318.
Mayer, F. S., & Frantz, C. M. (2004). The connectedness to nature scale: A measure of individuals' feeling in community with nature. *Journal of Environmental Psychology, 24*(4), 503–515.
Merzenich, M. M., Van Vleet, T. M., & Nahum, M. (2014). Brain plasticity-based therapeutics. *Frontiers in Human Neuroscience, 8*, 385.
Mikkelsen, A. S. B., Petersen, S., Dragsted, A. C., & Kristiansen, M. (2019). Social interventions targeting social relations among older people at nursing homes: A qualitative synthesized systematic review. *Inquiry, 56*, Article 46958018823929.
Moreno, N. (2025). Pharmacological and Non-Pharmacological Treatments for Cognitive Impairments in Older Adults with Alzheimer's Disease: A Narrative Review. *Mexican Journal of Medical Research ICSA*.
Müller, S., Saur, R., Greve, B., Melms, A., Hautzinger, M., Fallgatter, A. J., & Leyhe, T. (2013). Similar autobiographical memory impairment in long-term secondary progressive multiple sclerosis and Alzheimer's disease. *Multiple Sclerosis Journal, 19*(2), 225–232.
Munawar, K., Kuhn, S. K., & Haque, S. (2018). Understanding the reminiscence bump: A systematic review. *PloS One, 13*(12), Article e0208595.
Nadel, L., & Moscovitch, M. (1997). Memory consolidation, retrograde amnesia and the hippocampal complex. *Current Opinion in Neurobiology, 7*(2), 217–227.
O'Cathain, A. O., Murphy, E., & Nicholl, J. (2010). Three techniques for integrating data in mixed methods studies. *BMJ,, 341*, c4587.
Okabe, K., Nagata, T., Shinagawa, S., Inamura, K., Tagai, K., Nukariya, K., & Shigeta, M. (2020). Effects of neuropsychiatric symptoms of dementia on reductions in activities of daily living in patients with Alzheimer's disease. *Geriatrics & Gerontology International, 20*(6), 584–588.
Osborn, T. L., Ndetei, D. M., Sacco, P. L., Mutiso, V., & Sommer, D. (2023). An arts-literacy intervention for adolescent depression and anxiety symptoms: outcomes of a randomised controlled trial of Pre-Texts with Kenyan adolescents. *EClinicalMedicine, 66*, Article 102288.
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.
Pérez-Sáez, E., Justo-Henriques, S. I., & Alves Apóstolo, J. L. (2022). Multicenter randomized controlled trial of the effects of individual reminiscence therapy on cognition, depression and quality of life: Analysis of a sample of older adults with Alzheimer's disease and vascular dementia. *The Clinical Neuropsychologist, 36*(7), 1975–1996.
Pinquart, M. (2024). Effects of reminiscence interventions on depression and anxiety: a meta-analysis of randomized controlled trials. *Aging & Mental Health, 28*(5), 717–724.
Pöllänen, S. H., & Hirsimäki, R. M. (2014). Crafts as memory triggers in reminiscence: A case study of older women with dementia. *Occupational Therapy in Health Care, 28*(4), 410–430.
Pot, A. M., Bohlmeijer, E. T., Onrust, S., Melenhorst, A. S., Veerbeek, M., & De Vries, W. (2010). The impact of life review on depression in older adults: A randomized controlled trial. *International Psychogeriatrics, 22*(4), 572–581.
Rabin, J. S., Gilboa, A., Stuss, D. T., Mar, R. A., & Rosenbaum, R. S. (2010). Common and unique neural correlates of autobiographical memory and theory of mind. *Journal of Cognitive Neuroscience, 22*(6), 1095–1111.
Rao, C. B., Peatfield, J. C., McAdam, K. P., Nunn, A. J., & Georgieva, D. P. (2021). A focus on the reminiscence bump to personalize music playlists for dementia. *Journal of Multidisciplinary Healthcare, 14*, 2195–2204.
Robertson, J. M., & McCall, V. (2020). Facilitating creativity in dementia care: the co-construction of arts-based engagement. *Ageing & Society, 40*(6), 1155–1174.
Romaniuk, M., & Romaniuk, J. G. (1981). Looking back: An analysis of reminiscence functions and triggers. *Experimental Aging Research, 7*(4), 477–489.
Rubin, D. C., Wetzler, S. E., & Nebes, R. D. (1986). Autobiographical memory across the adult lifespan. In D. C. Rubin (Ed.), *Autobiographical memory* (pp. 202–221). Cambridge University Press.
Sánchez, A., Marante-Moar, M. P., Sarabia, C., de Labra, C., Lorenzo, T., Maseda, A., & Millán-Calenti, J. C. (2016). Multisensory stimulation as an intervention strategy for elderly patients with severe dementia: A pilot randomized controlled trial. *American Journal of Alzheimer's Disease & Other Dementias, 31*(4), 341–350.
Sánchez, A., Millán-Calenti, J. C., Lorenzo-López, L., & Maseda, A. (2013). Multisensory stimulation for people with dementia: a review of the literature. *American Journal of Alzheimer's Disease & Other Dementias, 28*(1), 7–14.
Särkämö, T., Tervaniemi, M., Laitinen, S., Numminen, A., Kurki, M., Johnson, J. K., & Rantanen, P. (2014). Cognitive, emotional, and social benefits of regular musical activities in early dementia: Randomized controlled study. *The Gerontologist, 54*(4), 634–650.
Schall, A., Tesky, V. A., Adams, A. K., & Pantel, J. (2018). Art museum-based intervention to promote emotional well-being and improve quality of life in people with dementia: The ARTEMIS project. *Dementia, 17*(6), 728–743.
Scherman, A. Z. (2013). Cultural life script theory and the reminiscence bump: A reanalysis of seven studies across cultures. *Nordic Psychology, 65*(2), 103–119.
Schultz, P. W. (2002). Inclusion with nature: The psychology of human-nature relations. In P. Schmuck, & W. P. Schultz (Eds.), *Psychology of sustainable development* (pp. 61–78). Springer.
... & Schwertner, E., Pereira, J. B., Xu, H., Secnik, J., Winblad, B., Eriksdotter, M., & Religa, D. (2022). Behavioral and psychological symptoms of dementia in different dementia disorders: A large-scale study of 10,000 individuals. *Journal of Alzheimer's Disease, 87*(3), 1307–1318.
Seifert, K., Spottke, A., & Fliessbach, K. (2017). Effects of sculpture based art therapy in dementia patients—A pilot study. *Heliyon, 3*(11), Article e00460.
Selkoe, D. J., & Hardy, J. (2016). The amyloid hypothesis of Alzheimer's disease at 25 years. *EMBO Molecular Medicine, 8*(6), 595–608.
Sepulcre, J., Sabuncu, M. R., Yeo, T. B., Liu, H., & Johnson, K. A. (2012). Stepwise connectivity of the modal cortex reveals the multimodal organization of the human brain. *Journal of Neuroscience, 32*(31), 10649–10661.
Sherratt, K., Thornton, A., & Hatton, C. (2004). Emotional and behavioural responses to music in people with dementia: An observational study. *Aging & Mental Health, 8*(3), 233–241.
Snow, C. P. (2012). *The two cultures, 12th printing*. Cambridge University Press.
Sommer, D. (2021). Pre-Texts: Press play to teach anything. In V. Rapti, & E. Gordon (Eds.), *Ludics. Palgrave Macmillan*. Singapore. https://doi.org/10.1007/978-981-15-7435-1_4.
Srikanth, S., Nagaraja, A. V., & Ratnavalli, E. (2005). Neuropsychiatric symptoms in dementia-frequency, relationship to dementia severity and comparison in Alzheimer's disease, vascular dementia and frontotemporal dementia. *Journal of the Neurological Sciences, 236*(1-2), 43–48.
Stern, Y. (2012). Cognitive reserve in ageing and Alzheimer's disease. *The Lancet Neurology, 11*(11), 1006–1012.
Strøm, B. S., Ytrehus, S., & Grov, E. K. (2016). Sensory stimulation for persons with dementia: A review of the literature. *Journal of Clinical Nursing, 25*(13-14), 1805–1834.
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.
Svoboda, E., McKinnon, M. C., & Levine, B. (2006). The functional neuroanatomy of autobiographical memory: A meta-analysis. *Neuropsychologia, 44*(12), 2189–2208.
Tadaka, E., & Kanagawa, K. (2004). A randomized controlled trial of a group care program for community-dwelling elderly people with dementia. *Japan Journal of Nursing Science, 1*(1), 19–25.

Tadaka, E., & Kanagawa, K. (2007). Effects of reminiscence group in elderly people with Alzheimer disease and vascular dementia in a community setting. *Geriatrics & Gerontology International, 7*(2), 167–173.
Terracciano, A., McCrae, R. R., & Costa, P. T., Jr (2003). Factorial and construct validity of the Italian Positive and Negative Affect Schedule (PANAS). *European Journal of Psychological Assessment, 19*(2), 131–141.
... & Thompson, J., Brown, Z., Baker, K., Naisby, J., Mitchell, S., Dodds, C., & Collins, T. (2020). Development of the 'museum health and social care service'to promote the use of arts and cultural activities by health and social care professionals caring for older people. *Educational Gerontology, 46*(8), 452–460.
Thomson, L. J., & Chatterjee, H. J. (2015). Measuring the impact of museum activities on well-being: developing the Museum Well-being Measures Toolkit. *Museum Management and Curatorship, 30*(1), 44–62.
Thomson, S., & Chatterjee, H. (2013). *UCL Museum Wellbeing Measures Toolkit*. AHRC & University College London.
Townend, S. (2003). Review of Muhr, T., Atlas.ti 5: The knowledge workbench. *Papers from the Institute of Archaeology, 14*, 161–169.
Uboldi, S., & Marasco, A. (2023). RADAR: A toolkit for cultural institutions to measure the impacts of cultural experiences on well-being. *Economia della Cultura, 33* (Speciale), 123–134.
... & Viard, A., Allen, A. P., Doyle, C. M., Naveau, M., Bokde, A. L., Platel, H., & Roche, R. A. (2024). Autobiographical Cerebral Network Activation in Older Adults Before and After Reminiscence Therapy: A Preliminary Report. *Biological Research For Nursing, 26*(2), 257–269.
Waller, D. (2002). Arts therapies, progressive illness: Dementia. In D. Waller (Ed.), *Arts Therapies and Progressive Illness: Nameless Dread* (pp. 107–134). Routledge.
Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54*(6), 1063.
Watson, D., & Tellegen, A. (1985). Toward a consensual structure of mood. *Psychological Bulletin, 98*(2), 219–235.
Webster, J. D., Bohlmeijer, E. T., & Westerhof, G. J. (2010). Mapping the future of reminiscence: A conceptual guide for research and practice. *Research on Aging, 32*(4), 527–564.
... & Wimo, A., Seeher, K., Cataldi, R., Cyhlarova, E., Dielemann, J. L., Frisell, O., & Dua, T. (2023). The worldwide costs of dementia in 2019. *Alzheimer's & Dementia, 19* (7), 2865–2873.
... & Woodbridge, R., Sullivan, M. P., Harding, E., Crutch, S., Gilhooly, K. J., Gilhooly, M. L. M., & Wilson, L. (2018). Use of the physical environment to support everyday activities for people with dementia: A systematic review. *Dementia, 17*(5), 533–572.
Woods, B., O'Philbin, L., Farrell, E. M., Spector, A. E., & Orrell, M. (2018). Reminiscence therapy for dementia. *Cochrane Database of Systematic Reviews, 3*(3). CD001120.
World Health Organization. (2021). *Global status report on the public health response to dementia*. World Health Organization.
Zhang, S. J., Hwu, Y. J., Wu, P. I., & Chang, C. W. (2015). The effects of reminiscence therapy on depression, self-esteem and life satisfaction on institutionalized older adults: A meta-analysis. *Journal of Nursing & Healthcare Research, 11*(1), 33–42.
Zhang, Y., Cai, J., An, L., Hui, F., Ren, T., Ma, H., & Zhao, Q. (2017). Does music therapy enhance behavioral and cognitive function in elderly dementia patients? A systematic review and meta-analysis. *Ageing Research Reviews, 35*, 1–11.
... & Zhao, Q. F., Tan, L., Wang, H. F., Jiang, T., Tan, M. S., Tan, L., & Yu, J. T. (2016). The prevalence of neuropsychiatric symptoms in Alzheimer's disease: Systematic review and meta-analysis. *Journal of Affective Disorders, 190*, 264–271.