# Digital and Traditional Coloring's Impact on Death Anxiety Among Older Adults

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## Abstract

The purpose of this study was to examine if coloring mandalas digitally or traditionally has a different impact in reducing death anxiety among older adults. Using random assignment, we compared digital and traditional coloring to a non-art distraction activity (completing a word puzzle) for levels of death anxiety following a death anxiety induction. We hypothesized that both digital and traditional coloring conditions would result in lower levels of death anxiety compared to the non-art activity, but that traditional coloring would result in the lowest levels of death anxiety. In addition, we explored technology literacy as a potential moderating factor. We found that among participants low in technology literacy, coloring a mandala with paper and colored pencils resulted in lower death anxiety than coloring a mandala on a digital tablet. This demonstrated the importance of attending to people's familiarity and confidence in using a particular medium when designing artistic interventions for anxiety reduction.

## Introduction

- Previous literature has found coloring mandalas is useful for reducing anxiety and works better than coloring a blank piece of paper or plaid designs (Flett et al., 2017; van der Vannet & Serice, 2012).
- Research to date has examined the effect of coloring on state-dependent anxiety in undergraduate students or test anxiety in children and adolescents, but rarely examined older populations in the study of coloring interventions. Increasing worries about death fueled by a lack of social support is even more relevant with the recent COVID-19 pandemic, as the disease led to further isolating environments through quarantine and made the concept of death more salient (Menzies & Menzies, 2020)
- Digital art is usually made on a drawing or graphic tablet with a stylus, or on a mobile device, such as an iPad. This form of art has been rising in popularity due to how easy it is to correct mistakes, reproduce, and share (Wang & Wang, 2021). There has been limited research exploring the possibility of using the digital medium as a de-stressing tool.
- The current study examined if coloring mandalas digitally or traditionally would be associated with less death anxiety among older adults, and if one or the other would be more effective..

**Hypothesis**

- We predicted that engaging in both traditional and digital art would be associated with lower death anxiety than a non-art distraction activity, but traditional coloring would be associated with the least amount of anxiety.
- We also examined whether technology literacy would moderate links between coloring in each modality and levels of death anxiety.

## Method

- Participants consisted of 69 older adults residing in Southern California, recruited from senior centers and from Pepperdine University.
  - Ages ranged from 50 to 97 years of age ($M$ = 72.20, $SD$ = 15.10).
  - 45 female participants (65.20%), and 24 male participants (34.80%).
  - 43 identified as white (62.30%), 16 as Asian (23.20%), and 7 as Latine (10.10%). Of the participants, 3 people (4.30%) chose not to report.
- Participants completed technology literacy scale (MDPQ-16; Roque & Boot, 2016) and then participated in a four-minute death anxiety induction. After, participants responded to a manipulation check.
- We then randomly assigned participants to one of three conditions:
  - traditional coloring group (TC): participants colored a mandala design on a piece of paper with colored pencils ($n$ = 26)
  - digital coloring group (DC): colored identical mandala as the TC group on a tablet with a stylus ($n$ = 22)
  - distraction condition: participants completed a word search (Flett et al., 2017)
- After the coloring or distraction activity, participants were given a modified Templer's Death Anxiety Scale and demographic survey. Then participants were debriefed and given a gift in the form of a coloring book with a set of colored pencils and a $10 gift card.

## Results

- Making use of orthogonal contrasts of the experimental conditions to compare them to one another, hierarchical regressions accounted for significant variation in participants' death anxiety following the experimental intervention, $F(5,63) = 3.90$, $p = .004$. See Table 1 and 2.
- Step 1 of the regressions comparing the experimental conditions for levels of death anxiety was significant, and Step 3 indicated there were significant interactions between technology literacy and the study conditions in predicting post-intervention levels of death anxiety.
- Post-hoc probing of these significant interactions indicated that among participants low in technology literacy (1 SD below the mean), being assigned to the TC was associated with significantly less death anxiety ($M$ = 17.53) than being assigned to the digital coloring condition ($M$ = 33.91; β = 1.46, $t$ = 2.84, $p$ = .006). The TC and DC did not result in different levels of death anxiety among participants high in technology literacy (1 SD above the mean), β = .025, $t$ = .195, $p$ = .846. Nor did the other experimental conditions differ from one another in levels of death anxiety at low technology literacy (non-art distraction vs. digital: β = .440, $t$ = 1.010, $p$ = .316; non-art distraction vs. traditional: β = -599, $t$ = -1.484, $p$ = .143) or high technology literacy (non-art distraction vs. digital: β = .220, $t$ = 1.010, $p$ = .316; non art distraction vs. traditional: β = -.296, t = -1.484, $p$ = .143).
- Death anxiety levels for each condition in high and low technology literacy groups are illustrated in Figure 1.

**Table 1**

*Hierarchical Regressions of Coloring Conditions Predicting Death Anxiety and the Moderating Effects of Technology Literacy (N = 69)*

| | Death Anxiety | | | | | | |
|---|---|---|---|---|---|---|---|
| | *B (SE)* | *B* 95% CI | β | $sr^2$ | $R^2$ | $\Delta R^2$ | ΔF |
| **Step 1** | | | | | | | |
| Contrast 1: control vs. traditional coloring | 1.34 (.828) | -.310, 2.997 | .218 | .003 | .069 | .069 | 2.451 |
| Contrast 2: control vs. digital coloring | -1.80 (.863) | -3.53, -.081 | -.281 | .061 | | | |
| Contrast 3: traditional vs. digital coloring | -1.80 (.863) | .081, 3.53 | .296 | .059 | | | |
| **Step 2** | | | | | | | |
| Tech literacy | .127 (.053) | .021, .233 | .275* | .075 | .144 | .075 | 5.705* |
| **Step 3** | | | | | | | |
| Contrast 1 x Tech literacy | -.177 (.070) | -.318, -.036 | -.329* | .000 | .236 | .092 | 3.799* |
| Contrast 2 x Tech literacy | .179 (.078) | .024, .334 | .305* | .065 | | | |
| Contrast 3 x Tech literacy | -.179 (.078) | -.334, -.024 | -.310* | .065 | | | |

*Note.* Contrasts 1 and 2 (and associated interaction terms) were run in a separate regression analysis from contrast 3 and 4. Each regression analysis had an identical hierarchical structure. For contrasts 1 and 2, the control condition was used as the comparison and for contrasts 3 and 4, traditional coloring was used as the comparison. Contrast 4 (traditional coloring versus control) is not reported in the table due to duplication with contrast 1.

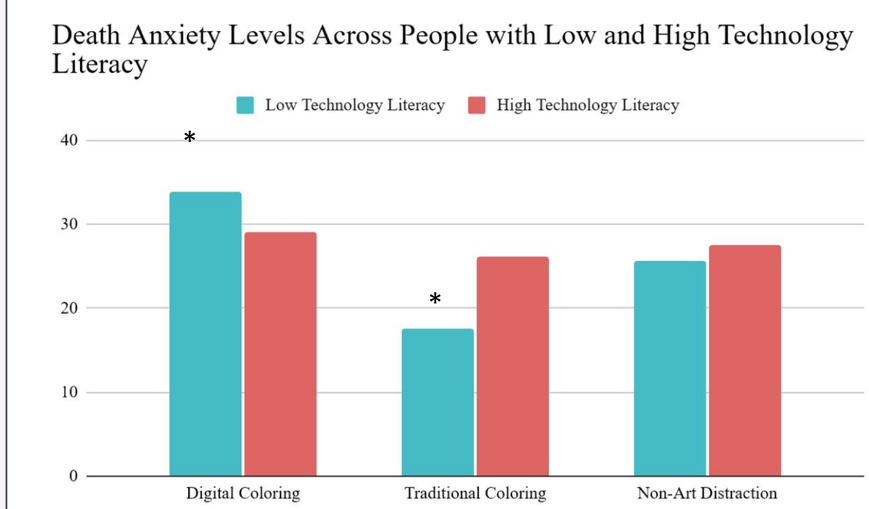
* $p < .05$

**Table 2**

*Means and Standard Deviations of Death Anxiety and Technology Literacy Scores Across Conditions*

| Experimental Condition | Death Anxiety Scores | | Technology Literacy Score | |
|---|---|---|---|---|
| | *M* | *SD* | *M* | *SD* |
| Digital coloring (n = 22) | 31.45 | 4.43 | 28.82 | 10.10 |
| Traditional coloring (n = 26) | 29.19 | 5.85 | 26.40 | 11.19 |
| Control (n = 21) | 29.58 | 5.11 | 27.55 | 11.06 |

**Figure 1**




*Note.* * $p < .05$

## Conclusions

- Although we did not find that digital or traditional coloring resulted in less death anxiety than a distraction-based activity (a word puzzle), we found that technology literacy moderated links between the art activities and levels of death anxiety. Specifically, participants with low technology literacy reported higher death anxiety following digital coloring compared to traditional coloring.
- The current study suggests that being proficient in an art medium may not improve the efficacy of art-based interventions over other types of distraction-based coping. Further, not being familiar with the medium (in this case technology) seems to harm the soothing effects of coloring.
- Unlike the forms of anxiety explored in previous literature (state-dependent anxiety and test anxiety), death anxiety is less state-dependent, as death anxiety is "omnipresent" in people's lives (Snioff, 2017). Thus, it is possible that a one-time intervention has less impact on death anxiety levels compared to other forms of state-dependent anxiety.
- Our results might further be explained on the basis of Terror Management Theory (TMT), in that people who did not feel comfortable using the tablets may have experienced a decrease in self-esteem, one of the buffers for death anxiety (Pyszynski et al., 2002).

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