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The development of independence of people living with dementia while performing an artistic painting activity

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Keywords

Alzheimer's disease
Engagement
Well-being
Spacing of practice
Implicit memory

Abstract

This study explored the practice and spacing-of-practice effects in people living with dementia during an artistic painting activity. The video recordings of 23 participants were systematically observed during their first and fourth session of the activity. Improvements in independence, engagement, and well/ill-being expressions were analyzed from the first to the fourth session. Moreover, it was analyzed whether a group who had practiced three times a week (n = 12) improved more than a group who had practiced once a week (n = 13). Participants became more independent as they practiced, but the spacing of the sessions did not show any significant effect. Participants with severe dementia showed greater independence improvements than participants with mild to moderate dementia, although they required significantly more assistance throughout the entire study. The positive rates in active engagement and well/ill-being expressions suggest that artistic painting activities promote the motivation and well-being of participants, including those in the severe stage of dementia.

El desarrollo de independencia de personas que viven con demencia mientras participan en una actividad de pintura artística

Palabras clave

Enfermedad de Alzheimer
Concentración
Bienestar
Espaciamiento de la práctica
Memoria implícita

Resumen

Este estudio exploró los efectos de la práctica y el espaciamiento de la práctica en personas que viven con demencia durante una actividad de pintura artística. Vídeos de 23 participantes fueron sistemáticamente observados durante su primera y cuarta sesión de la actividad. Se analizaron las mejoras de los participantes desde la primera sesión a la cuarta sesión, en base a las expresiones de independencia, involucración con la actividad y bienestar/malestar. Además, se comparó si un grupo que había practicado tres veces por semana (n = 12) mejoraba más que un grupo que había practicado una vez por semana (n = 13). Los participantes se volvieron más independientes a medida que practicaban, pero el espaciamiento de las sesiones no mostró ningún efecto significativo. Los participantes con demencia severa mostraron mayores mejoras en la independencia que los participantes con demencia de leve a moderada, aunque requirieron mucha más asistencia durante todo el estudio. La observación de altas tasas de participación activa y expresiones de bienestar sugieren que las actividades de pintura artística promueven la motivación y el bienestar de los participantes, incluidos aquellos en la etapa severa de la demencia.

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We have our arts so we won't die of truth
Nietzsche, 1888.

Artistic painting often acts as a vehicle to express feelings and ideas we cannot express through other conventional ways. In people with dementia (PWD), who have difficulties for self-expression and to perform leisure and work activities, artistic painting can have an extra value (Sauer et al., 2016). Dementia generally affects capacities such as language, attention, or our capacity to consciously recall memories (American Psychiatry Association, 2013). Most activities of day-to-day life are dependent upon these capacities. On the other hand, artistic painting relies flexibly on multiple capacities, allowing PWD to take advantage of their strengths. "While art is often conceptual or meaning laden, it not need to be. While art can be realistic and made with great graphic skill, it not need to be. Art draws on different neural capacities in a flexible manner" (Chancellor et al., 2014, p. 5). Even in the severe stage of the disease, PWD can create artworks with a sophisticated use of symbolism and aesthetics (Cummings et al., 2008; Kahn-Denis, 1997). However, there is scarce evidence of their independence, or their potential to gain independence, during artistic painting activities. This is the main focus of the present study.

Independence and Well-being in Dementia

Self-determination theory differentiates between three main psychological needs that are strongly related to well-being: the need for autonomy, which refers to feeling in control of our own conduct; the need for relatedness, which refers to feeling connected with others and the community to which we belong; and the need for competence, which refers to feeling the expression of our capability (Ryan & Deci, 2020). When PWD lose their capacity to perform leisure or work activities, it can not only affect their sense of competence and autonomy, but they might also become passive to avoid being a burden to others, and they might lose opportunities to be in contact with the people they used to share those activities with.

When asked about their principal worries, PWD frequently reported their incapacity to perform desired activities without assistance (Maki et al., 2012). Also, lower independence in day-to-day life activities for PWD has been associated with lower indicators in their quality of life (Giebel & Sutcliffe, 2018).

Attending to these concerns, several studies have shown that people with mild and moderate Alzheimer's disease can improve their independence while practicing activities of day-to-day life such as cooking or personal hygiene activities (De Wit et al., 2021; van Halteren-van Tilborg et al., 2007). Even though declarative memory – which refers to the conscious recall of ideas and procedures – is often impaired in PWD, practice allowed them to automatize procedures through implicit memory. Implicit memory refers to our capacity to learn and recall procedures and ideas with no conscious effort (e.g., automatically follow the tea preparation steps), and it is relatively spared in PWD (De Wit et al., 2021).

However, evidence about this practice effect is scarce for people in the severe stage of dementia (De Wit et al., 2021). Specifically, several studies indicated that practice allowed people with severe Alzheimer's disease and related dementias to improve their skills in simple tasks that require the application of a single procedure (e.g., following the trace of a painted line) (Kawai et al., 2002; Mochizuki-Kawai et al., 2006). Yet, it is unclear whether this evidence is generalizable to real life activities that combine several procedures.

More importantly, as far as we know, there are no studies addressing how PWD can gain independence in hobbies and leisure activities, which are of great importance in defining our identity and for interacting with our peers (Giebel & Sutcliffe, 2018; Hui et al., 2021). The present study focused on the independence, well-being, and motivation of PWD when painting artistically.

Artistic painting in dementia

Art is flexible regarding the skills required to practice it. In contrast to language, the symbolic and abstract cognition associated with artistic expression is supported by broad, diverse, and redundant brain areas (Zaidel, 2010), which can explain why PWD continue creating art with a sophisticated use of symbolism and aesthetics (Ullán et al., 2012). Also, in contrast to most activities of day-to-day life, artistic painting does not depend on our capacity to consciously recall memories and ideas (Chancellor et al., 2014), which is impaired early in the progression of Alzheimer's disease and other related dementias (Almkvist et al., 2019). Painting is a self-reflective activity that triggers automatic memories through implicit memory (Kahn-Denis, 1997), and PWD can reflect those memories as they automatically come to mind.

Rather than being an impediment for artistic painting, the dementia may influence the artistic style. The art of people with Alzheimer's disease and related dementias tends to be more abstract as the disease advances, while no changes were observed in their use of depth, balance, and the quality of their stroke (Cummings et al., 2008). This evolution can be explained as a product of their progressive inability to integrate visuospatial and semantic representations of the world, and also a product of their maintenance of basic perceptual abilities, which allows them to play with color and shape composition (Chancellor et al., 2014).

Artistic painting gives PWD "an opportunity to exercise his or her power to weigh choices, make decisions, and to act autonomously upon those decisions" (Gross et al., 2013, p. 30). PWD participating in artistic painting activities often reported frustration at not being able to express what they wanted, as well as self-efficacy about their artistic capacity (Ullán et al., 2016). Furthermore, artistic painting is a context that can contribute to the reinforcing of social relations. During art activities, PWD were frequently observed having conversations with each other or with facilitators about their family members, professional lives, religious opinions, and hobbies (Ullán et al., 2012).

A great body of research suggests that practicing artistic painting promotes well-being in PWD (Chancellor et al., 2014; Ward et al., 2021). When participating in an art painting activity, PWD displayed higher levels of pleasure, self-esteem, and sustained attention than when they were participating in other activities programmed by their facilities (Kinney & Rentz, 2005; Sauer et al., 2016). Also, PWD who were assigned to an artistic painting activity showed greater improvements in their mental quality of life than participants assigned to control activities (Savazzi et al., 2020).

However, regarding their capacity to participate in artistic painting, evidence is again scarce for people in the severe stage of dementia (Chancellor et al., 2014). Few studies have shown that people with severe dementia displayed high levels of engagement and pleasure while practicing artistic painting (Jeppson et al., 2022; Miller & Johansson, 2016; Sauer et al., 2016). However, it is important to note that in these studies, participants were assisted individually by a facilitator the entire time. People with severe dementia often require higher assistance because of their increased deficits in attention (Miller & Johansson, 2016), which can limit the easiness to include them in these activities. To what extent can practice compensate for these independence problems?

The role of practice in artistic painting

Although the practice effect has been investigated in a great variety of instrumental activities through specific training programs (e.g., hygiene activities) (De Wit et al., 2021; van Halteren-van Tilborg et al., 2007), there is scarce evidence about the practice effect in leisure activities such as artistic painting. The motivational and flexibility components of these activities can be especially relevant in people with severe attention symptoms, for which there is scarce evidence of the practice effect (De Wit et al., 2021).

A recent study showed that, on average, people with different dementia levels displayed higher well-being and engagement during the artistic painting sessions after several sessions of practice (Windle et al., 2017). However, no independence measure was used in this study. It is unclear whether these benefits were accompanied with independence improvements, or whether independence improvements actually happened. The main goal of this study was to evaluate the effect of practice on independence as well as engagement and well-being.

Another important issue regarding the effect of practice is the spacing of the practice sessions (Ciro et al., 2016). When learning depends on our capacity to consciously recall memories, it is generally recommended to space out the practice sessions with long intervals in between, to the point that the person has to make an effort to remember and generate a deeper trace in memory (Brown et al., 2014). On the other hand, in the case of PWD who have declarative memory deficits, this effort could produce no result and it may generate anxiety. It is important to see if for PWD it is advisable to space out the practice sessions with shorter intervals in between, in which the memory trace created from the previous session would be more available. A few studies indeed indicated that people with severe Alzheimer's disease reached higher improvements in procedural tasks when the practice sessions were separated by a few days, rather than a week or more (Mitchell & Schmitt, 2006; Mochizuki-Kawai et al., 2006). However, the spacing of the practice sessions has not been evaluated in the context of artistic painting activities. In the present study, we investigated this question.

The present study

The first aim of this quasi-experimental study was to explore the effect of practice in an art painting activity for PWD. We videotaped the first and the fourth session of an art activity and observed whether, by the fourth session, participants were more independent with the painting procedures, more actively engaged with the activity, and displayed more expressions of well-being than in the first session. Our first hypothesis was that participants would become more independent due to the learning of procedures being facilitated by implicit memory, and that they would show more pleasure and active engagement with the activity.

Our second aim was to explore the spacing-of-practice effect. We compared whether improvements from the first to the fourth session were higher in a group who had practiced three times a week rather than in a group who had practiced once a week. The hypothesis for this second objective was that independent improvements were higher for participants who practiced three times per week because their implicit learning would be facilitated by a more readily available memory. To focus on the specific characteristics of participants with severe dementia, we split the results into two groups: participants with severe dementia versus participants with mild or moderate dementia.

Method

Participants

At first, 34 residents living in three long-term care facilities in Chico, Northern California, were invited to participate in two sessions of the art activity prior to the study, which allowed them to observe and try the activity. They were informed that the study would consist of four additional sessions, which would be videotaped. Thirty residents expressed their initial consent to participate, and informed consent was sought from their primary caregivers. Only 25 of them met the inclusion criteria of having a diagnosis of Alzheimer's disease or unspecified dementia and constituted the initial group of participants. Yet, the other five residents who were interested in participating and who did not meet the criteria were also randomized and included in the activity sessions.

Within each of the three facilities, we randomly assigned participants to the two spacing-of-practice conditions, either practicing once per week or three times per week. To assure similar levels of dementia in both groups, we first grouped participants into pairs with the most similar level of dementia, and

then we randomly assigned each member of the pair to the two spacing-of-practice groups. Two independent caregivers in each facility had rated the participant's level of dementia with the Global Deterioration Scale (GDS) (Reisberg et al., 1982) and the Functional Assessment Staging Test in Alzheimer's disease (FAST) (Sclan & Reisberg, 1992), reaching inter-rater agreements of $\alpha = .95$ and $\alpha = .96$ respectively for each test. The participants who scored 6 or higher on both tests were classified as having severe dementia ($n = 9$), the rest were classified with mild or moderate dementia ($n = 14$).

Among the initial 25 participants, only 23 chose to continue participating in the four sessions according to the schedule they were assigned, and they constituted the final group of participants. Of the 23 participants, 18 were female (78.3%), and their ages ranged from 71 to 95 years old ($M = 82.87$, $SD = 8.5$). Two of them were diagnosed with Alzheimer's disease (8.7%), and 20 with unspecified dementia (91.3%). According to scores of the GDS and the FAST, nine had severe dementia (39.1%), and 12 (60.9%) had mild or moderate dementia (GDS: $M = 5.7$, $SD = 0.82$; FAST: $M = 5.56$, $SD = 1.35$). The demographic information of the two spacing-of-practice groups is reported in Table 1.

Procedures

The study was approved by the Ethical Committee of the Institutional Review Board at California State University, Chico (213-01).

The art activity. The art sessions took place in June and July of 2013 in Chico (California), in the activity room in each of the three facilities. These activity rooms were familiar to participants and close to their bedrooms, making it easier for them to leave and join at any time. Participants assigned to practice three times per week did the activity on Mondays, Wednesdays, and Fridays; and participants assigned to practice once per week did the activity on a specific weekday, depending on their facility. Within each group in each facility, sessions were always at the same time of the day. The number of participants in each session ranged from two to six. All participants in each group knew each other from living and doing other activities together. Yet, it was the first time they did an art painting activity at the facilities, as well as their first time working with the two art facilitators who led the art activities.

Facilitators were the first and the third authors. The first author is an educational psychologist and had previous experience conducting more than 20 sessions of artistic painting for PWD in other facilities. The third author is a nurse who had practiced artistic painting as a hobby and had collaborated with the first author in leading a previous session of artistic painting. They had no other previous experience in art or working with PWD. They did not receive training for leading the activity.

At the beginning of each session, participants always found all materials placed in the same manner, which could help them to activate an implicit memory of the art activity and its procedures. In front of each participant was a canvas made with a wood panel and covered with gesso. On the right was a brush and a palette with the three primary colors so that they could obtain any color by mixing.

Sessions lasted between 60 and 90 minutes. Participants were incorporated into the session progressively. At the beginning, a facilitator sat with each participant and, as long as the participant appeared comfortable, the facilitator showed the person artworks from different tendencies and styles and tried to know participants' preferences through informal questions and/or conversations. Facilitators also tried to discuss the artwork the participant would like to create, as well as the materials and colors needed. Participants had the option to attach visual elements to their canvas, such as random lines traced with paper-tape, pieces of collage, or any element they considered (see some of the attachments used in the Appendix). They were encouraged to design their own compositions, but they also had the option to use some of the artworks previously visualized for inspiration, in which case those artworks would be placed on the table. Otherwise, other random artworks were also placed on the table (see some artworks used for reference in the Appendix). After this individualized introduction, participants had time to create their own artworks. Facilitators could suggest artistic ideas or assist participants in adding elements to the canvas or starting the painting procedures but could not complete the artwork for them (Sauer et al., 2016).

When facilitators perceived that verbal indications or visual demonstrations were not effective to communicate, they communicated through kinesthetic directions, that is, by guiding the participant's hand. To facilitate the understanding of questions and to allow the expression of preferences by gestures such as nodding or pointing, facilitators often showed participants different options (e.g., illustrations of artworks, mixtures of colors, etc.) and asked them to express whether

Table 1

Demographic information for the group who practiced once a week and the group who practiced three times a week

Domain	Group Practicing Once a Week (2 males, 9 females)			Group Practicing 3 Times a Week (3 males, 9 females)			
	M	*SD*	Range	*M*	*SD*	Range	*p*
GDS	5.82	0.75	5 – 7	5.58	0.9	4 – 7	.503
FAST	6.03	1.29	4 – 7.4	5.11	1.29	4 – 7.4	.103
Age	82	7.87	71 – 95	83.67	9.31	71 – 95	.647

they liked an option, or which option they preferred between two given options.

Observation procedures. We videotaped the first and fourth session of each group of participants, with two small cameras videotaping a maximum of three participants each. The videotapes were edited to generate a new zoomed video for each participant, creating a total of 46 videos: one video for each participant for each of the two evaluation sessions. From each of these videos we conducted a systematic selection of observation intervals. During the first 20 minutes, starting from the moment in which the participant started painting, we selected three intervals of three minutes: from minute 0 until minute 3, from minute 8.5 until minute 11.5, and from minute 17 until minute 20. When one participant interrupted her participation for an external cause (e.g., going to the bathroom), this time was eliminated from the videotape and not considered in the calculation of the time intervals. An additional interval was selected, which collected all the assistance each participant received before starting painting, but it was only used for scoring the measure of independence.

Two independent observers rated the measures of engagement, well/ill-being expressions, and independence. Two additional independent observers rated four additional variables that we created to control for the consistency of the assistance provided by facilitators. Observers were blind, they did not know which spacing-of-practice group, or which evaluation session the intervals belonged to. All of the observers received a total of six hours of training before doing the assessments of the study, in which they conducted more than 30 observations, reaching an inter-rater agreement that exceeded 85% for all measures.

Measures

Engagement and well/ill-being expressions during the sessions. To measure the participants' engagement and well/ill-being expressions during the art sessions, we used the Menorah Park Engagement Scale (MPES) (Camp, Skrajner, & Gorzelle, 2015). It contains four variables to account for four types of engagement behaviors: active engagement (doing or speaking about the activity), passive engagement (looking at or hearing the activity), other engagement (doing or attending to things other than the activity), and non-engagement (keeping the eyes closed, or staring into space). It also contains two additional variables to account for expressions of well-being or ill-being: expressions of pleasure (clear signs of pleasure such as laughing or smiling), and expressions of sadness or anxiety (obvious displays of sadness through tearfulness, conversation, or clearly observable depressed affect; or obvious displays of anxiety such as hand-wringing, rocking, anxious vocalizations, or other psychomotor activity if seen in combination with an anxious facial display). For each of the three observation intervals collected in the session, the duration of each engagement or well/ill-being variable was coded with the following scores: 1 (*not present at all*), 2 (*present for less than half of the time*) and 3 (*present for more than half of the time*). The inter-rater reliability between the scores of the two observers was adequate (respectively for the six variables of active engagement, passive engagement, other engagement, non-engagement, pleasure and sadness/anxiety, the intra-class correlation coefficient were .85, .69, .56, .91, .59, .68). To calculate the scores of each variable in each session, we added the scores given by each of the two observers in each of the three intervals of the session. Therefore, the highest possible score in the session for each engagement or well-ill/being variable was 18, and the lowest possible score was 6.

Independence for the painting procedures. We created a measure to account for the level of assistance received to perform the painting procedures, which was inspired by the Kitchen Task Assessment (Baum & Edwards, 1993), but we adapted the definition of the activity requirements to those of the art painting activity. We defined four requirements: 1) initiating painting (starting to extend the paint over the canvas), 2) painting (keeping engaged while extending the paint over the canvas and performing this procedure appropriately, 3) sequencing (organizing the sequence of the painting procedures: reaching for colors and painting on the canvas), and 4) safety (keeping themselves safe while performing the painting procedures). After watching the four intervals of each session, observers coded the intensity of assistance for each requirement as follows: 4 (*independent*), 3 (*received only verbal or visual directions*), 2 (*received kinesthetic directions, such as guiding the participant's hand*) and 1 (*not capable without continuous assistance*). A consistent inter-rater reliability was obtained (respectively for the four requirements of initiating painting, painting, sequencing and safety, the intra-class correlation coefficient was .95, .78, .79, .76). To calculate the score of a composite variable of independence, we summed up the scores of the two observers. We also summed up the scores for the four requirements, which showed a high level of internal consistency (α = .785). Therefore, the final scores for independence ranged from 8 to 32.

Variables to account for the consistency of assistance provided by facilitators. In order to statistically control the consistency of the assistance that facilitators provided to participants across the different conditions of the study, the observers coded for four qualitative variables assessed within the interventions provided by facilitators. An intervention was operationally defined as a group of interactions between the participant and the facilitator that were separated by at least 10 seconds from any other interaction.

These variables were: (a) the antecedent of the intervention (whether it was solicited explicitly by the participant, solicited by a behavior of disengagement or inappropriate development of procedures, or initiated by the facilitator without the mentioned antecedents); (b) the presence of praise (whether praise was present within the intervention or not); (c) the antecedent of kinesthetic directions about the painting procedures (whether the first kinesthetic direction provided within the intervention was preceded by verbal/visual directions about the procedures, by encouragement or artistic comments, or neither); and (d) the antecedent of verbal/visual directions about the painting procedures (whether the first verbal/visual direction provided in the intervention was preceded by kinesthetic directions about the procedures, by encouragement or artistic comments, or neither). Observers

obtained a substantial level of agreement: the kappa statistic for these variables were .81, .77, .66, and .69, respectively.

Data Analysis

To explore the influence of potential extraneous variables, or variables that could influence the results beyond the practice or the spacing-of-practice effects, we first compared the demographic differences between the two spacing-of-practice groups using independent samples *t*-tests, and chi-square tests. Additionally, we used chi-square tests to analyze whether the four consistency-of-assistance variables had different proportions across the two evaluation sessions and across the two spacing-of-practice groups.

We used non-parametric tests to analyze the outcomes, because none of the seven dependent variables fulfilled the normality assumption to conduct parametric tests, as indicated by Kolmogorov tests. Differences between the first and the fourth session were compared with Wilcoxon Signed-Rank tests. Differences between the two spacing-of-practice groups were compared with Mann-Whitney *U* tests. This test was also used to analyze differences between level-of-dementia groups. For descriptive purposes, we reported relative frequencies, the median, and the 25th and 75th percentiles.

SPSS 22 was used to conduct all statistical analyses. The level of acceptable statistical significance for all tests was set at $p < .05$.

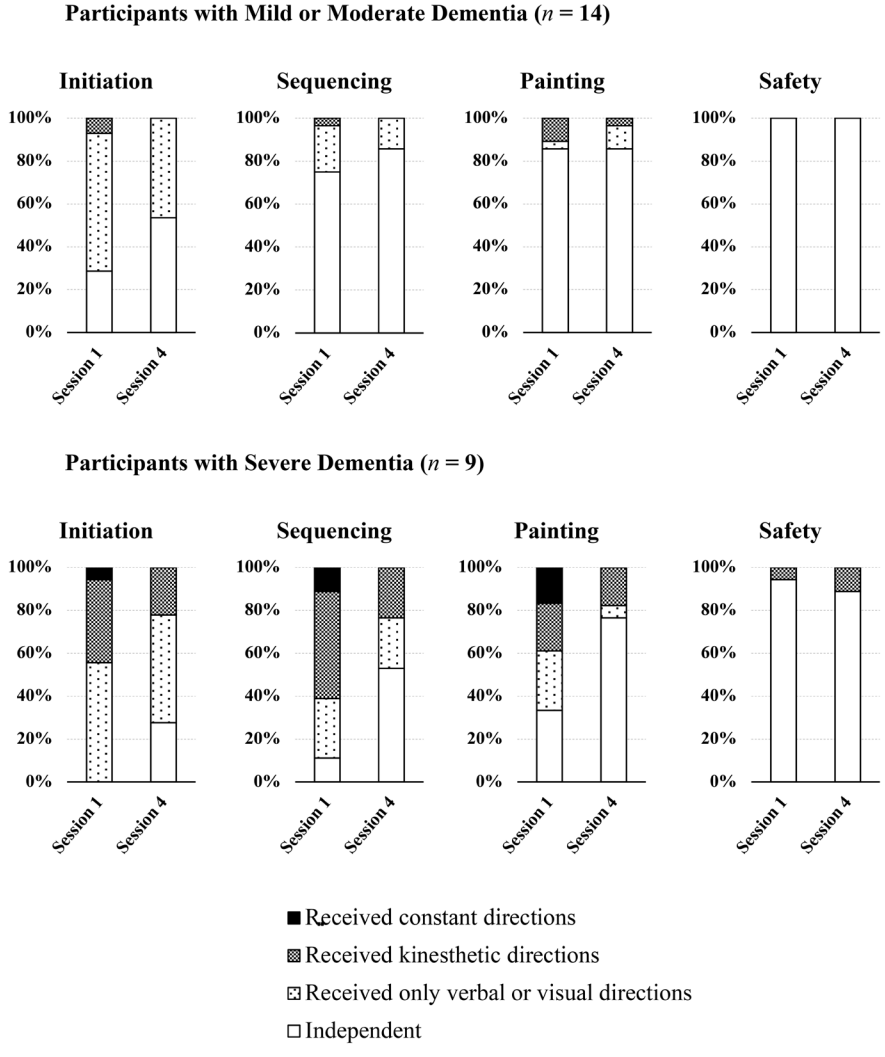
Results

Control of potential extraneous variables

We found no significant effects for the potential inconsistencies in which assistance was given to participants. Chi-square analyses showed that the four variables created to control the consistency of assistance did not show significantly different

Figure 1

Percentage of intervals in which participants received different levels of assistance, segregated by type of requirement, session, and level of dementia



proportions across the first and the fourth session, nor across the two spacing-of-practice groups. These results were found using the scores of any of the two observers.

Regarding the potential influence of initial differences between the two spacing-of-practice groups, several chi-squares and *t*-tests indicated that demographic differences were not significant (Table 1). Likewise, these groups did not significantly differ in the dependent variables during the first session (Table 3).

The practice effect

The first session. From the first session we observed that participants were actively engaged most of the time. In 79% of the intervals, participants reached the highest possible score in active engagement, which implied spending more than half of the time speaking about the activity or manipulating the materials. As a counterpart, other types of engagements were less observed. Passive engagement, that is, listening or looking at the activity, was observed in 62.32% of the intervals, but only in 6.52% as the predominant engagement behavior. Engagement in other activities or non-engagement behaviors were generally not observed: they were respectively observed in 13.04% and in 7.25% of the intervals, and only in 2.17% and 5.07% as predominant behaviors. Pleasure expressions were observed in 11.59% of the intervals, and sad or anxiety expressions only in 2.99%. No significant differences were found between participants

Table 2

Demographic information for the group who practiced once a week and the group who practiced three times a week

	First Session		Fourth Session		
Domain	Median	*P. 25 / P. 75*	Median	*P. 25 / P. 75*	*p*
Independence	28	23 / 30	30	27 / 32	.006
Active Engagement	18	15 / 18	18	17 / 18	.324
Passive Engagement	10	8 / 12	8	7 / 10	.138
Other Engagement	6	6 / 8	6	6 / 6	.244
Non Engagement	6	6 / 6	6	6 / 6	.672
Pleasure	6	6 / 7	7	6 / 8	.053
Sad/Anxiety	6	6 / 6	6	6 / 6	.102

Note. *P.25 / P.75* refer to the values of the 25th percentile and the 75th percentile respectively.

Table 3

Comparison of results between the two spacing of practice groups in the scores in the first session (s1) and in the fourth session (s4)

		Group Practicing Once a week (*n* = 13)		Group Practicing 3 times a week (*n* = 12)		
Domain		Median	*P. 25 / P. 75*	Median	*P. 25 / P. 75*	*p*
Independence	S1	28	22 / 29	29.5	24.25 / 31.5	.153
	S4	29	28 / 32	30	29.25 / 32	.703
Active Engagement	S1	17	15 / 18	18	15.75 / 18	.22
	S4	18	17.5 / 18	18	17 / 18	.791
Passive Engagement	S1	11	8 / 12	9.5	8.25 / 10	.169
	S4	8	7 / 8.5	8.5	7.75 / 12	.229
Other Engagement	S1	6	6 / 8	6	6 / 7.75	.483
	S4	6	6 / 6	6	6 / 6	.563
Non Engagement	S1	6	6 / 6	6	6 / 6	.963
	S4	6	6 / 6.5	6	6 / 6	.55
Pleasure	S1	6	6 / 7	6	6 / 7.75	.945
	S4	6	6 / 8	6	7.50 / 8.25	.361
Sad/Anxiety	S1	6	6 / 6	6	6 / 6	.462
	S4	6	6 / 6	6	6 / 6	.999

Note. S1 and S4 refer to the values of the first session and the fourth session respectively. *P.25 / P.75* refer to the values of the 25th percentile and the 75th percentile respectively.

with severe dementia and participants with mild or moderate dementia in any of the engagement or well/ill-being variables.

However, a significant difference was found between their independence. Participants with mild or moderate dementia were more independent (Md = 29.5) than participants with severe dementia (Md = 23), U = 14.5, z = -3.08, p = .002, r = .64. Specifically, in most intervals, participants with mild or moderate dementia were independent for painting and organizing the painting procedures, while participants with severe dementia generally required some or constant assistance for these procedures (Figure 1).

Changes from the first to the fourth session. We found a significant improvement in independence from the first session (Md = 28) to the fourth session (Md = 30), with a large effect size, z = -2.75, p = .006, r = .57 (Table 2). Figure 2 shows that these independence improvements applied to all levels of dementia, and for the activity requirements of initiating, painting, and sequencing the painting procedures. The independence improvements were more salient in participants with severe dementia. By the fourth session, none of them were observed needing constant assistance for any requirement, and in most of the observations, they were able to paint and sequence the painting procedures independently. Yet, their independence (Md = 29) was still significantly lower than the independence of participants with mild or moderate dementia (Md = 31, U = 25.5, z = -2.43, p = .015, r = .51).

No significant improvements were found for any of the engagement or well/ill-being variables (Table 2). However, it is important to note that at the descriptive level all these variables reached more positive scores in the fourth session than in the first. In the fourth session the predominant engagement behavior was active engagement in 85.5% of the intervals, passive engagement in 8.6%, non-engagement in 2.9%, and other engagement was not predominant in any interval. Pleasure expressions were observed in 23.18% of the intervals, and sad or anxiety expressions were not observed at all.

The spacing-of-practice effect

No significant differences were found for any independence, well-being or engagement variables between participants who had practiced three times a week versus participants who had practiced once a week, as indicated by Mann-Whitney U tests (Table 3).

Artistic results

Some of the artworks done by the participants are included in the Appendix. Also specified in the Appendix are some of the public exhibitions in which artworks were included.

Discussion

The present study increases the evidence regarding the importance of practice in the independence of PWD (De Wit et al., 2021; van Halteren-van Tilborg et al., 2007). Its value lies especially in the fact that it generalizes this practice effect to leisure activities, specifically to an artistic painting activity. Participants of all levels of dementia significantly increased their independence from the first to the fourth session, not only for the basic procedure of painting, but also for initiating the painting procedures and for sequencing them, which implies painting, reaching for colors, and coming back to paint. This change can be attributed to the capacity PWD have to learn via implicit memory. Implicit memory enables people at different levels of dementia to improve their skills through repetition, with no conscious effort (De Wit et al., 2021; van Halteren-van Tilborg et al., 2007).

These independence improvements were especially noteworthy in participants with severe dementia symptoms. In their first session, people with severe dementia frequently required assistance to keep actively engaged. For example, it was common for them to get disoriented after their brush dried out, and facilitators generally had to guide their hand to dip their brush in colors. However, after practicing for several sessions, these procedures were more mechanized, and the level of assistance participants needed was much lower. By the fourth session no participant required constant assistance for any painting procedures.

We expected that the general improvements of independence in participants would be accompanied by improvements in their engagement and well-being, because independence could facilitate a higher sense of competence and reduce the probability of participants feeling like a burden for facilitators. These improvements did not reach statistically significant levels. Yet, in coherence with previous studies about the effect of practice in artistic painting (Windle et al., 2017), at the descriptive level, all of the engagement and well/ill-being variables reached more positive values in the fourth session.

Finally, no significant difference was found between participants engaging three times per week versus participants engaging once per week, suggesting that the spacing of the practice has no effect on the enjoyment and independence gains. However, it is important to continue investigating this question with larger samples, especially because previous studies have shown that the procedural learning of people with severe dementia in simple procedural tasks was higher when sessions were separated by two or three days rather than a week (Mitchell & Schmitt, 2006; Mochizuki-Kawai et al., 2006).

Practice considerations

The main application of this study is to encourage the inclusion of participants with severe dementia in artistic painting activities. The scarce literature about people with severe dementia in artistic painting activities (Chancellor et al., 2014) might be attributed to the intense assistance they require in the first sessions. This study showed that they might require intense individualized assistance in the first sessions, but also that this assistance can be progressively removed as they practice. Also importantly, participants with severe dementia showed similar levels of engagement and pleasure compared to the rest of the participants. The

engagement levels were actually very high. In line with prior literature (Jeppson et al., 2022; Kinney & Rentz, 2005; Sauer et al., 2016; Ward et al., 2021), participants spent most of the time actively engaged, and rarely showed expressions of ill-being.

Of great importance is to consider the unpredictability of some of the independence improvements. In the first sessions, some participants with severe symptoms were losing attention only a few seconds after receiving indications from facilitators, and they questioned their potential to automatize the painting procedures. We believe that the individualized attention that facilitators provided in the first sessions was crucial for the independence gains in these cases. Not only did it help participants to practice more, but it also facilitated a common understanding between participants and facilitators through unspoken language. For example, one of the participants rarely spoke, and appeared to be uninterested in the activity because she lost attention every time she needed to fill the brush with paint. However, after receiving repeated assistance for this procedure, she started to request assistance for it in every single instance through gestures, by extending her arm, and maintaining it while her eyes remained focused on the painting, as if she did not want to get distracted by any means. It constituted a cue to provide more intense assistance to help her gain independence.

Limitations and future studies

One limitation of this study was that we did not use a control group to analyze the practice effect, that is, a group who would be videotaped in two sessions coinciding in time with the first and fourth session of the experimental group, but with no practice sessions in between. Because of that, there is not a systematic control for the momentary context or maturation effects that can influence the results. Another limitation was the small sample size, which reduced the possibility of finding differences to be statistically significant and reduced the generalizability of the results. Future studies can try to overcome these limitations. Additionally, participants selected themselves according to their desire to participate in artistic painting and results might not generalize to participants who do not have this pre-existing motivation. Future studies can continue exploring the independence gains of people with dementia in a greater variety of hobbies and activities such as bingo, music therapy, or aerobic exercise, for which there is already evidence showing that they can contribute to improve well-being in PWD, including those with severe symptoms (Hui et al., 2021).

Conclusion

Artistic painting is an activity in which people with dementia can not only experience high levels of engagement and well-being but can also develop independence while doing it. After practicing for a few sessions, people with severe dementia can go from receiving constant assistance for most painting procedures to only requiring some occasional assistance. The participants exceeded our expectations, not only of these independence changes, but also of what they were able to express through art.

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Conflict of Interest

The authors have no conflicts of interest to declare.

Data availability statement

The data supporting the conclusions of this study are available on Open Science Framework at http://doi.org/10.17605/OSF.IO/3WE76

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