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Expanding Minds: Artistic Film Promotes Conceptual Expansion and Verbal Creativity

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Can artistic experiences promote downstream cognitive effects relevant to creativity? In this preregistered, randomized controlled experimental study, a representative online sample of participants (N = 483) were randomly assigned to either the artistic short film condition or the control condition, where they watched enjoyable, nonartistic videos. Within each condition, participants were further randomly assigned to view one of five possible videos of comparable duration: artistic short films in the experimental condition or compilation videos depicting humorous, home-video-style domestic antics in the control condition. After viewing a video, participants completed a creative short story task and a categorization task designed to measure conceptual expansion. The results revealed that participants in the artistic short film condition showed increased creativity in a creative writing task and increased conceptual expansion—characterized by a greater tendency to endorse unconventional items as belonging to standard categories. The effect of condition on conceptual expansion was fully mediated by state openness. These results suggest that immersive aesthetic experiences can temporarily alter cognitive processes in ways that facilitate creative thinking, promoting more open, fluid, and expansive mental states.

Keywords: creativity, film, experimental design, overinclusive thinking, transfer effects

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The connection between art and human cognition has long captured public and scholarly interest. Art seems to have the power to alter our viewpoints and offer a fresh perspective on the world around us (Breen, 2023; Sherman & Morrissey, 2017; Talley, 2023). The call to integrate art-based education into the standard curriculum (e.g., National Art Education Association; California County Superintendents Arts Initiative) further suggests practical benefits of art on core thinking skills, such as conceptual flexibility, imaginative capacities, or creative thinking. Although these benefits are fundamentally cognitive in nature, existing research has disproportionately concentrated on emotional repercussions of aesthetic experiences (Drake et al., 2024; Fancourt et al., 2019; Fayn et al., 2018; Silvia, 2005; Tinio & Gartus, 2018), with few experimental studies addressing the potential cognitive value. It therefore remains poorly understood if, and how, exposure to art may benefit cognition more broadly.

Art has intrinsic value on its own, as evidenced by the sheer universality and sociocultural influence art and art-making has had on humankind throughout history. Beyond this, however, art and aesthetic experiences may have specific benefits for cognitive processes—particularly those related to creativity. Research in organizational and health psychology has provided suggestive evidence for this association, demonstrating how aesthetic environments—such as nature (Peng et al., 2022) and visually appealing interior spaces (McCoy & Evans, 2002)—can promote creativity. Field-based studies (i.e., in situ experimental, quasi-experimental, or qualitative studies) suggest that arts-based education can benefit imagination and creative thinking (Baş et al., 2022; Cote, 2010; Egana-delSol, 2023; Gero et al., 2019; Lukaka, 2023; Moga et al., 2000; Peleka et al., 2025). Indeed, drawing on the summative results of their meta-analysis, Peleka et al. (2025) found overall evidence for a beneficial impact of visual arts-

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based education on creativity at every level of education. These research efforts have provided foundational insights into the impact of sustained (i.e., semester- or year-long) arts-based training on creative thinking within naturalistic contexts—findings that hold significant implications for educational policy.

Field-based research has many methodological benefits, including increased ecological validity; however, it also often holds limitations, including a lack of experimental control and susceptibility to specific biases (e.g., contextual confounds and self-selection biases). For example, in the same meta-analysis reported earlier, Peleka et al. (2025) noted that only seven of the 22 studies included in their review used experimental control or randomization. Furthermore, all 22 of the included studies were found to have moderate to high risk of bias. Based on such limitations, both meta-analyses Moga et al. (2000) and Peleka et al. (2025) reached similar conclusions—existing research is highly limited by the shortage of methodologically rigorous study designs. To address these limitations, the authors recommended that future research efforts employ experimental control, along with active control groups, participant randomization, and replicable experimental methods. In short, the field would benefit from randomized, controlled studies with transparent methods to establish a stronger case for causality.

Besides arts-based educational interventions, which involve formal training and active participation in art-making, remarkably little experimentally controlled research has examined potential transfer effects from *passive* exposure to *completed* artworks. For most people, engagement with art and artistic products occurs more commonly through consumption—reading books, watching films, and listening to music—rather than through active creation. A broad literature of neuroaesthetics and empirical aesthetics research has examined the neural and cognitive processes activated *during* such art engagement (e.g., Cupchik et al., 2009; Kaube & Abdel Rahman, 2024; Vessel et al., 2013), but few studies have experimentally examined downstream impacts of aesthetic experiences on cognitive outcomes, that is, effects that persist beyond the immediate aesthetic experience.

Among the few experimental studies that exist, Hagtvedt and Vohs (2022) examined the impact of viewing complex art (or "high art"), compared with viewing simple art (or "low art"), finding the former increased perceptions of meaning in life. This finding suggests that exposure to art can influence broader cognitive or existential judgements, ideas, or beliefs. In a related vein, Proulx et al. (2010) found that exposure to absurdist works of art led to heightened meaning-affirmation efforts. For example, participants who read an absurd parable by Kafka, compared with those who read a "meaningful" parable, more strongly affirmed their own cultural identity in a subsequent task. The authors interpreted these findings as revealing that art that threatens individuals' sense of meaning, by confronting them with the strange or unfamiliar, can lead to efforts to restore cognitive coherence. In a particularly elegant experimental examination of cognitive transfer effects from art, Kidd and Castano (2013) illustrated that reading excerpts of literary fiction, as opposed to nonfiction and popular fiction, led to increased Theory of Mind in readers. Theory of Mind refers to the ability to understand that other people have beliefs and desires that are different from one's own. The use of experimental designs (i.e., randomization and/or active control groups) is unique in these studies and allows the authors to show that art has *causal* impacts on perceptions and cognitive capacities—particularly those related to empathy and understanding. Collectively, these studies provide initial evidence that exposure to art can have demonstrable cognitive transfer effects.

However, even fewer experimental efforts have examined the impact of art exposure on creative thinking skills. In one of the only experimental efforts to date, Gross et al. (2023) explored whether viewing art could facilitate thinking styles relevant to creativity. The research focused on whether two forms of cinematic films—avant-garde and traditional—could promote a pattern of thinking that has previously been associated with creativity, namely, overinclusive thinking. Overinclusive thinking, which we will refer to as *conceptual expansion*, refers to the tendency to blur categorical boundaries. It can be assessed by asking participants to evaluate how well atypical items fit within a category, for example, considering a camel as a means of transportation. Previous studies have revealed that the propensity to accept atypical items into traditional categories may boost creativity, presumably by providing greater access to diverse ideas and allowing seemingly unrelated concepts to connect (Chiu, 2015; Liu, 2016). Supporting this notion, Gross et al. (2023) showed that viewing films led to increases in both conceptual expansion and present moment feelings of creative inspiration.

Importantly, however, the impact of film was found to depend on the viewer's characteristics; in particular, trait levels of Magical Ideation were found to moderate the effects. Magical Ideation is a key component of subclinical schizotypy—a personality style linked to eccentric ideation and paranormal belief (e.g., Swami et al., 2011). Gross and colleagues' findings indicated that the ability of the avant-garde film to encourage conceptual expansion was attenuated in viewers low in Magical Ideation. For these viewers, the more conventional film promoted more feelings of meaning, which in turn promoted conceptual expansion (i.e., a moderated mediation effect). These findings indicate that the impact of art may vary considerably between personality types and depend on additional factors, such as meaning-making. In other words, the impact of art may be most pronounced when the artistic genre aligns with the personality of the viewer.

The concept of characteristic–state contingencies (Kuper et al., 2022) in personality psychology reinforces this point, suggesting that personality characteristics are amplified by contexts or situations that align with those traits. For example, social situations are most likely to impact dimensions of personality related to sociability, such as extraversion and agreeableness. Given that aesthetic sensitivity is intrinsic to most definitions of the personality characteristic Openness to Experience (Chacón et al., 2023; Silvia et al., 2015), we reasoned that this characteristic would be particularly responsive to exposure to art. We therefore predicted that artistic experiences may promote states of openness—in other words, a broadened and inspired state reflective of the personality trait of openness. This state may, in turn, promote the effects we previously observed on conceptual expansion.

The Current Study

To address limitations in past literature, the present study was designed to provide some of the first causal evidence of whether exposure to art can lead to changes in creative thinking. Specifically, we employed four key methodological features. First, we used an experimentally controlled design, with true random

assignment, to establish whether exposure to art has quantifiable transfer effects on creativity. Second, unlike Gross et al. (2023), which compared two types of art, we included an active, true control condition (nonartistic content) to examine the effect of artistic content per se. Third, although much prior work has emphasized formal arts training or active production, we examined *passive* viewing of art—the form of art engagement most common in everyday life. Fourth, we used empirically validated psychometric assessments of creative cognition and creative thinking to ensure replicable, transparent, and readily interpretable findings.

In addition to the primary question of causality, the present study also sought to explore when and for whom art promotes creative cognition. To this end, we examine whether the previously identified personality factor of Magical Ideation again moderates the impact of art on creative outcomes. To advance our understanding of *how* art promotes conceptual expansion and/or creativity, this study additionally explored the possible mediating role of state openness to experience—a transient, broadened state reflecting characteristics typical of trait Openness to Experience. Taken together, these features position the present research to provide the strongest test to date of whether and how exposure to art enhances creativity-linked cognitive processes.

For the artistic stimuli, we used animated short films that employed a wide range of animation techniques, such as traditional hand-drawings or computer-generation. The decision to use animated short films as the art form in this research was founded on several empirical and theoretical principles. First, animated films are multifaceted art forms that combine visual art, narrative, and music to offer a richly aesthetic experience. Second, in animated films, unlike live action films, all elements of the visual world, such as characters, settings, and props, are designed and created by the artist, thus amplifying the presence of an artistic voice. Third, short films lend themselves to controlled, computer-based contexts, as they remain largely faithful to the originally intended formatting when presented via computer. In contrast, physical art forms like paintings and sculptures lose essential qualities like scale and texture when viewed on a screen, potentially reducing their immersive or aesthetic quality and, in turn, their potential to impact the viewer. Lastly, earlier work (e.g., Gross et al., 2023) demonstrated significant and consistent outcomes using films in computer-delivered experiments, reinforcing their utility in aesthetics research.

Unlike Gross et al. (2023), the present study sought to compare an art condition to a nonart control condition. Given that the boundary between art and "nonart" is fairly subjective, we endeavored to maximize the distinction between conditions using a face-valid approach: selecting short films that were made by established artists and recognized by industry professionals (see the Materials section for further information on how the artistic short films were sourced). On the other hand, the control stimuli were compilation videos comprising humorous home-video clips. These compilations videos lack many of the qualities typically associated with art, that is, a narrative arc, an artistic intention or artistic voice, and aesthetic qualities (e.g., Isrow, 2017; Li & Chen, 2009). Both the art and control videos were kept comparable in length, approximately seven minutes. To diminish the potential for film-specific effects, five videos were selected for each of the conditions, and participants were randomly presented with one.

To examine effects on creativity thinking, we used the conceptual expansion task used in Gross et al. (2023). In addition to measuring cognitive processes associated with creative thinking, we extended this work by including a direct measure of creative performance. For this measure, we included a creative writing task that has been validated and widely used in contemporary creativity research (e.g., Johnson et al., 2023; Orwig et al., 2024; Prabhakaran et al., 2014). Creative writing offers an advantage in that it allows us to test for far transfer between the art stimulus and the creativity task, in that the art used was primarily audiovisual, whereas the creativity task was verbal. Furthermore, prior research by Welke et al. (2023) showed that visual art can enhance feelings of inspiration, providing precedent that exposure to visual art can facilitate creative expression across modalities.

It was predicted that exposure to one of the five artistic short films in the art condition, compared with one of the five humorous compilation videos in the control condition, would lead to greater conceptual expansion and verbal creativity. We further predicted that Magical Ideation would moderate these effects, such that the effects of artistic film on conceptual expansion would be amplified for individuals high in this trait. These effects represent a replication of pilot study efforts, which were used as the basis for the preregistration for this study. In addition, we included a state openness measure and predicted that state openness would mediate the effects of the film conditions on these two downstream creative outcomes. All materials, study design, hypothesis, exclusion criteria, and analysis plans were preregistered before data collection (https://doi.org/10.17605/OSF.IO/HS3QX; Gross & Schooler, 2023). The data that support the findings of this study are also openly available in an OSF repository (https://doi.org/10.17605/OSF.IO/63S2V; Gross, 2025). All predictions, with the exception of the state openness mediation, were preregistered as confirmatory hypotheses. The predicted mediation via state openness was preregistered as exploratory, rather than confirmatory, given that we had not explored this effect in our prior pilot effort.

Method

Transparency Statement

Sample size was preregistered and was determined from a pilot study in which we found significant increases in creativity and conceptual expansion following film exposure. Of the two main effects from the pilot study (the effect of art on conceptual expansion and creativity), the smaller of the two effect sizes was used to determine the minimum sample size to replicate the effect (effect size of .254). An a priori power analysis was run based on an independent samples t test, using the following metrics: a two-tailed test with an effect size of .254, alpha of .05, power of .8, and allocation ratio (N2/N1) of 1.12 (as the preliminary study had $N = 130$ in the experimental group and $N = 116$ in the control group). The calculated sample size was 506. A double-blind procedure was used in which both participants and research staff were unaware of group assignment.

Design

The study used a one-factor, two-condition between-subjects design (artistic short films vs. humorous animal videos) with

random group assignment to determine the effects of art exposure on conceptual expansion, creativity, and openness.

Participants

The study was approved by the Institutional Review Board at the University of California, Santa Barbara before commencing. Participants were recruited through Connect (connect.cloudresearch.com) and tested fully online. Eligible participants were at least 18 years of age, due to potentially mature content in the videos, residing in the United States, and native English speakers. The language requirement aimed to reduce comprehension differences between participants, given that some of the films were subtitled and in a foreign language (e.g., French). Individuals sensitive to flashing lights, susceptible to epileptic seizures, or with certain psychological conditions were advised against participation. To screen out bots and unengaged respondents, potential participants were asked to type the word "sandwich" at the study's outset; failure to do so resulted in exclusion from study participation. Nineteen participants did not pass this predata collection screener and were therefore not able to participate in the study. A further eight participants did not indicate consent and were therefore unable to proceed in the study. This resulted in usable data from 499 participants: 246 men, 227 women, 10 other (nonbinary), with a mean age of 22.47. The gender composition was similar across conditions (experimental: 121 men, 124 women, five nonbinary; control: 132 men, 112 women, five nonbinary). Education levels ranged from grammar school to professional degrees, with the majority having completed a 4-year college degree (45.9%) or some college (22.8%). In addition, 16.0% held graduate degrees (Master's, Doctoral, or Professional). Participants were paid $3 for completing the study, which took approximately 15 min to complete.

Materials

Film Materials

The films for the art condition were sourced from the leading professional film curation platform *Short of the Week* (e.g., shortoftheweek.com). All films curated on this platform have been nominated by a programming team and chosen by an industry panel with a highly selective acceptance rate of 3%. The films selected for this study were produced by professional artists and filmmakers, many of whom have received recognition from awarding bodies in the industry. For instance, the short film *I'm OK*, which was included in our experimental condition, was nominated for a prestigious British Academy of Film and Television Arts (i.e., BAFTA) award in the United Kingdom. The selected films were tagged in the experimental genre, which represents works that challenge traditional forms, techniques, and conventions. All videos were approximately equal in length (6–8 min) and were intended for mature audiences. The following films were used in the experimental condition: *I'm Ok* by Elizabeth Hobbs, *This Is How It Starts* by Shahaf Ram, *Mercury's Retrograde* by Zohar Dvir, *Flounder* by Elizabeth Hobbs, and *Au Revoir Jérôme* directed by Chloé Farr, Gabrielle Selnet, and Adam Sillard.

The control videos consisted of home-video-style compilations sourced from YouTube (e.g., the channel "FailArmy"). The videos consisted of a series of short (usually 10–20 s) segments featuring humorous content—such as funny animal antics, bloopers, and pranks—set largely in domestic settings (e.g., inside family homes). The control videos had neither a consistent narrative nor any musical accompaniment other than incidental background noises, such as occasional exclamations and laughter from the individuals featured in the clips. The domestic nature of the featured clips strongly implies that they were sourced from amateur recordings that were intended for personal use, rather than professional or artistic endeavors.

Before seeing the video, participants were told they would be viewing one, but received no further contextual information about the films. This design choice was intended to simulate everyday encounters with art. Individuals typically read books, watch films, and listen to music without first consulting the artist's work statement, biography, or supplemental information about the work itself; rather, they engage directly with the work. Examining the direct impact of the works themselves, therefore, represents a meaningful and informative research direction. However, it should be acknowledged that providing contextual information would likely change the reception of the work; a topic that has been examined by a vast body of research (e.g., Casteau & Smith, 2024; Darda & Chatterjee, 2023).

Postfilm Questions

After viewing the film, participants were asked to rate the film on a scale of 1 (*terrible*) to 100 (*excellent*) and to indicate how much they liked the film on a scale of 1 (*did not like at all*) to 100 (*liked very much*). Responses to these questions were averaged (after confirming a high degree of overlap, $r = .857$) to compute an overall rating score. Participants also responded to three questions assessing perceived meaningfulness of the film: (a) How meaningful do you find the film? (b) How well do you feel you understood the film? and (c) To what degree do you feel the film is significant?—all on a scale from 1 (*not at all*) to 100 (*extremely*). Responses to these questions were also averaged to create a composite meaning score. Lastly, participant curiosity was assessed using the averaged responses from the following three items: (a) How curious do you feel to learn more about the film? (b) How curious do you feel to learn more about the creator of the film? and (b) How curious do you feel to learn more about what the process was in making this film?—all on a scale from 1 (*not at all*) to 100 (*extremely*). Collectively, then, the postfilm questions produced the following three composite variables: rating, meaning, and curiosity.

Mood

Mood was measured with the 12-item Scale of Positive and Negative Experience (SPANE; Diener et al., 2010), which has six positive-valence items—happy, joyful, contented, positive, pleasant, and good—and six negative-valence items—sad, afraid, angry, negative, bad, and unpleasant. Items are rated on a 5-point scale with the following labels: 1 = *does not describe my feelings*, 2 = *slightly describes my feelings*, 3 = *moderately describes my feelings*, 4 = *mostly describes my feelings*, and 5 = *clearly describes my feelings*. The positive and negative dimensions are averaged separately to produce positive and negative mood dimension variables. The SPANE has demonstrated good reliability in

past research, and in the present study, the scale has an excellent Cronbach's alpha coefficients of .95 for the positive subscale and .92 for the negative subscale (Diener et al., 2010).

Overinclusive Thinking

The Categorization Task (Isen & Daubman, 1984; revised by Chiu, 2015) was used to measure overinclusive thinking or what we refer to here as conceptual expansion. In this task, individuals are asked to rate how highly different example items belong to a given category. Two categories are provided: Clothing and Vehicle. The items for Clothing are three typical examples—shirt, suit, and pants—and three atypical examples—ring, purse, and cane. The items for Vehicle category are three typical examples—automobile, train, and bus—and three atypical examples—camel, feet, and elevator. Each is rated for how much it belongs to the given category on a scale from 1 to 10: *definitely does not belong* to *definitely does belong*. The overinclusive thinking, or conceptual expansion, variable is created by summing the scores for the six atypical items. This task has been widely used and validated as a behavioral measure of category boundary looseness, demonstrating sensitivity to experimental manipulations and correlations with creativity and openness (e.g., Chiu, 2015; Gross et al., 2023; Wang et al., 2018).

Verbal Creativity

Verbal creativity was measured using the five-sentence creative story task (Johnson et al., 2023; Prabhakaran et al., 2014), in which participants are given three prompt words—stamp, letter, and send—and asked to generate a short, —four-to-six sentence, story using those words. Two blind independent raters scored the stories on creativity using the Consensual Assessment Technique—long considered the gold standard in creativity assessment (e.g., Amabile, 1982; Baer & McKool, 2014). Using a scale of 1–5 (with a score of 0 given for nonsensical or invalid responses), raters were asked to base their judgments of creativity on the definition of original (i.e., uncommon, rare, unusual) and clever (i.e., interesting, enjoyable, well-executed). Their ratings were averaged to create the creativity variable (see the Results section for details on computing reliability of this variable). Previous studies of creative cognition have demonstrated that human raters can reach a high degree of reliability on this measure (Orwig et al., 2024).

State Openness

Saucier's Big Five Mini-Markers (Saucier, 1994) was used to measure states of openness by having participants rate 11 adjectives for how much they reflect their present state (e.g., imaginative and philosophical). Scores from the 11 items are averaged to create the state openness variable (note that two items are reverse coded: "uncreative" and "unintellectual").

Magical Ideation

The Magical Ideation scale (Eckblad & Chapman, 1983) was used to measure the trait-level subfacet of the schizotypal personality trait. This 30-item measure captures individual differences in the propensity to endorse superstitious or paranormal ideas or beliefs (e.g., "I have sometimes been fearful of stepping on sidewalk cracks") measured with True and False response options. There are seven reverse-scored items on this scale, for example, "Good luck charms don't work." After reverse-coding these items, scores on this scale are calculated by summing the True responses, with higher scores reflecting greater propensity toward magical ideation. The scale has demonstrated good internal consistency in past research with good test–retest reliability ($r = .80$; Chapman et al., 1982) and showed excellent reliability in the present study (Cronbach's $\alpha = .89$).

Trait Epistemic Curiosity

The Epistemic Curiosity Scale (Litman and Spielberger, 2003) was included as an exploratory potential moderator. This 10-item measure captures an individual's dispositional tendency to seek out new knowledge or information, which is captured both as a tendency toward epistemic feelings of interest, for example, "I enjoy exploring new ideas," and epistemic feelings of deprivation, for example, "Difficult conceptual problems can keep me awake all night thinking about solutions." The items are measured on a 4-point Likert scale reflecting the following response options: 1 = *almost never*, 2 = *sometimes*, 3 = *often*, and 4 = *almost always*. This measure demonstrated excellent reliability in the present study (Cronbach's $\alpha = .88$).

Procedures

After providing informed consent, participants were randomly assigned to a video condition. To randomly assign participants to the conditions, block randomization was used such that all participants were randomly assigned to one of 10 possible videos (the five experimental and five control videos). Before viewing the video, participants were instructed not to interrupt the video, close the screen, or open a new tab while the video is playing, unless the video made them uncomfortable; in which case, they were told they could press the escape key and skip the video. They entered the word "Oath" to signal that they had read the instructions and agreed to watch the video in one take, uninterrupted, and not to engage in any other activity beyond viewing the film. Following the film, participants were asked "Did you watch the full video? Please answer honestly, you will receive full compensation regardless of your response" and given three response options: *Yes*, *No*, and *Other [please explain]*. Following this, participants completed the following questionnaires: postfilm questions (see the Postfilm Questions section), Saucier's state openness measure, the SPANE mood measure, the categorization task to measure conceptual expansion, the creative writing task to measure verbal creativity, and the personality measures. Finally, the participants completed brief demographics questions before receiving their payment code. The study was implemented in Qualtrics and run fully online using Connect (a CloudResearch platform).

Results

Exclusions/Data Cleaning

Following the video, participants were asked "Did you watch the full video? Please answer honestly, you will receive full compensation regardless of your response." If participants did *not* select "Yes," they were excluded, as per our preregistered

exclusion criterion. Sixteen were excluded based on these criteria, resulting in a final sample of 483 ($N = 244$ in experimental condition, $N = 227$ females).

Postfilm Ratings

First, to assess general differences in the reception of the videos across the experimental and control conditions, the three metrics derived from the postfilm questions were examined: curiosity, meaning, and ratings of the films.

As shown in Table 1, participants in the control condition rated the videos more favorably than those in the experimental film condition. However, the experimental condition elicited greater curiosity responses. No substantial differences were observed in the meaning metric between conditions. These observations were confirmed through independent samples t tests, indicating that the control condition was better liked, $t(481) = -5.07$, $p < .001$, $d = -0.46$, the experimental films produced more curiosity, $t(481) = 9.16$, $p < .001$, $d = 0.83$, whereas no differences were observed for meaning, $t(481) = 0.99$, $p = .32$, $d = 0.090$. As far as mood, the artistic film condition led to significantly more negative mood, $t(481) = -4.74$, $p < .001$, $d = -0.43$, as well as significantly lower positive mood, $t(481) = 5.32$, $p < .001$, $d = 0.48$.

This study sought to primarily test the following main, preregistered predictions: The artistic short film condition would lead to higher rater-scored creativity and higher scores on the conceptual expansion test, compared with the control condition. Two separate independent samples t tests were run to determine whether the art film condition led to increased creativity and conceptual expansion, respectively, compared with the control condition.

First, to examine the effects of the film conditions on creativity, the creative scores were independently rated by two blind raters. The internal consistency of the creativity ratings showed good reliability as measured by Cronbach's alpha ($\alpha = .87$). The scores from both raters were averaged to create a single creativity variable. Interrater reliability for this averaged measure was assessed using a two-way mixed-effects model, which yielded an intraclass correlation coefficient of .87, 95% confidence interval [CI; .84, .89], indicating good agreement between the two raters. The raters were given simple instructions and asked to use their own subjective judgements to determine the creativity of the short stories. In the Supplemental Material, an example of a low creative story (rated 1 out of 5 by both raters) and a high creative story (rated 5 by both raters) is provided.

Following averaging, the creativity variable was then entered as a dependent variable in an independent samples t tests with condition as the predictor, revealing a significant difference in creativity between the experimental (artistic short film) group and the control group, $t(479) = 2.39$, $p = .017$, $d = 0.22$, such that the experimental group ($M = 2.99$, $SD = 1.25$) was significantly more creative than the control group ($M = 2.73$, $SD = 1.11$).

Next, conceptual expansion scores were computed by summing the ratings of the atypical exemplars in the categorization task. Here, we found a similar effect, such that the experimental group ($M = 17.11$, $SD = 9.46$) demonstrated significantly greater conceptual expansion compared with the control group ($M = 15.28$, $SD = 8.26$), $t(481) = 2.26$, $p = .024$, $d = 0.21$.

Finally, greater state openness was also demonstrated in the experimental group ($M = 3.30$, $SD = 0.93$) compared with the control group ($M = 2.22$, $SD = 0.79$), $t(481) = 13.73$, $p < .001$, $d = 1.25$. See Table 2 for descriptive statistics across all conditions.

A two-way interaction was run to examine whether Magical Ideation interacts with condition to predict conceptual expansion scores, as was observed in our initial pilot study. This analysis was run using Hayes's PROCESS macro (Model 1) with condition entered as the independent variable, Magical Ideation scores as the moderator, and conceptual expansion as the dependent variable. Contrary to our preregistered predictions, no interaction effect was detected, $F(1, 479) = 1.31$, $p = .25$, Lower Level Confidence Interval to Upper Level Confidence Interval (LLCI to ULCI) [−.107, .404]. Epistemic curiosity was also included as an exploratory (not preregistered) moderator that was thought to potentially strengthen the effect of condition on creativity, but again no interaction effect was detected, $F(1, 477) = 0.36$, $p = .55$, LLCI to ULCI [−.255, .549].

Full descriptive statistics and reliability metrics for trait variables are presented in Table 3. Both measures were approximately normal distributions, with the Magical Ideation scale showing a slight right skew. Both measures also showed good reliability.

As preregistered, we then explored whether state openness mediates the relationship between condition and both the conceptual expansion and creativity variables by running two mediation analyses. Both mediation models were run using Hayes's PROCESS macro (Model 4) with condition coded as 1 = *artistic short film condition* and 0 = *control condition*, and 5,000 bootstrapping iterations. First, examining state openness as a potential mediator of conceptual expansion, we find that condition was a significant predictor of state openness (similarly as previously reported; $b = 1.08$, $p < .001$) and state openness significantly predicted conceptual expansion ($b = 1.42$, $p = .0025$). The total effect of condition on conceptual expansion was statistically significant ($b = 1.83$, $p = .024$); however, the direct effect of condition on conceptual

Table 1
Descriptive Statistics for Postfilm Questions

	Experimental (art films; $N = 244$)		Control condition ($N = 239$)	
Post-film metrics	*M*	*SD*	*M*	*SD*
Ratings	47.88	31.39	62.07	30.09
Meaning	44.09	28.43	46.35	21.07
Curiosity	50.12	32.67	24.76	27.97
Positive mood	2.69	1.18	3.24	1.12
Negative mood	1.66	0.84	1.33	0.66

Table 2
Descriptive Statistics (Mean and SD) for Main Outcome Variables Across Conditions

Outcome variables	*N*	Min	Max	*M*	*SD*
Verbal creativity	481	0	5	2.86	1.19
Conceptual expansion	483	6	60	16.21	8.93
State openness	483	1	5	2.76	1.02

expansion was no longer significant once controlling for state openness ($b = 0.30$, $p = .75$). To test the significance of the indirect effect, nonparametric bootstrapping with 5,000 samples was conducted. The unstandardized indirect effect of condition on conceptual expansion through state openness was statistically significant (Indirect Effect = 1.53, $SE = 0.51$, 95% CI [0.57, 2.55]). Collectively, this indicates that state openness fully mediates the relationship between condition and conceptual expansion (Baron & Kenny, 1986), with the mediation model accounting for a significant portion of variance in conceptual expansion ($R^2 = .282$, $p < .001$). For standardized regression coefficients, see Figure 1.

Conversely, state openness was not found to significantly mediate the effect of condition on verbal creativity. Although the effect of condition was once again a significant predictor of state openness (as previously reported; $b = 1.08$, $p < .001$), state openness did not significantly predict creativity ($b = -0.022$, $p = .73$). The standardized indirect effect of condition on creativity through state openness was therefore not statistically significant (Indirect Effect = −0.023, $SE = 0.072$, 95% CI [−0.16, 0.12]), nor was the model ($R^2 = .012$, $p = .056$).

Discussion

Exposure to artistic expression has long been thought to expand our mental boundaries, yet direct empirical evidence to support this has been largely missing. Employing a randomized, experimentally controlled design, in which artistic film was compared with a "nonart" control, we examined the psychological impact of art on creative outcomes. Using animated short films as the artistic medium, we observed several downstream consequences of exposure to art. In particular, we find that, compared with exposure to entertaining compilations of home videos, artistic shorts can promote a state conducive to creative thinking and ideation, as evidenced by increases in state openness, conceptual expansion, and verbal creativity.

Our findings provide novel support for recent theoretical advances in aesthetics, which suggest that artistic or aesthetic experiences may trigger cognitive processes that overlap with those underlying creativity (Kenett et al., 2023; Starr, 2023; Tinio, 2013). Although such theories have proposed particular processes that may be shared between aesthetic experiences and creative ideation, such as information-seeking (Kenett et al., 2023), the question of whether aesthetic experiences actually *drive* creativity remains underexplored. In this study, we not only find evidence to suggest that viewing art promotes creative thinking but also find initial evidence as to *how*—by promoting states of openness and by broadening or loosening the rigidity of individuals' conceptual boundaries.

The *atypical salience model of creativity* (Gross & Schooler, 2024b) offers a mechanistic pathway for how this effect may take place. The model proposes that creative thinking is supported when atypical information receives heightened attention or consideration, thereby broadening the material accessible for idea generation and inhibiting attentional fixedness. Certain contexts may trigger these processes, particularly those that resist routine interpretation, thereby requiring individuals to suspend their established interpretative frameworks to accommodate novel and surprising information; this may be precisely the type of experience that engagement with complex art provides.

In this study, we used films classed in the experimental genre—works that do not present their meaning straightforwardly but instead require active interpretation from the viewer. The ambiguous and visually surprising nature of these works pushes viewers beyond simple object recognition, engaging them in deeper, more interpretive cognitive processing. Combining the various structural, emotional, and symbolic elements of art into a cohesive whole requires complex cognitive processes (Cupchik et al., 2009; Hagtvedt & Vohs, 2022). The level of complexity present in the art therefore likely determines the cognitive processes it initiates and, in turn, the possible downstream benefits. For example, Hagtvedt and Vohs (2022) demonstrated that "high art" (complex depictions) promotes deeper integrative processing that, in turn, increases individuals' perceptions of meaning in life; on the other hand, "low art" (simpler depictions) increases processing fluency, thereby improving mood.

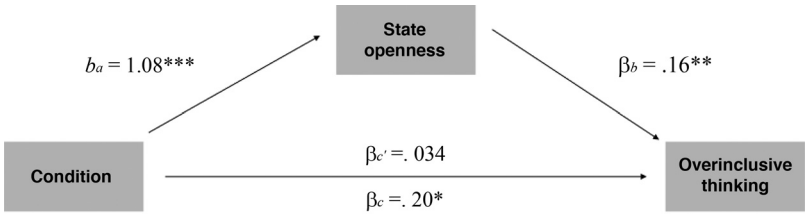
In line with these findings, we found evidence that participants perceived and processed the videos differently between the two conditions. The (less complex) control videos, which were similar in style to social media "reels," were rated more favorably than the art films. The rapid-paced segments that comprised the control videos offered predictable, readily interpretable content with immediate affective payoff. This style of entertainment likely promotes higher levels of processing fluency and attentional capture, which contribute to overall more positive assessments, as suggested by past research linking processing fluency with positive mood (Reber et al., 2004). On the other hand, the artistic shorts were intentionally selected from the "experimental" genre—defined by the use of unconventional (i.e., nonpredictable) styles or techniques and often ambiguous narrative structure. Such qualities not only impose higher cognitive demands and lower fluency but also encourage deeper, more elaborative processing. In short, although the control films may have had optimal qualities for immediate enjoyment, the artistic films required deeper processing, along with meaning-making processes and cognitive accommodation—conditions that benefit conceptual expansion and creative thinking but potentially at the expense of immediate gratification. This interpretation aligns with theoretical work linking aesthetic challenge to curiosity and openness, suggesting that the very features that make an artwork difficult to process may also stimulate deeper cognitive engagement.

Table 3
Descriptive Statistics and Reliability for Trait Questionnaires

Trait measures	*N*	Min	Max	Skewness	Kurtosis	Reliability
Magical Ideation	483	0.00	25.00	.81	−.34	.89
Epistemic Curiosity	483	1.30	4.00	.19	−.23	.88

Note. Reliability is computed with Cronbach's alpha.

Figure 1
Summary of the Mediation Model



Note. N = 483. The path from condition (binary predictor) to state openness is an unstandardized coefficient (*b*), representing the mean difference in state openness between conditions. All other path coefficients shown here are standardized regression coefficients (β). Unstandardized coefficients (*b*) for all paths are reported in the text. β_c indicates the standardized effect of condition on conceptual expansion, $\beta_{c'}$ indicates the standardized direct effect of condition on conceptual expansion controlling for the indirect effects.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Prior research has demonstrated a link between positive mood and creativity (Baas et al., 2008), raising the possibility that art might boost creativity by improving mood. However, given that participants in the art film condition rated the films below the midpoint in favorability, while also reporting a significantly poorer mood relative to the control, it would seem that art need not be particularly likable or enjoyable to produce impacts on cognition; at least, the creative benefits observed in the present study cannot be attributed to positive mood.

Beyond creative performance, we further found that individuals exhibit greater conceptual expansion, or overinclusive thinking styles, compared with individuals exposed to control videos. This style of thinking has historically been linked to disordered cognitive processes, such as psychoticism or schizotypy (e.g., Andreasen & Powers, 1974; Cutting et al., 1987). Given that a growing body of research suggests that an "overinclusive" style of thinking is also a key component of openness and creative thinking (Chiu, 2015; Liu, 2016), however, we feel the less pejorative term "conceptual expansion" is more fitting descriptor of the same phenomenon. The link between conceptual expansion and creativity also raises an intriguing possibility: Everyday experiences that challenge existing conceptual frameworks could foster a state of openness, which in turn may promote looser categorical boundaries and more conceptual cross-pollination—characteristics of a creative mindset. Supporting this idea, we found that the impact of art on conceptual expansion was entirely mediated by increased state openness.

A relationship between our outcome measures—conceptual expansion and verbal creativity—was not observed, however. Although interpreting a null correlation warrants caution, the lack of association may suggest that art facilitates these processes through alternative mechanisms. Alternatively, it may suggest that the type of creativity measured by the writing task differs from the type of creativity relevant to conceptually expanded, or overinclusive, thinking styles. Indeed, recent theoretical and empirical advances suggest that different forms of creativity may be underpinned by distinct cognitive processes (Gross et al., 2019, 2024a; Zabelina et al., 2015, 2016). In particular, past research has identified two distinct attentional phenotypes related to creativity: leaky and flexible attention (Zabelina et al., 2016). Leaky attention, which resembles overinclusive thinking in its inclusion of seemingly irrelevant information, has been linked to real-world creative achievements but is not typically related to performance on structured creative tasks (Zabelina et al., 2015). In contrast, flexible attention—characterized by controlled executive functioning—better supports the demands of time-constrained creative tasks like the one used in our study (Zabelina & Robinson, 2010). This distinction may explain the lack of relationship between divergent thinking and conceptual expansion observed here; however, alternative explanations may account for this finding.

Despite the overall significant differences between the experimental and control conditions, it is important to note that the five artistic short films differed in how strongly they contributed to the overall effects. Some films had higher overall conceptual expansion scores (e.g., *Au Revoir Jérôme* and *This is How it Starts*) than the other experimental films (see Supplemental Table 2). The capacity for the different films to promote a state of openness also varied, with *Au Revoir Jérôme* again among the highest. Verbal creativity scores—reflecting the rater-scored originality and quality of participants' short stories—remained somewhat more consistent across films. On the other hand, participants' subjective responses and ratings also differed considerably across films. Once again, *Au Revoir Jérôme* received the top ratings across all dimensions: enjoyment, perceived meaning, and feelings of curiosity (note the strong correlations between these variables; see Supplemental Table 4). These patterns suggest that the ability of films to evoke stronger subjective responses may facilitate further downstream benefits. As our mediation results suggest, the capacity of artistic shorts to promote a state of openness may also determine transfer effects on conceptual expansion.

Differences in the short films' style and content likely contributed to the variability in outcomes we observed. The films overlapped only in the following ways: their classification in the experimental genre, their approximate length, their production by recognized artists, and their use of animation or other similar techniques (i.e., not live action). Beyond these similarities, the films had completely different narrative themes, emotional qualities, and visual styles, and they differed in their use of music, as well as their use of narration or dialogue, and type of language. Any one of these factors, alone or in combination, may have contributed to

the impacts on the viewers and could explain the variability in outcomes, including why participants rated the artistic films as, on average, less enjoyable than the humorous control videos. An important avenue for future research will be to isolate the specific aspects, features, or personal reactions from art and artistic film that determine these particular outcomes. Such research could benefit from the use of qualitative methods and/or expert film analysis to assist in isolating the specific elements present in the experimental films, and how such features contribute to creative cognition.

Although this study successfully replicated and extended previous findings, supporting an effect of artistic shorts on conceptual expansion and creativity, it also opened up numerous avenues for future experimental research examining the cognitive impact of art and aesthetic experiences. Art may lead to creative outcomes through various pathways, such as enhancing motivation, inspiration, cognitive flexibility, or perspective-shifting (An & Youn, 2018; Gross et al., 2023; Welke et al., 2023). Although we did not observe personality-specific effects (i.e., interactions) in this study, previous research, including our own (e.g., Gross et al., 2023), has shown that personality traits can also significantly influence how individuals respond to artistic stimuli. Future research should continue to explore these possibilities with the goal of deepening our understanding of how—and for whom—art benefits creative thinking.

Limitations

Although these initial results are promising, it is important to note that there are several limitations inherent in our study design. The present work examines one specific instantiation of exposure to artistic expression, specifically, viewing short, critically acclaimed animated films. Although we used a face-valid approach for determining the stimuli used in the artistic and nonartistic conditions, art is an incredibly broad category, and much future research is necessary to determine whether the effects we observed extend to different genres of film, other artistic domains (e.g., dance, static visual art, and music), or even other aesthetic, nonartistic domains (e.g., nature). In other words, the present findings should not be generalized to all forms of artistic experience or creative engagement. Future research is also necessary to determine whether similar effects could be found when using more traditional film, such as live action or nonexperimental genres. This is particularly relevant for the current research question as it is possible that unconventional art is key to driving the unconventional thinking styles underpinning creativity, whereas conventional or realistic art forms may not show these effects.

As outlined in the introduction, animated film shorts were chosen as the artistic stimuli in this study as they provide an inherently multifaceted artistic experience, combining visual art, narrative, and, oftentimes, music. We intended to draw the largest distinction possible between the artistic and nonartistic conditions, given the novelty of our experimental approach in this research area. However, the present methods were not designed to be able to isolate and test which specific components of the films (visual aesthetics, musical composition, and narrative structure), or their interaction, contributed to the observed effects. Future research systematically varying these components is necessary to identify the "active ingredients" underlying art's influence on creative cognition. Creativity itself is an incredibly broad and multifaceted construct. Our measures of conceptual expansion and verbal creativity capture particular components of creative thought—conceptual flexibility and idea generation—and do not encompass the full range of creative or aesthetic processes.

Another potential limitation is the sample used. The present research sought to examine how exposure to art affects creative cognition in a general, lay population, not in trained critics, film students, or art enthusiasts. This approach reflects the reality that most people's encounters with art occur without specialized training or preparation. However, because participants' prior art experience was not explicitly assessed, we do not know the range of arts education or learnedness that was present in our sample, nor how this may have moderated the overall effects. Furthermore, several of the experimental films were not made by U.S. artists nor were in the English language (although all had English subtitles); the films, therefore, may have included cultural references that were missed by our U.S.-residing, Native English-speaking participants.

Future studies could examine how culture and past artistic experiences affect how art is received and its resulting impacts. To capture the subjective aspects of aesthetic engagement, such as the meanings, feelings, and insights individuals receive from artworks, such attempts might benefit from combining a wider range of creative modalities and complementary qualitative methodologies. A more pluralistic understanding of how art affects cognition would result from including these viewpoints, which could also offer insight into the ways in which various artistic mediums, skill levels, and styles of engagement contribute to creative thought.

Concluding Remarks

Creative thinking is not constant; sometimes ideas bubble up effortlessly and inspiration abounds; other times, we find ourselves stuck in the same familiar patterns of thought. What drives these natural fluctuations? Although many strategies for promoting creativity focus on behavioral strategies (e.g., Lu et al., 2017; Weinberger et al., 2016), few have explored the potential impact of everyday experiences and situations, particularly within the context of experimentally controlled study designs. Our findings suggest that relatively brief exposure to art or aesthetic contexts may be one way in which creativity is naturally influenced. We also find support for a novel mechanism of change via state openness—a psychological state with a small, but growing, academic interest (e.g., Herz et al., 2020). Our state-level examination of openness emphasizes its dynamic, context-dependent nature, and the potential for promoting it. Collectively, these findings contribute to a steadily growing interest in understanding the psychological impact of art, offering new insights into how artistic engagement might influence human cognition. In so doing, this work opens up important questions about the practical value of incorporating creative and aesthetic elements in workplace and educational settings.

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