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Exploring the Acceptability of AI-Generated Art in a Dementia Care Setting: A Pilot Study

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Abstract: Art enhances both cognitive and non-cognitive, behavioral abilities in people with dementia, as well as overall wellbeing. The use of contemporary art technologies, i.e., creative artificial intelligence (AI), in people with dementia has not been researched to date. We studied the reception of AI art by Gene Kogan, created using Google Deep Dream and Inceptionism algorithms, installed for 4 weeks in a memory clinic. The study consisted of an observational arm of 2,200 service users and their carers attending the memory clinic. Their comments were collected informally by clinical staff. Only three service users (0.1364% visitors) reported an adverse reaction to the exhibited AI-generated art. 17 people (two people with dementia, three carers and 12 healthcare professionals) took part in the quantitative arm using a questionnaire containing the PANAS scale to evaluate perception of and responses to the AI art by older people. Video AI art was well accepted by service users, their carers and healthcare professionals - it resulted in positive emotions and a low rate of negative side effects as demonstrated with the PANAS emotional scale. The uncanny valley effects previously reported in medical studies using assistive technology were not observed, suggesting that older adults irrespective of memory problems may have a distinct acceptance of new emerging technologies. AI art perception was like that of classical art and suggests that AI art has a potential to be used in dementia care, similarly to that of classical and contemporary art.

Keywords: Artificial Intelligence; Art; Dementia; Service Users; Carers

1. Introduction

Adults with profound and multiple disabilities, including dementia, often operate on a sensory level, and are more interested in exploring their bodily and environment sensations than trying to understand complex concepts [1]. It is, thus, not surprising that people with dementia respond well to sensory stimulation interventions that improve not only their psychological and behavioural symptoms but also their mood, self-esteem and overall well-being [2–5]. Reminiscence in these art-based interventions seems to play a big role in experiencing the benefits [6].

In the systematic review we carried out on art therapy as a non-pharmacological treatment for dementia [3], we identified three different forms of Creative Art therapy: Visual Art Making, Art Appreciation and a combination of both. They all appear to be beneficial in people with dementia via improving their cognition (via bettering their attention, concentration and memory), biological and psychological symptoms of dementia (improving motivation, mood, apathy, aggressive behaviour or agitation and sadness), wellbeing and quality of life (via changes in commu-

nication, fulfilment, engagement and general quality of life measures).

Sensory interventions are a standard psychosocial approach to managing the personal expressions commonly experienced by people living with dementia, especially those with advanced stages and in the presence of behavioural and psychological symptoms of dementia (i.e., agitation, wandering, low mood, etc.). They aim to engage people's vision, touch, hearing, smell, taste and movement, and do not require higher cognitive processing. Benefits of art sensory stimulation, i.e., touch and smell, have been reported for the general population. Namely, a study conducted by museum curators found that real and vicarious touch to 'introduce a new realm of communicative and interpretive resources that function as sources of information, to confirm or counter visual observations, and in discernments of the sculptures' shape, texture, substance, and their creation process' [7]. Olfactory art [8] not only activates air as an aesthetic medium, but also provokes memory engrams (via, for example, scented scenography or olfactory art) by a physical interplay (inhaling and thus incorporating odour) with the artwork. The multisensory artwork that is exhibited in contemporary museums, provides both public and artists with different opportunities to interact, explore and be emotionally connected by art.

These multisensory artistic expressions are a positive inclusive medium to engage with the public that will not be able otherwise, i.e., members of blind and visually impaired communities, people with learning disabilities and dementia. The ability to incorporate multiple sensory stimulations (colours, smells, sound, movement, physical activity, etc.) can also trigger curiosity, exploration of stimuli, interactions with the artwork (via touch, 'communication'), participation, leading to emotional reactions, i.e., enjoyment, pleasure, sadness. However, there are no evidence-based studies on how people with dementia perceive these art forms. And yet, they are the ones who find the (multi)sensory artwork stimulating and interactive. Is that because the multisensory experience might be overwhelming for them, causing distress and disturbed behaviour, in contrast to 'soft' sensory stimulation of music, gentle dancing, crafts, and the touch of copies of artefacts that will stimulate their reminiscence, rather than stimulate new experiences?

Contemporary art incorporating technological advances, including creative applications of artificial intelligence (AI), invokes not only different sensory perceptions related to the artwork displayed but also potentially intangible experiences [9]. People with more advanced dementia responded more to artefacts, i.e., objects not originally meant as artworks, than the artworks *per sé* [10], suggesting that new forms of synthetic and even unthinkable images instigate more curiosity and interactions than conventional art.

To address the acceptance of contemporary technologically assisted art by older adults with dementia, their carers and dementia professionals, we conducted a study into AI art acceptance to prepare for future AI art implementations with people with dementia. This is an explorative study that aims to collect and examine pilot data/insights that will inform future research design, sampling methodology and data collection and, thus, contribute towards more conclusive research.

2. Materials and Methods

2.1. AI Artwork

The appreciation of the video AI artwork by dementia service users, their carers and healthcare professionals working with people with dementia was the subject of this pilot study. A video artwork by Gene Kogan, called 'Neural Synthesis', was commissioned by the Art AI Festival 2019, and was shown (screened) at the Neville Centre memory clinic (General Hospital, Leicestershire Partnership NHS Trust, Leicester, UK) waiting room for duration of 4 weeks, from 900 h to 1,700 h. The video piece was part of the Art AI Festival that took place in Leicester (30 April–31 May 2019), an event exploring the role of artificial intelligence in arts through a programme of creative work including installations, performances and discussions.

Gene Kogan's video artwork used Google's Deep Dream and Inceptionism algorithm, devising an iterative process for 'optimising the pixels of an image to obtain a desired activation state in a trained convolutional network' (http://art-ai.dmu.ac.uk/event/neural-synthesis/). It utilised dynamics of feedback generated by the algorithms in which each frame in the video is initialised by the previous one, with the pixel gradients formed by predetermined masking patterns, also feeding in distorting images. In other words, the image manipulation programme generated patterned noise(s) which enabled the viewer to find meaning in the pictures, which were packed with animals' faces, intricate towers and lighting, trees and flowers, pipes and swirling, all very colourful, unusual, unex-

pected in their presence and appearance and generated by quick transformations that appear spatially randomly. The video art we used in the current study featured a sequence of brightly coloured psychedelic images (see **Figure 1**). The video artwork was shown on a 65" LED plasma screen (digital TV) positioned at one end of the waiting room area of the clinic and ran for a duration of 3 min. It was continuously looped during the opening times of the Memory Clinic. The video was not accompanied by music and was the dominant feature in the waiting room, with blinds being closed to protect the screen from excessive light bleed and outside distractions.

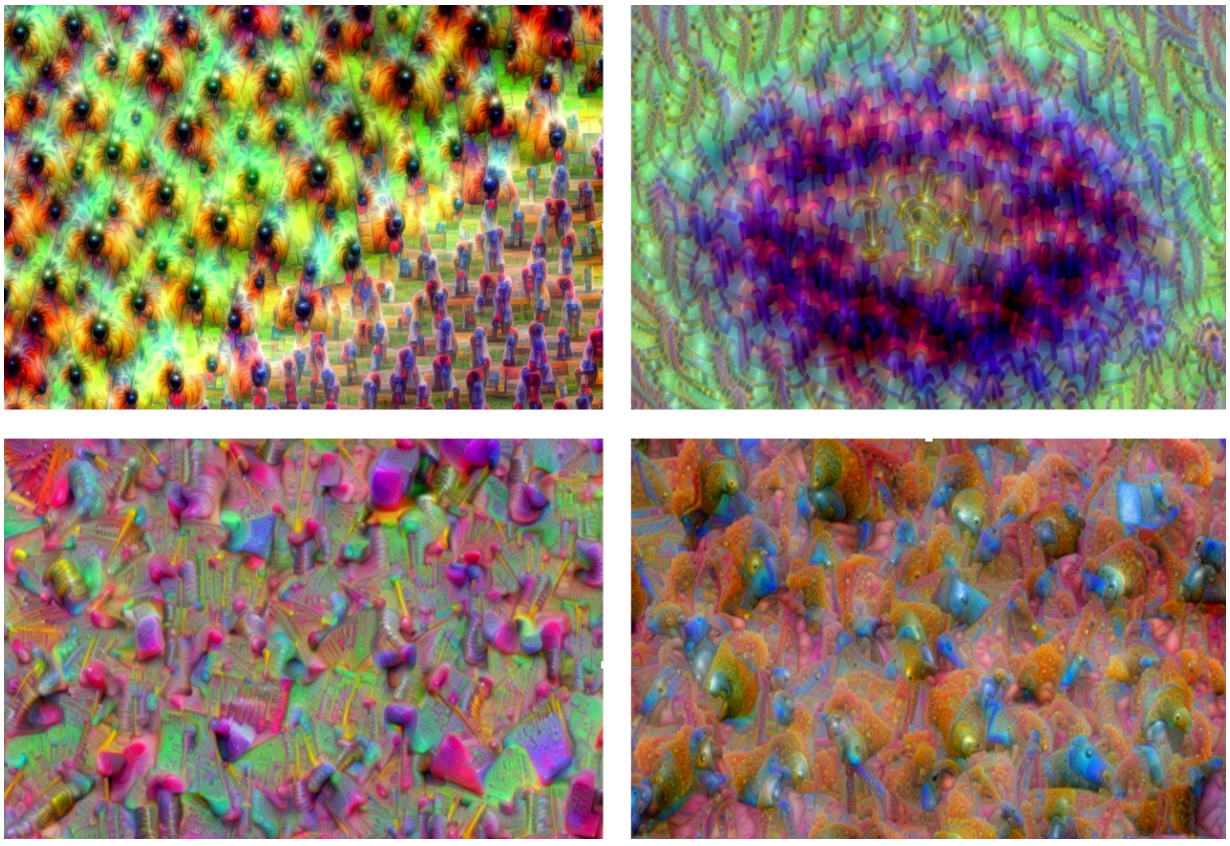

Figure 1. Images from Neural Synthesis.
Source: Images used with permission; copyright retained by the artist (Gene Kogan). Images generated by an AI algorithm (details in https://deepdreamgenerator.com/).

2.2. Participants

2.2.1. Observational Arm

During the 4 weeks it was installed, based on the number of outpatient clinics and their capacity, the video artwork was seen by approximately 1,600 service users and 600 carers, amounting to a total of 2,200 visitors to our memory clinic, in addition to professionals working in the clinic. The personnel working in the memory clinic (receptionists, nursing and medical staff, administrator, psychologists) observed the interactions of visitors with the video AI artwork. These informally collected observations and reported adverse effects (defined as all unwanted events which were caused by the shown artwork/treatment [11]) were conveyed to the principal investigators (EBM-L). In addition, the main receptionist noted spontaneous comments from service users awaiting clinical appointments. We opted to collect these informal reports for fast and effective communication than formal structuring them, and these informal reports were used to collect data without interpretation. For this, no criteria for reporting were used. The questionnaire was made available to visitors at the reception desk and side tables, with prompts advertising the event placed at random within the waiting room, inviting visitors to fill in the questionnaires and return them in a box that was made available; however, we were not able to obtain any feedback from the memory clinic users. The most frequent 'excuse' for not completing the questionnaire was 'lack of time', since people were

approached whilst waiting for their medical appointment or returning home following their appointment. Engaging directly with service users and visitors was similarly difficult in the light of the volume of daily clinical trafficking.

2.2.2. Quantitative Arm

Since the observational arm was not very informative, we organised an afternoon social event, inviting health care professionals who worked in the Memory Clinic, service users and their carers who have expressed interest in the artwork. 17 people took part by completing a questionnaire, assisted by one of the researchers (TH or EBM-L): 12 healthcare professionals, two people with a clinical diagnosis of Alzheimer's Disease and three carers. Although initially there were 3 dyads of carers and service users, one of the service users failed to engage with the project. The service user who did not engage was a woman with advanced dementia who fell asleep during the event. The other two service users had moderate and severe stage dementia, as assessed by one of the investigators (EBM-L). All replies were submitted anonymously and could not be identified.

Most participants were 45–64 years of age: one each in 25–34 and 35–44 years, six 45–54, five 55–64, and four older than 65 years of age (three carers and one service user with dementia). 12 were women and 5 men, with 4 participants from ethnic minority backgrounds. Some took the questionnaires to fill in at home, but none were returned. Since this is a pilot study on the usability of AI artwork by older people and clinical providers, we did not include a comparison group who would have been shown an alternative classical artwork.

2.3. Questionnaire and Emotional Scale

Art appreciation is measured by how well individuals engage with and understand artworks, focusing on elements like visual analysis, emotional response, and personal interpretation. It involves observing details, expressing feelings about the art, and connecting it to broader ideas or experiences. For the current study, we designed a questionnaire to explore participants' attitudes/opinions about the AI artwork and their appreciation of art in general. We incorporated questions about the most memorable images seen in the AI artwork, including colours. Since the AI art contained all the colours of the visible spectrum, our questionnaire was based on the RGB colour model (an additive colour model in which the red, green, and blue primary colours of light are added together in various ways to reproduce a broad array of colours), used widely in displaying images on electronic devices (e.g., colour television, video and digital cameras, mobile phone displays, video projectors, as well as Microsoft Office products). In addition, we also used the 20 item PANAS (Positive And Negative Affective Scale) scale [12] to measure their emotional response as a result of exposure to the AI artwork. All questionnaires were administered immediately after the viewing the AI generated artwork and were completed independently. One service user participant with advanced dementia needed assistance completing some items of the PANAS scale.

The PANAS is a brief scale comprised of 20 items, with 10 items measuring positive affect (i.e., excited, inspired, alert) and 10 items measuring negative affect (i.e., upset, scared, afraid). Each item is rated on a five-point Likert Scale, ranging from 1 = Very Slightly or Not at all to 5 = Extremely, to measure the extent to which the affect has been experienced in a specified time frame. The PANAS was designed to measure affect in various contexts such as at the present moment, the past day, week, or year, or in general (on average). Thus, the scale can be used to measure state affect, dispositional or trait affect, emotional fluctuations throughout a specific period or emotional responses to events [12].

2.4. Statistical Analysis

For processed data, the statistical analysis was performed with SPSS v.26. Data were normally distributed (Shapiro-Wilk Test) and parametric tests were used to analyse the questionnaire regarding the AI usability in the health care professionals group, with the mean values and standard error of the mean (SEM) provided, with *t*-test. Differences in PANAS scale (total score, positive and negative scores) between the three analysed groups (healthcare, service users/people with dementia and carers) were analysed with ANOVA test. However, PANAS raw data for positive and negative subscale items were presented for the two groups of carers and service users, whereas mean and SEM were presented for the care professionals. Quantitative data for service users and their carers are summarized descriptively as mean value and range. Frequency was presented as percentage.

2.5. Ethical Statement

The study had an ethical approval from the University of Leicester, reference number: 19758-eml12-ls: neuroscience,psychology&behaviour (22.02.2019) and was part of the De Montfort University directed Art AI Festival. The 17 participants who took part in the quantitative evaluation arm of the study provided written consent to the inclusion of material pertaining to themselves and acknowledged that they cannot be identified in the paper. The dementia participants had the mental capacity to consent to take part in this study, as verified by one of us (E.B.M.-L.). In addition, we have fully anonymized them.

3. Results

3.1. Observational Arm

Adverse Reactions

Out of the total of 2,200 service users and carers, only two people reported they were disturbed by the AI-generated images that were shown on the banners, which were used to support the Art AI Festival (not specific to the video artwork at the Neville Centre). Only one gentleman with profound dementia complained about the content of the video artwork ('I like football, not this'—pointing to the TV set, whilst continuing to watch the artwork). This amounts to a total of 0.1364% visitors who had an adverse reaction to the exhibited AI-generated art. None of the professionals working in the Mental Health Services for Older People (MHSOP) made complaints or negative comments about the AI art during the 4-week period.

Memory Clinic Visitors' Comments Regarding AI Artwork

In the observational study, most of the comments were related to the impact of the video artwork, labelling it as 'mesmerising', 'psychedelic', 'relaxing', 'making me sleepy'. The video screen-based artwork was received as a TV viewing experience, with several visitors positioning themselves in front of the screen. Few families came and joined their relatives with dementia and had snacks whilst watching the video artwork.

3.2. Quantitative Usability Arm

3.2.1. Uncanny Valley Analysis

Out of the 17 participants, 3 (17.65%) felt that the images were created by humans, one participant found it difficult to comment, whereas the remaining 13 participants declared that the artwork was machine-generated. Interestingly, both service users identified the artwork as machine-generated. One couple, a service user and a carer commented 'We disagree on this', with the partner with dementia identifying correctly the machine-generated artwork, whereas the carer felt that it was a human product.

Since the concept of 'uncanny valley' relates to a hypothesized relationship between the degree of an object's human likeness (resemblance, i.e., form, interactivity, and dynamics/behavior) and the emotional response to such an object [13], we investigated whether this concept was also seen in our participants, especially whether the AI created objects provoked 'uncanny' or strangely familiar feelings of 'eeriness and revulsion' in our participants. For this, we analysed the PANAS scores (total, negative and positive subscales, and individual items) in relation to participants' views on whether the AI art was machine (n = 14) or human (n = 3) generated. The groups did not differ in relation to their total, positive and negative PANAS scores, or individual PANAS items. However, the 3 participants who felt the AI art was human generated reported somewhat higher scores on being enthusiastic (mean value 4 vs. 3).

The participants' attitudes towards AI art were like those they had for art in general. Thus, they felt that both art and AI art would equally improve their standard of living, achievements in life, reciprocal understanding of both art and AI art, and learning about art and AI art. Interestingly, healthcare professional participants felt that art was somewhat superior in comparison to AI art in improving their health (p = 0.058). They similarly felt that art would bring them closer to a community than AI art, but this did not reach statistical significance (p = 0.139) (**Table 1**). The dementia patients, on the other hand, felt that AI art may not have a significant impact on improving their standard of living (p = 0.050), and were less enthusiastic to learn about AI art (p = 0.050) and AI technology (p = 0.037) compared to both their spouses and healthcare professional participants (data not shown).

Table 1. Healthcare professional participants' attitudes towards Art and AI-generated Art. Paired *t*-test analysis.

Question	N	Mean ± SEM	*t*	*p*
Art will improve my standard of living	12	3.42 ± 0.31	0.692	0.504
AI will improve my standard of living	12	3.25 ± 0.26		
Art will improve my health	12	3.50 ± 0.36	2.159	0.058
AI will improve my health	12	3.08 ± 0.31		
Art will improve what I want to achieve in life	12	2.75 ± 0.37	0.498	0.6284
AI will improve what I want to achieve in life	12	3.00 ± 0.35		
Art will improve my feelings of being part of a community	12	3.42 ± 0.31	1.533	0.139
AI will improve my feelings of being part of a community	12	2.67 ± 0.38		
Art will improve my understanding of AI	12	2.56 ± 0.34	0.170	0.867
AI will improve my understanding of art	12	2.50 ± 0.36		
Art makes me enthusiastic to learn more about art	12	3.58 ± 0.31	0.196	0.847
AI art makes me enthusiastic to learn more about AI	12	3.50 ± 0.292		

3.2.2. Memorable AI Art Images and Colours

We asked the participants in the survey about what they remembered from the video AI artwork. Participants from all three groups remembered the brightness and changing colours in the video artwork, with one service user remembering a relaxing effect. Not surprisingly, the healthcare professional group provided more detailed information, including patterns, details about changing images (i.e., flashing images (kaleidoscopic) colours and patterns, details about images, i.e., 'the cat that changed to a fox, then to a dog and wearing glasses', animals, flowers, leaves and buildings, 'ever changing patterns', 'network of people'), the transition to unexpected new images, vibrant colours, 'psychedelic experience' effect and symmetry and movement. The most memorable images ranged from shapes (i.e., diamonds, circles and squares) to industrial images and animals. Interestingly, the service users and their carers reported more frequently images of objects (i.e., trees, houses, pipes) and animals (i.e., cat). This may be due to participants' familiarity and experience with objects seen, i.e., technical versus household items. This is an area for future investigation.

When asked which the most memorable colours were and participants were offered a list of colours, the most frequent colours were blue (17/17; 100.00%), pink and green (16/17 each; 94.12%), yellow (15/17; 88.24%), purple and orange (13/17 each; 76.47%) and red (12/17; 70.59%), whereas black (4/17; 23.53%), brown and white (3/17 each; 17.65%) were reported least. The most memorable colours differed between the healthcare professionals and service users/carers groups. Thus, for the latter two groups, pink and blue were the only two colours that were reported to be most memorable. In contrast, the healthcare professionals reported a larger array of colours, with purple (6/12; 50.00%) and green (5/12; 41.67%) being reported more frequently, whereas pink (3/12; 25.00%) and blue (2/12; 16.67%) were not that frequent in this group.

3.3. AI Art and Emotional State

To measure participants' emotional state, we used the PANAS 20-item scale [12]. The three analysed groups did not differ in respect to their interest towards the AI art, though the service users had somewhat lower interest in comparison to their carers and healthcare professionals (**Table 2**). The average positive subscale sum for the health professional group was 26.25, which is in line with the accepted momentary positive, Momentary = 29.7. However, scores from patient and carer groups were lower by 8–11 points (18.5 and 18.67, respectively) (**Table 2**). Of note, the scores on the negative PANAS subscale were well below the average Momentary values of 14.8 in all three groups. This was largely due to the abundance of missing replies in all 3 groups, with the dementia participants failing to provide replies to any of the negative subscale items.

Table 2. PANAS analysis.

PANAS	Health Professionals (n = 12)	Service Users (n = 2)		Carers (n = 3)		
Total score	29.83 (3, 4)	18.50 (3, 4)		21.67 (3, 4)		
Positive subscale	26.25 (3, 4)	18.50 (3, 4)		18.67 (4,4)		
Negative subscale	3.58 (1, 2)	na		3.00 (1, 0)		
Positive PANAS Items	**Professionals (n = 12)**	**Service Users (n = 2)**		**Carers (n = 3)**		
		1	**2**	**1**	**2**	**3**
Interested	4.08 ± 0.19 (4, 2)	3	4	5	4	5
Excited	2.83 ± 0.35 (3, 3)	2	2	5	na	1

Table 2. *Cont.*

Positive PANAS Items	Professionals (n = 12)	Service Users (n = 2)		Carers (n = 3)		
		1	2	1	2	3
Strong	3.33 ± 0.21 (3, 1)	1	na	na	na	na
Enthusiastic	3.42 ± 0.34 (3, 4)	na	4	5	4	1
Proud	2.17 ± 0.40 (2, 2)	na	na	na	na	na
Alert	3.09 ± 0.42 (3, 4)	1	5	4	na	1
Inspired	3.46 ± 0.39 (3, 4)	na	4	4	na	na
Determined	2.71 ± 0.47 (3, 3)	na	3	na	na	na
Active	3.58 ± 0.36 (4, 4)	na	3	4	na	na
Attentive	3.00 ± 0.46 (3, 4)	1	4	4	5	4
Negative PANAS Items						
Jittery	1.17 ± 0.15 (1, 1)	na	na	1	na	na
Distressed	1.00 ± 0.00 (1, 0)	na	na	1	na	na
Guilty	1.00 ± 0.00 (1, 0)	na	na	1	na	na
Upset	1.00 ± 0.00 (1, 0)	na	na	1	na	na
Scared	1.00 ± 0.00 (1, 0)	na	na	1	na	na
Hostile	1.00 ± 0.00 (1, 0)	na	na	1	na	na
Irritable	1.00 ± 0.00 (1, 0)	na	na	1	na	na
Ashamed	1.00 ± 0.00 (1, 0)	na	na	na	na	na
Nervous	1.40 ± 0.39 (1, 2)	na	na	1	na	na
Afraid	1.00 ± 0.00 (1, 0)	na	na	1	na	na

Note: Mean values for all 3 analysed groups are presented. Data in brackets relate to mean and range. Abbreviation na = not available.

4. Discussion

Our study finds that dementia service users, their carers and medical professionals view the video AI-generated artwork positively. Participants saw the AI art as 'inspirational, innovative, visually pleasing, relaxing', with 'endless possibilities for enjoyment and even relaxation of (carer's) stress'. Suggestions for further enhancement of this work were also provided, with one participant commenting that the video artwork could be combined with music and integrate personal photos to enhance viewers' enjoyment and relaxation. Their perception of AI art was like that of classical art [9], which adds to the weight that the AI art may have as a potential tool to be used in dementia non-cognitive therapy, similarly to that of classical and contemporary art [14–16].

The PANAS is sensitive to momentary changes in affect and can be used to chart the immediate effects of therapy sessions as well as outcomes associated with positive psychological interventions, exercises, or activities. It is also a self-report measure, which may be influenced by self-awareness and bias. The PANAS positive subscale was in line with the accepted momentary positive affect (referring to pleasurable engagement with the environment, including feelings like enthusiasm, interest, and excitement) whereas the negative emotional subscale was well below the reported momentary emotional negative scales [12]. Furthermore, the negative emotional subscale was also lower than the reported post-therapeutic evaluation of negative emotions in both short, i.e., one session [17] and longer longitudinal interventional (yoga) studies [18]. The emotional experience was also closely related to the wellbeing of older frail adults. Thus, those having a significant greater severity of frailty scored low on the positive and high on the negative affect [19].

The combination of the observed high positive and low negative emotion scores, because of the exposure to AI art, therefore, has a potential to influence the improvement of calmness and serenity [18] in both people with dementia and their carers. This has been noted in a recent similar study conducted on a smaller group of dementia people residing in a nursing home (n = 4) and their informal (n = 1) and formal (n = 2) carers [20]. In this study, an interactive web app with pages for searching on photo (sub)themes, a digital guide, and a profile page with photo-selection tool, was developed. This easily implementable and easy-to-use web app improved the mood and/or quality of life, as well as social health of dementia residents via maintaining social interactions in the nursing home [20]. However, we cannot exclude the possibility that our findings reflect the mechanism of a 'positive prioritisation' to increase positive and reduce negative emotions, particularly profound among older adults [21]. In support for the latter is an Italian study conducted on older and frail people that reported significantly higher positive emotional perception values in these older adults (>75 years of age compared to their younger counterparts 60–75 years), despite their greater severity of frailty [19].

The positive emotional response, as demonstrated on the PANAS scale, may be used as a proxy measure to address the lack of the uncanny valley effect (unsettling feeling we get from robots and virtual agents that are too

human-like). One reason for this may be that most of the participants, despite the lack of familiarity with the AI artistic process, felt that the AI was machine-generated. This knowledge may have helped rationalise the eeriness feelings usually associated with non-human made interventions and interactions. Alternatively, participants' responses may have reflected the age-related poorer performance on theory of mind tasks [22]. Most recently, the uncanny valley response was attributed to the activation of dorsomedial prefrontal cortex [23], a brain area known to be involved in cognitive functions (such as empathy and apathy), as well as decision-making. This brain region hypo excitability is linked to loss of empathy (seen in frontotemporal dementia) and apathy that accompanies various dementia subtypes, including Alzheimer's disease. This calls for further, structured research to be conducted in addressing the uncanny valley effect in ageing and especially in people with overt cognitive impairment, to also facilitate wider application of AI technologies in dementia healthcare.

The participants reported remembering intense colours, both on spontaneous and cued recall, with primary, cool colours, i.e., blue and green, as well as secondary (i.e., pink) being most frequently reported. These findings suggest that AI art based on intense colours stimulates recall and may be closely related to positive emotional feelings. This is similar to recent findings in young children, who self-reported preference for artwork featuring bright colour tones and engaging themes, which in turn was more comforting and less intimidating for them [24–26]. Interestingly, the two complaints about AI art were around images presented with dark, tertiary colours (brown and black), which, not surprisingly, were recalled the least in our survey. The participants' heterogeneity, including wide age-range, prevents us exploring whether people with dementia may have a specific affinity for certain colours that may parallel the semantic colour impairment, as suggested recently [27].

Our findings also feed into some of the aesthetics quality of the video AI artwork, namely, colour, content, and composition [28]. However, deep convolutional neural networks have been recently successfully applied to aesthetic quality assessment. Based on the later, three aesthetic categories were identified, 'scene', 'object' and 'texture' [29], which should find place in forthcoming research studies on aesthetics of AI artworks.

Our study is not without limitations. The assessment of feelings and receptions facing the AI generated artwork was based on a small number of participants, which, besides the 12 healthcare professionals included only two service users with a profound cognitive impairment and three dementia carers/next of kin. However, the replies from the service users and their carers did not significantly differ in relation to the healthcare professional group, except for people with dementia having substantially lower scores on AI art appreciation and AI technology. This may be due to the diminished contextual information processing described in people with dementia, proportional to their global cognitive functioning [30]. We must note that the perception of colour is highly context-dependent, and colours associated with images that resonate with the viewer may be more memorable for reasons other than the colour itself. In addition, we failed to make enquiries regarding colour blindness in this study, an important issue to be considered in future larger studies. Future studies on a larger sample of people with dementia with different extents in their cognitive functioning will need to be conducted to explore this.

Although AI-generated artwork did not result in negative emotions, as measured with the PANAS emotional scale, the high number of missing data calls for cautious interpretation. Namely, PANAS being a self-reported emotional scale, it is possible that our participants did not engage fully with the negative emotional subscale items due to either not understanding the questions, considering them irrelevant to their emotional state, or avoiding answering them. The quality of the PANAS questions' formulation may also contribute to the latter, requiring more tangible and specific formulation so that participants are engaged with such items. This needs to be addressed further since incomplete data sets can significantly impact on gathered knowledge and limit gaining valuable insights.

An additional limitation is the poor understanding of computer-generated artwork's therapeutic effect. Are there any therapeutic differences in respect to different computer-generated artworks, i.e., AI art versus non-AI artwork? What, exactly, is it about a specific computer-generated artwork that makes it particularly amenable to use in the treatment of medical conditions, including dementia? Does the extent of cognitive impairment influence the AI art benefits for people with dementia? To answer some of these questions further work will require not only larger studies in terms of dementia participants but also conducting randomised control trials. Only this way can we address whether video AI artwork alone has an impact on emotional state, art appreciation and potential benefits in a medical setting. In addition, the recorded adverse effects may have been an under representations, since they were based on reported major side effects that resulted in verbal or written complaints, or overt disturbed behaviour as a direct result of watching the AI art video. In this respect, we cannot rule out that the AI artwork may have also

generated more subtle adverse effects that remained unrecorded.

5. Conclusions

Our study suggests that video AI artwork has very low adverse effects and is well received by service users, carers and healthcare professionals. The reported positive emotional responses provide further utility of AI art in people with dementia. The AI positive neurobiological influence upon brain areas involved in cognition (ventromedial prefrontal cortex and hippocampus) [23,24] holds a promise for novel antidementia interventions. All this may place AI-generated art well beyond traditional art therapeutic dementia interventions we are currently using management of (non)cognitive dementia symptoms. Its ability to be personalised (in terms of colour, shapes, topic etc.) according to service users' taste and needs, and not losing any of the advances, i.e., relaxing, calming effects etc. is another advantage. This, in combination with an additional incorporation of multisensory stimulation, can contribute to further enhancement of well-being and quality of life for both people with dementia and their carers and find a place in novel dementia prevention and therapeutic programmes.

Future Work

There is still a need for a much deeper engagement in what AI-generated artwork does and how to engage everyday people, or people with different abilities, with such creative artefacts, to offer a stronger evaluation and contribution. Its calming, relaxing, psychedelic qualities, as stressed by participants, provide further gravity that AI art may have additional benefits for both people with dementia (i.e., nonpharmacological regulation of some of the behavioural and psychological symptoms associated with dementia, such as agitation, disturbed sleep etc.) and their carers (i.e., reducing carers' burden, providing them with much required 'me' time being away from their direct carer's duties etc.). The success of various touring immersive art installations may be due to their soothing qualities appreciated by visitors.

The creative AI potential in dementia care incorporating elements of AI artwork has already been implemented in commercially available reminiscence tools aiming to preserve old memory engrams. Their design is person-centered and involves consumers' participation. Examples of this are AI-powered chatbots and virtual assistants such as Liv and CLOVA CareCall (that offer 24/7 emotional companionship, cognitive stimulation, medication reminders, and memory support, reducing depression and improving memory function in community-dwelling individuals with dementia), AI-driven music therapy platforms like and CareYaya's neuro-adaptive music system (that use real-time brain data to compose personalized music that reduces agitation, improves mood, and enhances cognitive engagement). The future development involves the Synthetic Memories initiative (https://blog.google/company-news/outreach-and-initiatives/arts-culture/exploring-ais-creative-potential-in-dementia-care/), a research collaboration between an artist and researchers and explores whether art and Generative AI tools such as Google's image and video generation models can aid therapeutic engagement with senior citizens.

Artists like Sih-Ying Hsieh (Iris Hsieh) lead workshops with a generative AI image generator into community education modules to enhance cognitive functions and social contacts for people living with dementia. Given that generative AI is a deep learning mechanism known for generating texts, images, or audio speeches through diverse data and prompts, it makes it easier for participants to navigate their past memories according to specifically generated images during the workshops. The wider use of AI-based platforms that can synthesize user inputs and provide caregivers with real-time feedback, seems to be a favourite hybrid way to encourage creative collaboration and connection, stimulate learning and thinking in people with dementia [31]. This calls for further pragmatic studies to be conducted in this ever-evolving field, followed by economic evaluation of the AI art therapy in the management of dementia symptoms. Nevertheless, our study, being the first pragmatic pilot study in this field, provides new evidence that AI technological advances incorporated within artworks are well accepted by the dementia community, offering a potential use for development of person-centred approaches to meet the individual cognitive and/or behavioural needs of people with dementia living in community and/or residential settings.

Author Contributions

E.B.M.-L. and T.H. conceived and designed the experiments, and acquired and analysed data. Both authors drafted and revised the manuscript. Both authors have read and agreed to the published version of the manuscript.

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Institutional Review Board Statement

The study received ethical approval from the University of Leicester (reference number: 19758-eml12-ls: neuroscience,psychology&behaviour, 22.02.2019) and was part of the De Montfort University directed Art AI Festival.

Informed Consent Statement

The 17 participants who took part in the quantitative evaluation arm of the study provided written consent to the inclusion of material pertaining to themselves and acknowledged that they cannot be identified in the paper. The dementia participants had the mental capacity to consent to take part in this study, as verified by one of us (E.B.M.-L.). In addition, we have fully anonymized them.

Data Availability Statement

The data that support the findings of this study are not openly available due to reasons of sensitivity and are available from the corresponding author upon reasonable request.

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Conflicts of Interest

The authors declare no competing interests.

References

1. Fowler, S. *Sensory Stimulation: Sensory-Focused Activities for People with Physical and Multiple Disabilities*; Jessica Kingsley Publishers: London, UK, 2007.
2. Strøm, B.S.; Ytrehus, S.; Grov, E.K. Sensory stimulation for persons with dementia: A review of the literature. *J. Clin. Nurs.* **2016**, *25*, 1805–1834. [CrossRef]
3. Emblad, S.Y.M.; Mukaetova-Ladinska, E.B. Creative art therapy as a non-pharmacological intervention for dementia: A systematic review. *J. Alzheimers Dis. Rep.* **2021**, *5*, 353–364. [CrossRef]
4. Zhao, Y.; Li, T.; Wang, H.; et al. Visual art therapy for cognitive and emotional enhancement in aging and dementia: A structured narrative review. *J. Alzheimers Dis. Rep.* **2025**, *9*. [CrossRef]
5. Chao, S.-Y.; Chen, H.-M.; Su, B.-Y. Shadow puppetry therapy enhances dementia-related cognitive function and interpersonal relationship. *Exp. Gerontol.* **2025**, *199*, 112667. [CrossRef]
6. Healy, T.-L.; Thompson, G.; Archibald, M.M. The role of reminiscence in arts-based interventions for dementia care: A scoping review. *Dementia* **2025**, *24*, 1334–1351. [CrossRef]
7. Christidou, D.; Pierroux, P. Art, touch and meaning making: An analysis of multisensory interpretation in the museum. *Mus. Manag. Curatorship* **2018**, *34*, 96–115. [CrossRef]
8. Kjellmer, V. Scented scenographics and olfactory art: Making sense of scent in the museum. *Konsthist. Tidskr.* **2021**, *90*, 72–87. [CrossRef]
9. Harwood, T.; Maltby, J.; Mukaetova-Ladinska, E.B. Role of artificial intelligence (AI) art in care of ageing society: Focus on dementia. *OBM Geriatr.* **2019**, *3*, 062. [CrossRef]
10. Hendriks, I.; Meiland, F.J.M.; Slotwinska, K.; et al. How do people with dementia respond to different types of art? An explorative study into interactive museum programs. *Int. Psychogeriatr.* **2019**, *31*, 857–868. [CrossRef]
11. Linden, M.; Schermuly-Haupt, M.-L. Definition, assessment and rate of psychotherapy side effects. *World Psychiatry* **2014**, *13*, 306–309. [CrossRef]
12. Watson, D.; Clark, L.A.; Tellegen, A. Development and validation of brief measures of positive and negative

affect: The PANAS scales. *J. Pers. Soc. Psychol.* **1988**, *54*, 1063–1070. [CrossRef]
13. Mori, M. The uncanny valley. *Energy* **1970**, *7*, 33–35. (in Japanese)
14. Graham, D.; Stockinger, S.; Leder, H. An island of stability: Art images and natural scenes–but not natural faces–show consistent esthetic response in Alzheimer's-related dementia. *Front. Psychol.* **2013**, *4*, 107. [CrossRef]
15. Selberg, S. Modern art as public care: Alzheimer's and the aesthetics of universal personhood. *Med. Anthropol. Q.* **2015**, *29*, 473–491. [CrossRef]
16. Hernández Belver, M.; Hernández Ullán, C. From Velázquez to Picasso: Proposal of artistic mediation activities for people with dementia. *Barcelona Res. Art Creat.* **2019**, *7*, 10–29. [CrossRef]
17. Shortway, K.M.; Prajapati, S.; Donald, B.; et al. A preliminary investigation of the effects of one yoga session for service recipients in a behavioral health intensive outpatient program. *Complement. Ther. Clin. Pract.* **2018**, *31*, 91–95. [CrossRef]
18. Patel, N.K.; Nivethitha, L.; Mooventhan, A. Effect of a yoga based meditation technique on emotional regulation, self-compassion and mindfulness in college students. *Explore (NY)* **2018**, *14*, 443–447. [CrossRef]
19. Mulasso, A.; Argiolu, L.; Roppolo, M.; et al. Emotion experience and frailty in a sample of Italian community-dwelling older adults. *Clin. Interv. Aging* **2017**, *12*, 2017–2024. [CrossRef]
20. Tan, J.R.O.; Boersma, P.; Ettema, T.P.; et al. Getting to know the person: Participatory development of the artistic person-centered fotoscope web-app in Dutch nursing homes. *Disabil. Rehabil.* **2025**, *48*, 2447–2468. [CrossRef]
21. Littman-Ovadia, H.; Russo-Netzer, P. Prioritizing positivity across the adult lifespan: Initial evidence for differential associations with positive and negative emotions. *Qual. Life Res.* **2019**, *28*, 411–420. [CrossRef]
22. Henry, J.D.; Phillips, L.H.; Ruffman, T.; et al. A meta-analytic review of age differences in theory of mind. *Psychol. Aging* **2013**, *28*, 826–839. [CrossRef]
23. Rosenthal-von der Pütten, A.M.; Krämer, N.C.; Maderwald, S.; et al. Neural mechanisms for accepting and rejecting artificial social partners in the uncanny valley. *J. Neurosci.* **2019**, *39*, 6555–6570. [CrossRef]
24. Liu, A.; Jain, N.; Vyas, A.; et al. Ventromedial prefrontal cortex stimulation enhances memory and hippocampal neurogenesis in the middle-aged rats. *eLife* **2015**, *4*, e04803. [CrossRef]
25. Biddle, K.S.; Boggs, L.M.; Wolfe, M.L.; et al. Healing ceilings: A collaborative exploration of pediatric preferences in ceiling tile artwork. *J. Pediatr. Nurs.* **2025**, *81*, E96–E105. [CrossRef]
26. Nanda, U.; Chanaud, C.M.; Brown, L.; et al. Pediatric art preferences: Countering the "one-size-fits-all" approach. *HERD-Health Env Res.* **2009**, *2*, 46–61. [CrossRef]
27. Rogers, T.T.; Graham, K.S.; Patterson, K. Semantic impairment disrupts perception, memory, and naming of secondary but not primary colours. *Neuropsychologia* **2015**, *76*, 276–288. [CrossRef]
28. Kao, Y.; Huang, K.; Maybank, S. Hierarchical aesthetic quality assessment using deep convolutional neural networks. *Signal Process. Image Commun.* **2016**, *47*, 500–510. [CrossRef]
29. El Haj, M.; Antoine, P. Reduced contextual information during future thinking in Alzheimer's disease. *Curr. Alzheimer Res.* **2021**, *18*, 876–883. [CrossRef]
30. Mangoulia, P.; Milionis, C.; Vlachou, E.; et al. The interrelationship between diabetes mellitus and emotional well-being: Current concepts and future prospects. *Healthcare* **2024**, *12*, 1457. [CrossRef]
31. Parvari, P.R.; Schofield, D. Dementia therapy: The role of gamified AI and digital art in supporting cognitive and emotional well-being. *Procedia Comput. Sci.* **2025**, *256*, 1391–1398. [CrossRef]