

Is AI-assisted Creativity an "Original Sin"?: Lay Judgments of Qualities Justifying Copyright Protection for Artworks Derived from AI- vs. Human-generated Sources

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Abstract

Recent legal rulings have denied copyright protection to artworks derived from AI-generated sources, because AI is assumed to be incompatible with qualities that define human authorship. We empirically test lay intuitions related to these assumptions in two studies ($N = 235$, $N = 119$) by investigating how creator attribution of initial source material (AI- vs. human-generated), effort investment in generating source material, and modification level of a derivative work influence perceptions of transformativeness, essence change, and creativity in derivative artworks. Modification level exerted the strongest influence across all measures, with dramatic modifications rated significantly higher than slight or no modifications. Effort investment in generating source material only influenced creativity ratings, with less effort sometimes perceived as more creative. Most notably, creator attribution for source material had minimal impact. These results challenge current copyright doctrine by demonstrating that lay human observers prioritize degree of transformation over both effort and creator attribution for source material. Our findings suggest that legal frameworks should recognize that AI assistance in generating artworks does not preclude a genuine human contribution that merits copyright protection.

Keywords: aesthetic cognition; law and cognition; AI-human interaction

Introduction

In 2022, Jason Allen submitted the work "Théâtre D'opéra Spatial" to the Colorado State Fair's digital arts competition, winning first prize and sparking national debate. The artwork, depicting a baroque-style opera scene in a futuristic setting, was initially created using the artificial intelligence platform Midjourney through 624 text prompts provided by Allen, and later modified by him in Adobe Photoshop. Following his victory, Allen applied for copyright registration with the U.S. Copyright Office (USCO), igniting legal controversy over authorship and creativity. The USCO ultimately rejected his application, despite his human modifications of the AI-generated source material, concluding that "the image generated by Midjourney that formed the initial basis for th[e] Work is not an original work of authorship protected by copyright" (Letter from U.S. Copyright Office to Tamara Pester, 2023).

This rejection reflects a broader legal consensus that has since crystallized through court decisions and formal policy guidance. In March 2025, the U.S. Court of Appeals for the D.C. Circuit affirmed in *Thaler v. Perlmutter* that "copyright law requires all work to be authored in the first instance by a human being," concluding that "because many of the

Copyright Act's provisions make sense only if an author is a human being, the best reading of the Copyright Act is that human authorship is required for registration" (Thaler v. Perlmutter, 2025). This judicial interpretation builds upon the USCO's comprehensive January 2025 report, which concluded that copyright does not extend to purely AI-generated material, or material where there is insufficient human control over the expressive elements (U.S. Copyright Office, 2025).

Copyright protection relies on foundational principles—originality, human authorship, and the idea-expression dichotomy—rooted in an anthropocentric legal tradition (Blaszczyk, 2023). To qualify for protection, a work must reflect original human creativity, a requirement derived from Article 1, Section 8 of the U.S. Constitution. The Supreme Court has consistently interpreted "authors" and "writings" as necessitating human origin (*Burrow-Giles Lithographic Co. v. Sarony*, 1884; *Feist Publications, Inc. v. Rural Tel. Service Co.*, 499 U.S. 340 (1991); *Naruto v. Slater*, 2018). While not explicitly stated in the Copyright Act of 1976, courts have reinforced that "original works of authorship" require initial human creativity (17 U.S.C. § 102(a)). The emergence of AI as a perceived "original author" challenges these principles, especially in cases involving human direction, AI generation, and subsequent modification.

The USCO's recent guidance attempts to navigate these tensions by distinguishing between AI as an assisting tool versus an autonomous creator (U.S. Copyright Office, 2024, 2025). However, this binary framework fails to account for contemporary AI-assisted creation, particularly in cases like Allen's, where human creative intent manifests itself through iterative prompts and digital editing. The limitations of the binary framework are especially evident in the treatment of *derivative works*, for which a person takes an initial artwork as a source and then modifies it. If an AI-generated work lacks protection due to insufficient human authorship, can this deficiency be overcome if it serves as a source for a human-generated derivative work? Denying this possibility would disrupt traditional doctrine concerning derivative works, which presumes that new creative expression can build upon prior works.

The USCO's position establishes what we are characterizing as an "original sin", wherein AI generation constitutes an insurmountable disqualification regardless of subsequent human modification. This categorical approach is particularly striking because it effectively circumvents the core evaluative criteria (transformativeness, essence change,

and sufficient creativity) that judges and lawyers use to determine copyrightability. The USCO's rejection of Allen's application implicitly suggests that the presence of AI-generated elements renders traditional copyright analysis moot, regardless of how substantially the work was subsequently transformed. It raises key legal questions: when (if ever) does human refinement of AI-generated source content constitute protectable expression? Can transformation occur if the source material itself is deemed unprotectable?

Beyond legal challenges, this debate also raises empirical questions about human judgments of creativity for AI-assisted works. While the USCO maintains that AI-generated outputs are "mechanical reproduction" (U.S. Copyright Office, 2024), this assumption remains untested in terms of how people evaluate and attribute creativity in AI-generated art. Studies show that people struggle to distinguish between AI-generated and human-created works, often perceiving machine-generated art as characteristically "human" (Sun et al., 2022; Nightingale & Farid, 2022). For instance, Porter and Machery (2024) found that participants performed below chance in identifying AI-generated poetry, suggesting that the USCO's rigid distinctions may not align with human perception.

Nonetheless, laypeople exhibit preferences for works they attribute to humans. Bellaiche et al. (2023) found that people systematically devalue artwork labeled as AI-generated, regardless of its actual origin (AI- or human-generated). This human preference operates independently of the work's characteristics. However, previous research has largely focused on comparing purely AI-generated works with traditional human art, overlooking the growing practice of modifying AI-generated source content to create AI-assisted artworks. Studies of human-AI collaboration (e.g., Orwig et al., 2024) emphasize the role of human expertise, but do not address post-generation modifications.

The present study investigates how individuals evaluate creativity in derivative works. Specifically, we examine cases where artists take an existing source image, either AI-generated or human-created, and produce a second, modified work through solely human intervention. This experimental paradigm reflects real-world artistic practices and directly engages with the legal question of whether modifications to AI-generated source material can achieve sufficient creative transformation to deserve copyright protection. Our investigation focuses on three qualities of protectability criteria recognized in copyright law: *transformativeness* (the degree to which the derived work adds new expression, meaning, or message to a source work), *essence change* (the core sense and feeling that makes a work unique), and *creativity* (the presence of at least a minimal original, intellectual contribution) (Campbell v. Acuff-Rose Music, Inc, 1994; Feist Publications, Inc. v. Rural Tel. Service Co., 1991).

Study 1 examines how varying degrees of modification to the initial source work, whether AI-generated or human-created, influence lay judgments about these qualities, thus addressing the central question raised in the Allen case. Study 2 extends this analysis by manipulating perceived creative effort involved in the initial work—whether through AI prompting or human artistry—to empirically assess the USCO's distinction between AI as a tool versus an autonomous creator. Together, these studies provide a novel perspective on whether substantial human modification can potentially overcome the legal challenges surrounding AI-generated art.

Study 1

Methods

Participants: A convenience sample of 275 undergraduate students ($Mage = 19.93$ years; $SD = 1.8$ years; 201 identified as women, 38 identified as men, 5 preferred not to respond) were recruited through the university participant pool. Sample size determination was predicated by an *a priori* power analysis using G*Power 3.1 (Faul et al., 2009), configured for a mixed factorial ANOVA with repeated measures. The experiment was pre-registered (find all pre-registrations, analyses, and raw data here: https://dggk-law-and-cognition-lab.github.io/AICopyrightabilityVisualArt_CogSci2025/)

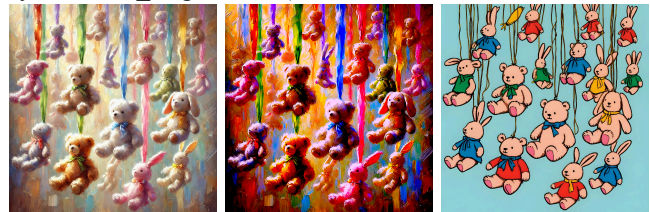


Figure 1: Stimuli examples of original (left), slightly modified (middle), and dramatically modified (right) works of art.

Stimuli and Procedure: The experimental paradigm employed a mixed factorial design with Creator Type (Human Artist vs. AI as attributed creator of source image) as a between-subjects factor, and Modification level (no modification, slight modification, dramatic modification) as a within-subjects factor. The stimulus set (see Figure 1) comprised ten original digital artworks generated using established prompts from the validated set developed by Orwig et al. (2024), generated through DALL-E. For each original image, two modified versions were created: minimal modifications implemented through selective adjustment of hue, coloration, contrast, and maximal modifications by manually altering images using Adobe Photoshop (following methodologies documented in Allen's artistic practice).

Participants completed the study through Qualtrics. Participants were randomly assigned to either the Human Artist or AI condition, with the experimental manipulation

embedded in the introductory vignettes that established the creator's methodology. Participants were introduced to Alex, a digital artist, who generated initial source images either by utilizing traditional graphic design and digital sketching tools (Human Artist condition) or by developing and inputting prompts into an artificial intelligence system that generated artworks (AI condition). Following the introductory context, participants viewed an image said to be the initial source, with an enforced 8-second minimum viewing period to ensure sufficient engagement with the art.

Subsequently, participants were informed that Alex had examined this initial artwork, produced either through AI prompting or by himself with his digital design tools, and decided to produce secondary versions using just his digital design and sketching tools. Each participant was shown randomly-ordered presentations of three Modification levels: no modification, slight modification, or dramatic modification. After viewing each modification pair (initial and modified work) with an enforced 8-second minimum viewing period, participants evaluated three questions comparing the second work to the first: (1) "How transformative is the second work compared to the first work? Transformative is the degree the second work adds new expression, meaning, or message to the first work;" (2) "How much has the essence of the first work changed in the second work? Essence refers to the core sense and feeling that one has while observing a work of art that makes that work unique;" and (3) "How much creativity was involved in the production of the second work? Creativity is defined as the presence of at least a minimal original, intellectual contribution to the creation of the work." All questions were based on a five-point Likert scale ("Not at all transformative" to "Highly transformative"; "No change in essence" to "Complete change in essence"; "No creativity involved" to "A great deal of creativity involved"). Participants also provided written justifications for their ratings across all three questions. Two attention checks were completed, with one embedded as a check on the instructions and another at the experimental midpoint.

Results and Discussion

Data Processing: Prior to analysis, we implemented data quality measures to ensure the reliability of our findings. Of the initial 275 participants, 31 did not complete the full experimental procedure and were excluded. Among the remaining 244 participants, 9 indicated they did not complete the study seriously and were also removed from analysis. All participants successfully passed both attention checks. This screening resulted in a final sample of 235 participants.

Written justifications for ratings were retained for qualitative analysis but are not reported here. Demographic data was collected, which included race, sex, age, native language, and level of formal artistic training or experience

(painting, drawing, sculpture, ceramics, photography, and/or film-video).

Transformativeness: Results for all three ratings of artistic qualities are shown in Figure 2. A mixed ANOVA revealed a substantial main effect of Modification, $F(2, 466) = 1988.60, p < .001, \eta^2 = .81$, with modification level accounting for 81% of variance in transformativeness ratings. No significant effects emerged for Creator Type, $F(1, 233) = 1.49, p = .223, \eta^2 = .003$, or the Creator Type \times Modification interaction, $F(2, 466) = 0.49, p = .611, \eta^2 = .001$, indicating transformativeness judgments were independent of creator identity.

Post-hoc analyses demonstrated significant differences across all modification levels. Dramatic modifications ($M = 3.66, SD = 0.73$) were rated more transformative than both slight modifications ($M = 1.95, SD = 0.50; t(234) = 41.47, p < .001$) and no modifications ($M = 1.05, SD = 0.20; t(234) = 51.93, p < .001$). Effect sizes showed robust differentiation (none-slight: $d = 1.81$; slight-dramatic: $d = 2.71$; none-dramatic: $d = 3.39$), demonstrating systematic increases in perceived transformativeness with modification level.

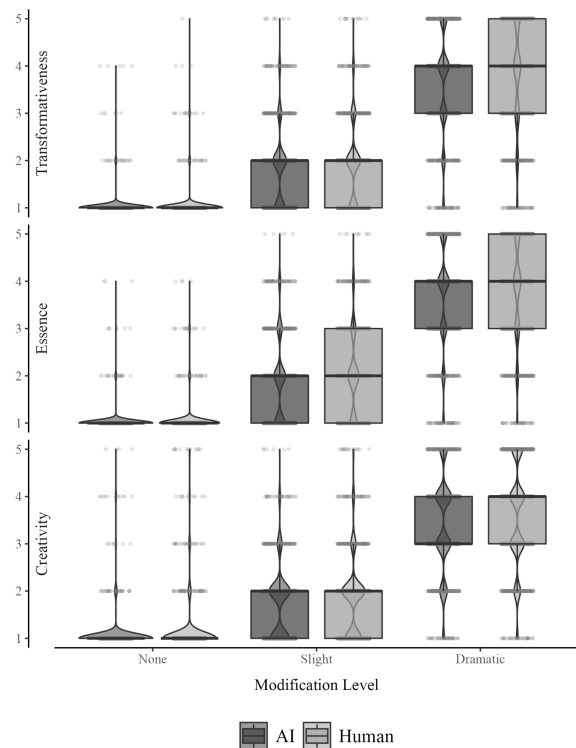


Figure 2: Violin plots for transformativeness, essence change, and creativity across modification levels for AI-generated and human-created source artworks. Boxplots show median and interquartile range.

Essence: A mixed ANOVA revealed a main effect of Modification, $F(2, 466) = 1993.84, p < .001, \eta^2 = .80$,

accounting for 80% of variance in essence change ratings. Neither Creator Type, $F(1, 233) = 2.05, p = .153, ges = .005$, nor its interaction with Modification, $F(2, 466) = 1.01, p = .366, ges = .002$, reached significance.

Post-hoc analyses showed dramatic modifications ($M = 3.67, SD = 0.73$) produced greater essence change than both slight modifications ($M = 2.00, SD = 0.55; t(234) = 42.41, p < .001$) and no modifications ($M = 1.05, SD = 0.19; t(234) = 52.37, p < .001$). Effect sizes demonstrated categorical differences (none-slight: $d = 1.77$; slight-dramatic: $d = 2.77$; none-dramatic: $d = 3.42$).

Creativity: A mixed ANOVA revealed a main effect of Modification, $F(2, 466) = 1496.29, p < .001, ges = .76$, accounting for 76% of variance in creativity ratings. A small but significant pooled effect of Creator Type emerged, $F(1, 233) = 5.01, p = .026, ges = .01$, with products of human-created source works ($M = 2.20, SD = 1.17$) rated marginally higher than products of AI-created works ($M = 2.08, SD = 1.10$) when averaged across modification levels. However, this effect should be taken with caution, as Creator Type comparisons within individual modification levels showed no significant differences (all $ps > .244$). The Creator Type \times Modification interaction was non-significant, $F(2, 466) = 0.45, p = .638, ges = .001$.

Post-hoc analyses revealed dramatic modifications ($M = 3.49, SD = 0.67$) were rated more creative than both slight modifications ($M = 1.82, SD = 0.54; t(234) = 37.67, p < .001$) and no modifications ($M = 1.12, SD = 0.44; t(234) = 44.11, p < .001$). Effect sizes were robust (none-slight: $d = 1.40$; slight-dramatic: $d = 2.46$; none-dramatic: $d = 2.88$).

The findings from Study 1 reveal a disconnect between current copyright doctrine and patterns of lay human evaluation regarding qualities of AI-assisted creative works. Across three key qualities related to copyright evaluation (transformativeness, essence change, and creativity) we found no “original sin”: there were remarkably consistent effects of modification level for a derivative artwork regardless of whether participants were told the source image was AI- or human-generated.

However, the findings of Study 1 leave a critical legal question unresolved: the role of invested effort in determinations of copyrightability. While current doctrine emphasizes human authorship as a function of creative labor and intentionality (Feist Publications, Inc. v. Rural Tel. Service Co., 1991; U.S. Copyright Office, 2024; 2025), the USCO's rejection of Allen's application dismissed his iterative prompting and post-generation modifications regardless of the creative investment they represented (Letter from USCO, 2023). This tension between effort and outcome raises fundamental questions about how human agency manifests itself in AI-assisted creation. Study 2 addresses this empirical gap by systematically manipulating reported effort levels in both AI prompting and human creation for the initial work.

Study 2

Methods

Participants: A convenience sample of 131 undergraduate students ($Mage = 20.55$ years; $SD = 3.08$ years; 95 identified as women, 34 identified as men, 2 identified as other) were recruited through the university participant pool. The criteria for sample size determination were the same as for Study 1.

Stimuli and Procedure: As in Study 1, the experimental paradigm employed a mixed factorial design with an additional within-subjects factor of Effort level (less than 1 hour, 10 hours, 100 hours), representing the reported time investment in either AI prompting or human artistic creation when creating the initial work.

Participants completed the experiment through Qualtrics following procedures similar to Study 1. After the initial introduction to Alex and his creative methodology, participants were additionally informed of the time investment involved in creating the initial source work. Specifically, they learned that Alex had spent either less than 1 hour, 10 hours, or 100 hours either working directly on creating the artwork with his digital sketching and design tools (Human Artist condition), or iteratively refining his own AI prompts to generate the desired artwork (AI condition). From the stimulus set of ten original artworks, each participant evaluated six (randomly assigned), with each effort level represented exactly twice in randomized order. Following the protocol of Study 1, participants then evaluated modified versions of these works varying across three levels of Manipulation, with attention checks implemented at consistent intervals. Written justifications and demographic data were again collected.

Results

Data Processing: The same data quality measures were used as in Study 1. Of the initial 131 participants, 6 did not complete the full experimental procedure and were excluded. Among the remaining 125 participants, 6 indicated they did not complete the study seriously and were also removed from analysis. All participants successfully passed both attention checks. This process yielded a final sample of 119 participants.

Transformativeness: Results for all three ratings of artistic qualities are shown in Figure 3. A mixed ANOVA revealed a substantial main effect of Modification, $F(2, 230) = 804.73, p < .001, ges = .68$, accounting for 68% of variance in transformativeness ratings. Neither Creator Type, $F(1, 115) = 0.60, p = .440, ges = .002$, nor Effort level, $F(2, 230) = 1.17, p = .313, ges = .001$, showed significant effects, indicating transformativeness judgments were independent of creator identity and time investment for generating the initial source image. The interaction between Creator Type

and Modification approached but did not reach significance, $F(2, 230) = 2.91, p = .056, ges = .008$.

Post-hoc analyses revealed systematic differentiation across modification levels. Dramatic modifications ($M = 3.45, SD = 0.908$) were rated more transformative than both slight modifications ($M = 2.01, SD = 0.702; t(116) = 22.7, p < .001$) and no modifications ($M = 1.05, SD = 0.245; t(116) = 36.0, p < .001$). Effect sizes were substantial across all contrasts (none-slight: $d = 1.76$; slight-dramatic: $d = 2.10$; none-dramatic: $d = 3.33$), demonstrating systematic increases with Modification level regardless of Creator Type or Effort expended in generating the source image.

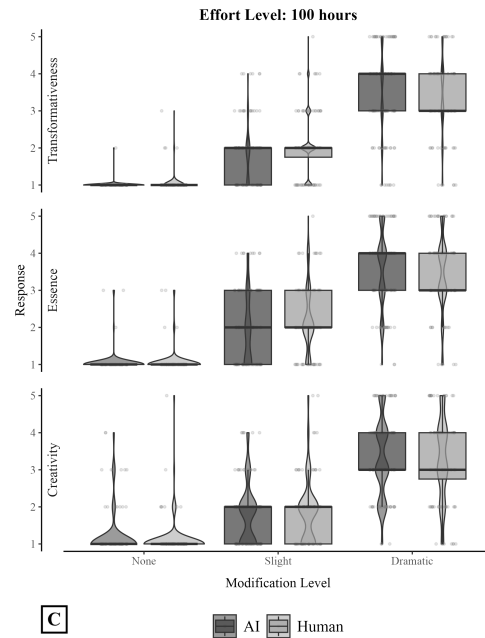
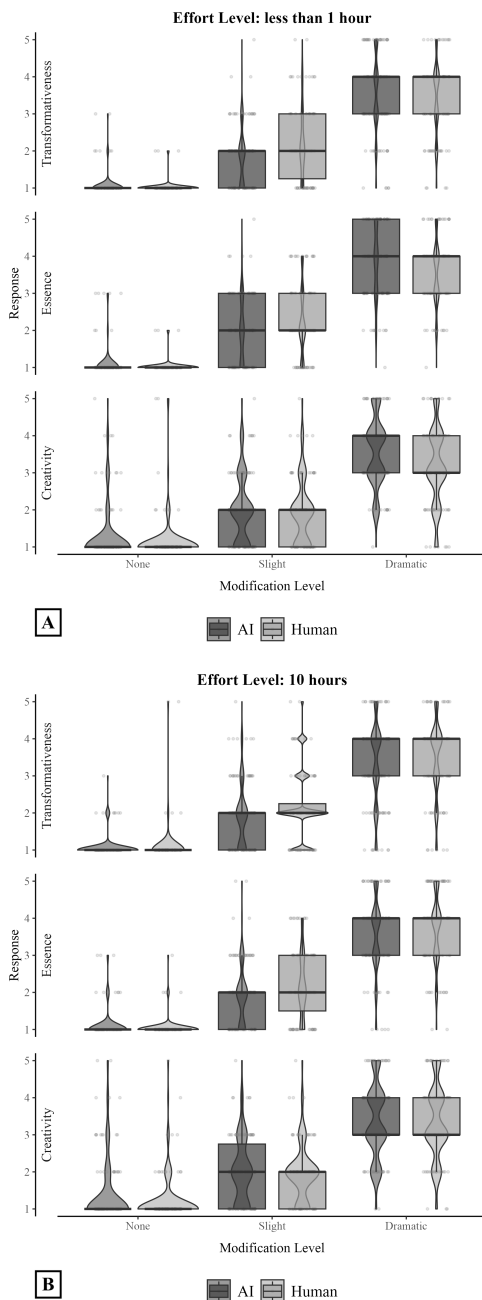


Figure 3: Violin plots of transformativeness, essence change, and creativity (for less than one hour effort (A) 10 hours effort (B) and 100 hours effort (C), separated by Modification level for AI-generated and human-created derivative artworks. Boxplots show median and interquartile range.

Essence: The mixed ANOVA demonstrated a substantial main effect of Modification, $F(2, 230) = 953.36, p < .001, ges = .72$, accounting for 72% of variance. Neither Creator Type, $F(1, 115) = 0.19, p = .661, ges = .001$, nor Effort level, $F(2, 230) = 2.35, p = .097, ges = .002$, showed main effects. However, a small but significant Creator Type \times Modification interaction emerged, $F(2, 230) = 3.74, p = .025, ges = .01$. An interaction analysis revealed Creator Type differences only for the slight-modification condition, for which works based on human-created sources ($M = 2.17, SD = 0.766$) showed marginally greater essence change than those based on AI-created sources ($M = 1.95, SD = 0.728; t(343) = 2.70, p = .022$).

Post-hoc analyses revealed systematic differentiation across modifications. Dramatic modifications ($M = 3.62, SD = 0.824$) produced greater essence change than either slight modifications ($M = 2.06, SD = 0.753; t(116) = 26.2, p < .001$) or no modifications ($M = 1.07, SD = 0.267; t(116) = 40.5, p < .001$), with substantial effect sizes (none-slight: $d = 1.65$; slight-dramatic: $d = 2.42$; none-dramatic: $d = 3.74$).

Creativity: A mixed ANOVA revealed a substantial main effect of Modification, $F(2, 230) = 565.93, p < .001, ges = .59$, and a small but significant effect of Effort level, $F(2, 230) = 4.76, p = .009, ges = .004$. Source works generated with both intermediate (10 hours: $M = 2.21, SD = 1.10$) and minimal effort (less than 1 hour: $M = 2.19, SD = 1.18$) received slightly higher creativity ratings than those

generated with extensive effort (100 hours: $M = 2.10$, $SD = 1.16$; both $ps < .024$). Creator Type had no reliable effect, $F(1, 115) = 1.32$, $p = .254$, $ges = .005$, and no interactions reached significance (all $F_s < 2.72$, $ps > .067$).

Post-hoc analyses demonstrated clear Modification effects, with dramatic modifications ($M = 3.34$, $SD = 0.852$) rated more creative than either slight modifications ($M = 1.92$, $SD = 0.739$; $t(116) = 22.6$, $p < .001$) or no modifications ($M = 1.23$, $SD = 0.596$; $t(116) = 27.3$, $p < .001$). Effect sizes were substantial (none-slight: $d = 1.34$; slight-dramatic: $d = 2.09$; none-dramatic: $d = 2.52$).

General Discussion

Current policy of the United States Copyright Office in effect treats AI assistance in the generation of artworks as an “original sin.” Contrary to this policy, our data from two studies demonstrate that lay human observers primarily evaluate qualities relevant to copyright by assessing the magnitude of the perceptual modifications made in changing the initial source image into a final derivative image. If a human artist makes a sufficiently great change in the final steps of the creative process, laypeople judge the final artwork to be high in all the core qualities required to merit copyright protection.

In contrast, attributions about the process used to generate an initial source image have little impact on lay judgments about the final derivative artwork. Neither the type of creator (AI or human; Studies 1 and 2) nor the amount of effort expended in generating the source image (Study 2) have more than minor impacts on judgments about the final derivative artwork.

The minimal impact of reported effort is particularly striking given the USCO's focus on authorial determination and execution. While the USCO maintains that AI platforms such as Midjourney function as autonomous creators rather than as assisting instruments, our data suggest that observers evaluate the transformative nature of modifications independently of both the initial creator's attributed identity and their time investment. Indeed, for creativity judgments, works reportedly requiring extensive effort to generate the source image (100 hours) were rated *less* creative than those generated with minimal or intermediate effort (Study 2). This finding suggests that judgments of creativity may be increased by apparent spontaneity, rather than by prolonged refinement. From Picasso's assertion that “inspiration exists, but it has to find you working” to the aesthetic valuation of *prima vista* execution in music performance, Western creative traditions have historically romanticized the immediacy of creative insight. This perception may reflect an implicit theory of creativity that associates authentic artistic expression with spontaneity rather than deliberate, time-intensive refinement. While contradicting the “sweat of the brow” doctrine historically invoked in copyright adjudication for creativity thresholds, this finding resonates with contemporary copyright doctrine's emphasis on originality over effort, following *Feist Publications, Inc. v.*

Rural Tel. Service Co. (1991). The devaluation of extensive time investment in creative judgment is inconsistent with the USCO's emphasis on authorial determination and execution. Observers may privilege apparent spontaneity in their evaluations of creative merit. Future research might explore whether this effect persists across different creative domains.

The present study focused on the role of a human artist in altering an initial source image to create a derivative work. If the human artist makes sufficiently large perceptual transformations of the source image, lay observers “forgive” the use of AI assistance in generating the initial starting point. Our findings do not contradict previous evidence that lay people downgrade artworks attributed *solely* to AI, without any significant contribution from a human (Bellaiche et al., 2023). But in current practice, humans who produce digital art often do so with AI assistance, rather than treating the AI as an autonomous system operating without guidance from a human. The present findings suggest that copyright doctrine could better align with lay human intuitions by moving beyond a strict dichotomy between human-authored versus machine-generated artworks, and instead considering the nature of human-AI collaborations more carefully. Given increasing use of AI-assisted tools for generating creative products, a focus on AI-human collaboration would better serve the core goals of copyright law: protecting original creative expression while adapting to technological realities.

Future research should examine how domain expertise may moderate the patterns found in the present studies for lay evaluators of artworks. It will be particularly interesting to assess whether artists and legal experts show different sensitivity to variations in creator type and effort when judging qualities of artworks.

Acknowledgments

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