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The Effect of Art Therapy on Time Preferences and Emotions: A Behavioral Online Experiment

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Abstract. This paper examines the causal effect of short, experiential art-based interventions on both immediate affective conditions (affect) and intertemporal choice (patience). Through the use of a pre-post randomized controlled design (online), a sample of 489 students was allocated to a guided art therapy session (T1), an unguided pure art-making session (T2) and a control group (T0). Measures of outcomes were made in relation to a positive-affect index, a perceived stress scale, a patience index derived from a multiple-price-list task, and a self-reflection scale. The key robust finding is that both art interventions significantly increased post-intervention self-reflection. The guided therapy shows a larger effect (adjusted β=2.082, $p< 0.01$). However, in covariate-adjusted models, neither intervention produced a statistically significant effect on positive affect or patience. The initial unadjusted improvements in positive affect were attenuated after controlling for baseline characteristics. These results demonstrate that brief art activities, particularly when therapeutically guided, can reliably promote introspection. However, they provide no robust evidence that a single session causally improves mood or alters short-term time preferences. The findings highlight the importance of controlled experimental designs and adjusted analyses in evaluating art-based interventions and suggest their primary value may lie in enhancing reflective capacity rather than immediate mood or decision-making.

Keywords: art therapy, emotions, behavioral economics, mental health intervention

1. Introduction

Within the context of a fast-changing and technologically evolving world, the mental health issues among students become increasingly prevalent. There is a pressing need to identify accessible, scalable, and efficient strategies to enhance students' psychological well-being and cognitive functioning. Conventional methods of therapy, though effective, are likely to encounter hurdles in costs, stigma, and accessibility. Meanwhile, behavioral economics has influenced psychological conditions, especially affect and emotional control on basic decision-making, e.g., intertemporal choice, the trade-off between immediate and delayed rewards. Present-biased preferences and impatience are associated with a series of long-term results in health, education, and finance.

As a type of expressive therapy, art therapy is a mode of creative therapy in which the creative process of art-making is employed to achieve clinical benefits in mental and emotional well-being. The mechanisms it is hypothesized to possess are emotional catharsis, enhanced self-awareness,

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reduced stress, and enhanced cognitive regulation. Independently, participation in art-making as a recreational activity is also anecdotally related to relaxation and a better mood. Nevertheless, there is limited rigorous support based upon controlled experimentation and on the influence of non-clinical forms of art intervention on both emotional and behavioral economic behavior [1]. However, whether a single session of artistic activity can causally alter emotional state and patience remains an open question.

The study closes this gap, it hypothesizes that the immediate positive effect can be induced when active engagement in the creation of art is experienced. It would lead to a state of deep concentration or flow. This improved positive mood may be associated with counteracting the tendency to discount future rewards. It is a tendency that is typically exacerbated by cognitive burdens and negative emotional states, which are frequently the motivators for impulsive, short-term decisions [2]. The hypothesis is that the intended program of art therapy, including the concepts of mindfulness and self-expression, will produce more significant effects on emotional and behavioral results compared to an unaided art task or an active control condition.

The main research questions are as follows: (1) What is the relative efficacy of brief art therapy and pure art-making activities, compared to a control condition, in eliciting an immediate increase in positive affect? (2) Can such interventions trigger a measurable increase in patience and future orientation? (3) Does the provision of therapeutic guidance moderate these effects? Through the use of an interventional, randomized controlled study, post- and pre-test outcomes, this research aims to provide estimates of these effects. The goal is to fit into the literature in the intersection of psychology, behavioral economics, and arts-based health studies.

2. Literature review

Art therapy is based on the idea that the creative process is beneficial to healing and well-being [1]. Art therapy may be used effectively to decrease anxiety and depression symptoms and improve mood [2]. The hypothesized mechanisms are emotional catharsis, unloading unpleasant emotions, and the achievement of the flow state of concentration of attention and disappearance of the self-conscious feeling [3]. Much of the evidence base, however, is based in a clinical setting or in a multi-session intervention. How short-term, non-clinical, and one-session art activities may modify the immediate affective condition of a heterogeneous population of students is less strictly studied in terms of controlled, experimental studies.

The role of emotional and visceral states in decision-making, especially intertemporal decisions with trade-offs between present and delayed rewards, has been documented in the body of literature in behavioral economics [4,5]. Present bias may be aggravated by negative affective states such as stress or sadness because people would like to quickly recover and restore their mood [6,7]. Positive affect, in turn, has been associated with more patient, future-directed decisions, which may be caused by the expansion of cognitive scope as well as such improvement in self-regulation [8].

Can a brief artistic experience cause a change in time preferences? Some studies have been conducted on similar associations; retrospective reflection has been identified to enhance patience [9], and mindfulness-based interventions can decrease delay-discounting [10]. These activities may have common features with art-making, including the ability to make one reflect and pay attention. This study is driven by the desire to test this through a combination of a standardized art intervention and an economically important behavioral measure of patience. The goal is to examine how accessible and non-pharmacological tools can influence well-being and impact decision-making.

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3. Methods

3.1. Experimental design and procedure

A three-arm, parallel-group randomized controlled trial was conducted. The pre-test and post-test design were completely online. The study protocol was pre-registered before collecting the data. The process involved three phases using an online survey. Our primary specification estimates treatment effects using ANCOVA models. It is to control only for baseline outcome levels. Fully adjusted models include additional demographic and covariate variables as conservative robustness checks.

First, each respondent completed a baseline questionnaire. This gathered standard demographic data (e.g., age, gender, education, employment, salary) and baseline (pre-treatment) measures of the main outcome variables. Then, they were randomly and automatically allocated into three categories based on an algorithm with a similar expected duration (about 15-20 minutes).

Treatment Group 1 (Guided Art Therapy, T1; N=135): In this group, the participants were exposed to an art-making activity facilitated by the principles of art therapy. The use of a standardized protocol, presented both as a video and textual instruction, was explicitly supported with the encouragement of paying mindful attention to the materials, being non-judgmental to themselves, and being mindful of the process and outcomes produced in the creative activity. Treatment Group 2 (Pure Art Making, T2; N=256) applied the same art-making task with the same core materials, but the participants were only given technical and task instructions with no therapeutic guidance. This approach aimed to isolate the effect purely attributable to the core processes of creative engagement. Lastly, the Control Group (T0; N=98) was involved in a non-artistic, neutral activity of similar length: reading a short piece of informational material. This design controlled for potential confounding effects of time passage, repeated testing, and general platform familiarity. The outcome measures were repeated, as well as the secondary measures and manipulation checks.

3.2. Participants

489 participant students were recruited into the study by university participant pools and online academic websites. The sample included 260 female and 236 male participants. The sample size on analysis differs slightly among models because of item non-response on certain tasks. Randomization was effective. This results in balanced groups across all key baseline characteristics and pre-test measures. It supports the internal validity of the study.

3.3. Measures

Primary and secondary outcomes were assessed. Positive affect was assessed using a multi-item scale. The items were adapted from established measures, such as the Positive and Negative Affect Schedule (PANAS), and targeted specific states, including happiness, calmness, and inspiration. Responses were collected into a composite index. Change scores were derived by comparing pre- and post-intervention values.

The time preferences, or the operationalization of patience, were examined through the multiple-price-list format, which is a typical behavioral economics instrument [11]. Participants made a series of sequential binary choices between smaller-sooner and larger-later monetary rewards. Personal discount rates derived from these choices were used to construct a weighted patience index, where higher values correspond to greater patience. Change scores in discount rates were calculated. A

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decrease (more negative change) in the discount rate would indicate a shift toward greater patience and future orientation. Perceived stress was measured using a short-form scale.

Two secondary outcomes were assessed at post-intervention: (a) a self-reflection measure assessing the degree of introspection prompted by the activity, and (b) a single-item measure of the activity's perceived positive contribution. These constructs were not measured at baseline, so analyses for these outcomes focused on comparing post-intervention levels across groups. Demographics (Age, Gender, Education, and Salary) and art-associated behavioral variables (frequency of art exposure, prior therapy experience, and general liking of art) were collected as baseline covariates.

3.4. Analytical strategy

All the analyses were based on intention-to-treat. Baseline equivalence across groups was assessed. Primary analysis was conducted using Analysis of Covariance (ANCOVA). Post-intervention scores served as the dependent variable, treatment group assignment as the independent variable, and the corresponding pre-intervention (baseline) scores are included as a covariate. This approach increases statistical robustness by accounting for baseline variability. Change scores were also calculated in secondary or sensitivity analyses.

The average treatment effect was estimated using multivariate Ordinary Least Squares (OLS) regression. Model specification was determined by outcome variable type: OLS regression was applied to continuous outcomes. Ordered logistic regression was used for ordinal outcomes. Primary ANCOVA models included treatment assignment and baseline scores only. Fully adjusted models controlled the full set of demographic and behavioral covariates.

In line with the preregistered analysis plan, robustness checks were used to assess the sensitivity of the results to (a) alternative model specifications and (b) the exclusion of inattentive respondents. Estimates are reported with clustered robust standard errors, and statistical significance is indicated by p-values.

4. Results

4.1. Overview and randomization

Four hundred and eighty-nine participants were randomly assigned: Control (n=98), Pure Art (n=256) and Guided Art Therapy (n=135). Random assignment resulted in balanced baseline characteristics across groups. There were no statistically significant differences in baseline positive affect, patience, or the key demographic variables (all $p > 0.05$). The direction of the estimated effects on affect remains positive for specifications. Yet statistical significance is observed only in parsimonious models. It indicates that the affective gains are present. However, no robust affective gains can be found in highly conservative adjustment.

4.2. Treatment effects on primary outcomes

The fundamental results are presented in Table 1. Participants in the Guided Art Therapy showed the largest mean increase in positive affect change (+3.41), compared with the Control group (+1.69). ANOVA showed a statistically significant difference ($p<0.001$). Post-treatment self-reflection scores were also highest in the Guided Art Therapy group (2.08). It was followed by the Pure Art group (1.70). The score for the control group was 1.12. The difference was also statistically significant ($p < 0.001$).

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For patience, mean changes were negative across all groups. It indicates a shift toward future-oriented choices on average, but the overall difference was not significant (p=0.198). For perceived contribution, unadjusted ANOVA indicated a significant between-group difference (p=0.028). The unadjusted differences did not remain statistically significant after covariate adjustment.

Table 1. Descriptive group differences in primary outcomes (unadjusted)

Outcome	Control	Pure Art	Art Therapy	Overall p-value (ANOVA)
Positive Affect	+1.69	+2.38	+3.41	p < 0.001
Patience Index	-0.64	-1.39	-1.81	0.198
Post Self-Reflection	1.12	1.70	2.08	p < 0.001
Perceived Contribution	9.53	12.37	14.49	0.028

Values are the unadjusted mean changes
Negative values of the patience index indicate shifts toward more future-oriented choices
Differences in the patience index across groups are not statistically significant
Regression-adjusted estimates controlling for covariates are reported in Table 3

Pairwise comparisons (Table 2) show that guided art therapy increased the positive effect by 1.721 points relative to the control group, while the pure art group showed an increase of 0.689 points. Similarly, post-treatment self-reflection scores were 0.959 points higher in the guided art therapy group and 0.573 points higher in the pure art group, compared to the control group. Changes in the patience index were not statistically significant. Although the unadjusted difference in Perceived Positive Contribution was large and statistically significant for the guided art therapy group (+4.959, p<0.01), this effect did not persist in adjusted models, which will be further discussed in the following section.

Table 2. Unadjusted Treatment Effects on Primary and Secondary Outcomes

Outcome	Control (T0)	Pure Art (T2)	Art Therapy (T1)	Overall p-value
		Change in Positive Affect (Emotion_c)		
Mean (SD)	+1.694(3.399)	+2.383 (2.848)	+3.415 (2.763)	< 0.001
vs. Control	—	+0.689**	+1.721**	
		Change in Patience Index (w_Preference_c)*		
Mean (SD)	-0.640 (7.440)	-1.393 (5.780)	-1.809 (5.584)	0.198
vs. Control	—	-0.753	-1.169	
		Post-Treatment Self-Reflection		
Mean (SD)	1.122 (1.254)	1.695 (1.237)	2.081 (1.252)	< 0.001
vs. Control	—	+0.573***	+0.959***	
		Perceived Positive Contribution		
Mean (SD)	9.531 (13.90)	12.37 (15.36)	14.49 (15.63)	0.028
vs. Control	—	+2.839	+4.959**	

Note: A more negative w_Preference_c indicates a shift toward more future-oriented choices. Significance stars (*p<0.05, ** p<0.01, *** p<0.001) for pairwise comparisons.

4.3. Adjusted effects from multivariate models

The average treatment effects, adjusted for all demographic and behavioral covariates, are presented in Table 3.

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Table 3. Adjusted average treatment effects on primary and secondary outcomes

Outcome	Control	Pure Art	Guided Art Therapy
Self-Reflection	(Ref)	β = 1.459***(0.304)	β = 2.082*** (0.413)
Patience Index Change	(Ref)	β = -0.241 (0.427)	β = -0.396 (0.480)
Positive Affect Change	(Ref)	β = 0.241 (0.399)	β = 0.715 (0.543)
Perceived Contribution	(Ref)	β = 0.373 (0.338)	β = 0.266 (0.369)

Note: Coefficients (β) and robust standard errors (in parentheses) are from multivariate regressions controlling for the full set of demographic and behavioral covariates (age, gender, education, salary, art exposure, etc.). *** p < 0.01, ** p < 0.05, * p < 0.1

The effect of guided art therapy on self-reflection remained highly significant (β= 2.082, p<0.01). The Pure Art condition also showed a significant positive effect (β= 1.459, p<0.01), relative to the control group. This confirms that the treatment effects on self-reflection are the most robust.

For Patience, Positive Affect, and Perceived Contribution, no treatment conditions showed a statistically significant effect in the adjusted models (all p>0.1). The unadjusted group differences observed were likely to be influenced by the covariates.

5. Discussion

This online randomized controlled trial examined the immediate effects of brief art-based interventions on the three aspects: affective, reflective, and behavioral economic outcomes. Importantly, the present findings are confined to short-term effects measured within a single experimental session. No inference can be made regarding the persistence of these effects over time.

Both art interventions significantly increased post-intervention self-reflection compared to the control condition. The effect was substantially larger in the guided therapy condition. It underscores the added value of therapeutic structure in promoting introspection.

In covariate-adjusted models, there were no significant treatment effects observed on positive affect, patience, or perceived contribution. This difference with the unadjusted results highlights a critical methodological point. It is that initial mean differences can be partially attributed to baseline characteristics (e.g., prior art experience, demographics). Therefore, this study does not support the hypothesis that a single session of art-making causally improves immediate mood or alters short-term time preferences in a general student population. The significant unadjusted results for positive affect and contribution serve as a reminder of the necessity of controlled experimental designs and adjusted analyses to isolate true causal effects.

The positive effect on self-reflection aligns with art therapy theories. Art-making would facilitate cognitive engagement and internal focus. In addition, the null findings on patience suggest that in order to change deep-seated economic preferences, there is a need for more intensive interventions than a brief art session. The attenuation of the effect calls for future research to carefully measure relevant variables.

6. Conclusion

This study provides experimental evidence on the effects of brief, non-clinical art-based interventions on emotional and behavioral outcomes. The study uses a randomized controlled online design. It is found that even a single session of art engagement can meaningfully influence participants' reflective capacity.

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Across specifications, the most robust and consistent finding is a substantial increase in self-reflection, with the guided art therapy condition producing the largest effect. This result remains statistically significant in covariate-adjusted models. It suggests a reliable causal impact of therapeutically guided art activities on introspective processes.

With respect to emotional outcomes, both art interventions are associated with improvements in positive affect in baseline-adjusted models. However, these effects are attenuated under adjusted specifications. This sensitivity to model specification indicates that affective gains may be present, but they are less stable compared with changes in reflective capacity. Thus, they should be interpreted with caution.

For intertemporal choice, the estimated treatment effects consistently point toward more future-oriented preferences. This suggests that a single, short art-based session may be insufficient to generate measurable changes in economic time preferences, even if it initiates psychological processes related to reflection and emotional regulation.

Taken together, the findings suggest that the primary value of brief art-based interventions lies in their capacity to promote self-reflection. Future research should explore whether repeated or sustained engagement is necessary for these reflective gains to translate into durable emotional improvements, as well as economically relevant behavioral change.

There are several limitations of the research. First, there is the risk that the generalizability of the effects to in-person environments may be constrained by the use of a single-session and online format. Thus, future research should consider using larger and pre-registered designs. It can help obtain more precise estimates and examine treatment effect heterogeneity across subgroups. Additionally, the use of mediation analyses would assist in clarifying whether affect or self-reflection enhancement would drive modifications in preferences for time. Furthermore, future research can study the role of perceived stress as a potential moderator. In short, the more precise temporal measurement of stress dynamics can be studied.

References

[1] Rubin, J. A. (1999). Art therapy: An introduction. Psychology Press.
[2] Slayton, S. C., D'Archer, J., & Kaplan, F. (2010). Outcome studies on the efficacy of art therapy: A review of findings. Art therapy, 27(3), 108-118.
[3] Csikszentmihalyi, M. (1990). Flow: The psychology of optimal experience. Harper & Row.
[4] Pyone, J. S., & Isen, A. M. (2011). Positive affect, intertemporal choice, and levels of thinking: Increasing consumers' willingness to wait. Journal of Marketing research, 48(3), 532-543.
[5] Loewenstein, G. (1996). Out of control: Visceral influences on behavior. Organizational Behavior and Human Decision Processes, 65(3), 272–292.
[6] Lewis, M., Haviland-Jones, J. M., & Barrett, L. F. (Eds.). (2010). Handbook of emotions. Guilford Press.
[7] Ifcher, J., Zarghamee, H., & Graham, C. (2018). Local neighbors as positives, regional neighbors as negatives: Competing channels in the relationship between others' income, health, and happiness. Journal of Health Economics, 57, 263-276.
[8] Fredrickson, B. L. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. American psychologist, 56(3), 218.
[9] Huang, X., Huang, Z., & Wyer Jr, R. S. (2016). Slowing down in the good old days: The effect of nostalgia on consumer patience. Journal of Consumer Research, 43(3), 372-387.
[10] Hendrickson, K. L., & Rasmussen, E. B. (2017). Mindful eating reduces impulsive food choice in adolescents and adults. Health Psychology, 36(3), 226.
[11] Coller, M., & Williams, M. B. (1999). Eliciting individual discount rates. Experimental economics, 2(2), 107-127.