Who, or Rather, What Painted This? Generation Z's Attitudes Towards Artificial Intelligence Artworks

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ABSTRACT

Throughout art history, the exact boundaries of what can and cannot be considered art has long been debated, and the rise of artificial intelligence (AI) algorithms that produce artworks has rekindled this debate in the context of technology. History indicates that the answer to what is considered "art" largely depends on the evaluator's personal definition of creativity and their perception of the artist, which gives reason to investigate people's attitudes towards AI art. Pre-existing research has discovered a negative perception bias towards AI artists in adult generations. However, no studies have been conducted on Generation Z specifically. Gen Z possesses a close association to technology which distinguishes them from previous generations, and could therefore produce differing attitudes towards AI art. Therefore, this study seeks to investigate: what are Generation Z's attitudes towards AI art? This study defined "attitudes" to combine attitudes towards the *artist*, and attitudes towards the *artworks*. Therefore, a mixed method study consisting of 1) a ratings test to examine any perception biases towards AI artists, and 2) a questionnaire to investigate the criteria Gen Z used to determine value in AI artworks were combined to answer this question. It was concluded that Generation Z had a neutral attitude towards AI artists and responded rather well to AI art styles of landscape paintings.

Introduction and Background

Artificial intelligence (AI) is a subset of computer science focused on designing systems that can emulate human intelligence in narrow areas (Shannon 1987, 16). Through various AI models such as machine learning, neutral networks, and computer vision, AI has begun to replicate creativity, a trait once considered to be exclusive to humans. AI researchers initially experimented with this new technology by applying it to art, but the movement grew and has since gained momentum (Elliott 2019, 9). For example, Google's "DeepDream" algorithm has come out with a so-called "hallucinogenic" art style, and hundreds of Generative Adversarial Network (GAN) systems are available for the creation of anything from faces to landscape paintings.

Another painting titled *Edmond de Belamy*, authored by a system called AI Creative Adversarial Networks (AICAN), has recently been auctioned off at the prestigious Christie's auction house for $432,500 (Elliott 2019, 9). Altogether, such advances in the field of AI art have sparked heavy debate on the future of creative professions.

Figure 1. *Edmond de Belamy*. GANs Algorithm, Inkjet printed on Canvas by Obvious, via Obvious Art

Context and Perspectives

Naturally, many have raised the question "Can AI be creative?" and "Can AI art be considered art?"; there are currently many diverse definitions of creativity, but no agreement on a concrete definition and what it means for the value of AI's creations (Norton 2009, 339). Among others, Simon Colton, a professor of computational creativity, believes artifacts can be considered creative if the process of its generation involves "skill, appreciation, and imagination", and that its value can be judged with the help of this information (Colton 2008). However, artist Luba Elliott, who employs AI algorithms in her pieces, asserts that at the technology's current stage, a human touch is still needed to give "meaning and context" to the AI's output, and that human guidance remains crucial in administering value (Elliot 2019, 11).

To further put this debate into context, a similar controversy over Marcel Duchamp's artwork titled *Fountain* can be examined. Duchamp created this experimental piece by taking a porcelain urinal and signing "R. Mutt" on its side before submitting it to the Society of Independent Artists, which vowed to accept all artworks for display. The response was mixed, where some argued that *Fountain* could not be considered art but held important implications for aesthetics and art history (Camfield 1990). Others reluctantly accepted it but did not attribute to it any significant value, and still others argued that Duchamp's decisions to select the urinal through his own vision and recontextualize it, elevated the creation from a piece of plumbing to a piece of art (Camfield 1990). In any sense, this example indicates that accepting a work as art or not is incredibly subjective and can vary greatly based on the nature of the evaluator themselves.

Figure 2. *Fountain*, by Marcel Duchamp, 1917. Photograph by Alfred Stieglitz, Public Domain via Wikimedia Commons

The evaluator's perception of the *artist* is also significant. A recent study using an extensive database of exhibition and auction data found a "lock-in effect" where artists with known prestigious backgrounds were found to be more likely to succeed in their careers, whereas less reputable artists from the peripheral of the community faced long struggles for realization (Fraiberger et al. 2018). This indicates that the audience's perceptions of the author themselves can also affect how the creations they produce are accepted. Therefore, it can be said that: 1) The evaluator's definition of creativity/how value is attributed to an artwork and 2) The evaluator's perception of the artist (AI) will dictate an evaluator's overall attitude towards AI artworks.

Then, what are people's views on AI art? Currently, investigations into common perceptions of AI art have already been conducted by cognitive scientists and psychologists Martin Ragot, Nicolas Martin, and Salomé Cojean. They asked 565 adult participants randomly recruited from Amazon Mechanical Turk (a crowd-sourcing platform) to evaluate GANs artworks based on liking, perceived beauty, novelty, and meaning; they found a negative bias towards AI's creations where artworks evaluated under the assumption that they were created by humans were rated higher than supposedly machine-made artworks (Ragot et al. 2020, 5).

Gap in Research

However, no studies have been conducted on Generation Z's perspective on AI art. Generation Z (Gen Z), who are individuals born from the mid to late 90's and early 2000's, grew up in an era unique to their predecessors - they were raised during the digital revolution (Wood 2013, 1). According to scholars, growing up amidst "web, internet, smart phones, laptops, freely available networks, and digital media" has distinguished them from any other generation to be "more connected to electronics and the digital world" (Singh and Dangmei 2016, 2). Altogether, many aspects of their

lives such as entertainment (internet and video games), communication (smart phones and texting), and education (online schooling platforms and digital assignments), have greatly integrated technology into Gen Z's daily lives. Not only this, but they also reportedly have a "focus on innovation" (Wood 2013, 1). Will this close association with the digital world and innovative perspective motivate Gen Z to hold a unique perspective on AI art? Perhaps this intimate connection to technology will create a different reaction to AI art compared to adults in the aforementioned study. If the evaluator's perspective greatly influences how value is attributed to an artwork, and their perception of the artist also affects this, this study hypothesized that Gen Z's uniquely close relations to the digital world will make them more inclined to accept AI art.

Significance of Research

As AI systems are further developed and increasingly integrated into society, its influence on creative fields may be greater. Additionally, as Gen Z - who are current graduate, undergraduate, and high school students - grow up and enter the professional world, they will be the future artists, software developers, and art market during the new era with AI. How they view and attribute value to art pieces, and the ways in which they define creativity will greatly shape these professions. Therefore, answering the question "What are Gen Z's attitudes towards AI-generated paintings?" and understanding their attitudes will help predict how these professions will react and adjust to the coming changes of AI to give a glimpse into what the future holds for creative fields.

Methodology

Purpose

The overall goal is to find out Gen Z's attitudes towards AI art to help predict what the art fields may look like in the future. If Gen Z accepts AI art and views it as art, they may grow up and start to introduce new mediums that involve AI to create artworks. Additionally, it may also help us predict if AI art is marketable to Gen Z in the future and worth the investment. Therefore, the attitudes of Generation Z participants towards AI authored artworks will be investigated in a mixed method study with two stages:

1. An artwork ratings survey to isolate and reveal biases (if any) for or against AI artists. (Attitude towards the artist)
2. A brief questionnaire survey on Gen Z's definitions of creativity and value in artworks. (Attitude towards the artwork)

These methods were chosen above others due to the fact that Gen Z has not yet been represented in other art studies. Metadata analysis with gallery or auction data would not be possible since Gen Z is commonly too young and financially unable to be involved in such spheres. Additionally, no studies isolate and examine the younger ages only. Therefore, original data had to be produced by contacting Gen Z individuals directly.

Alignment

It was established in the literature review that 1) the evaluator's perception of an artwork and 2) the evaluator's definitions of creativity and value will dictate how the artwork is received. Therefore, investigating any biases will capture Gen Z's attitudes towards AI *artists*. Identifying biases, if any, would help show how the knowledge of an AI artist alone will impact Gen Z's instinctive reactions and perceptions towards a painting. In this, we may gain insight into

how Gen Z individuals are naturally inclined to feel towards AI works and how other Gen Z individuals may react to AI art as well.

The questionnaire will then gauge Gen Z's attitudes towards the AI *artwork* itself. It will provide insight into the reasons behind their ratings and the extent to which the conclusions from the ratings can be generalized to a greater population (See Figure 3 for summary).

Combining the attitudes towards the artist and attitude towards the artworks will capture a fuller picture of Generation Z's overall attitudes towards AI artworks, and help in understanding changing views towards creativity, as well as the extent to which AI will impact future creative professions.
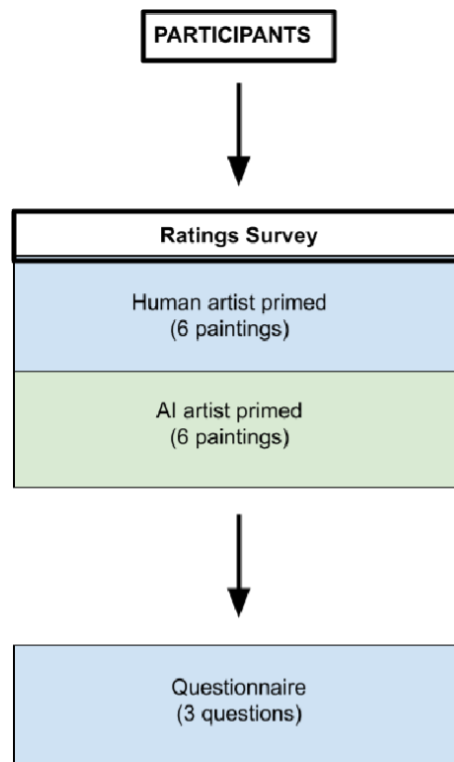

Figure 3. Overall Study Procedure

Design

Possible biases or differing attitudes towards AI artworks will be examined with a blind survey-based study modeled after Martin Ragot, Nicolas Martin, and Salomé Corjean's "AI-generated vs. Human Artworks. A Perception Bias Towards Artificial Intelligence?" paper. Several elements (discussed below) were kept similar, rather than creating a wholly independent test, in order to allow comparison of Gen Z's results from this study to the adult population from Ragot et al.'s study. In contrast to this seminal work, the participants in this study will be restricted to Gen Z (born from 1995-2009), compared to all ages in the seminal work. This factor is accounted for by informing interested participants of the age requirement, as well as a statement before the test begins that their date of birth is within the valid dates.

Participants

Participants were recruited through posters with QR codes linking them to the Google Form test. QR codes and digital tests were chosen because an online forum would be accessible to the tech-savvy Gen Z. Taking out a smartphone and scanning the code to immediately view the test would be more accessible to a broader population than having to physically visit a testing site. Additionally, participants could retain anonymity and freely share their opinions if the test was conducted remotely, and their identities or personal information was not collected. To prevent data skewing towards the population that knows how to use QR, classrooms throughout North Creek High School and advisories were visited, as well as social media posts were made to gather a broader population of participants.

Materials

Google forms were used to administer the ratings survey to the Gen Z participants. A raffle for $15 was used as compensation for interested individuals.

The artworks shown to the participants were selected to be either landscape or portrait paintings in accordance with the design of the seminal work. Additionally, similar artwork styles were chosen to best mask any obvious distinctions between AI and human artworks. A total of 12 artworks were selected: 6 Human-authored and 6 AI-authored.

Part 1: Artwork Ratings Test

Participants were presented with 12 human or AI- authored artworks (landscape/portrait paintings) and asked to rate them on a scale of 1-7 in four categories - **Liking, Perceived Beauty, Novelty, and Meaning** – which were defined in the seminal work (Ragot et al. 2020, 1). Numerical ratings were ideal in order to convert instinctual reactions and emotions into a measurable and uniform scale which would allow for a standard comparison between individuals.

The twelve paintings were first scrambled then divided into a "Human-Primed" and "AI-Primed" section with six paintings each. Table 1 details the order of the artworks, their artist identities, and sections within the test. In reality, there was a mix of human and AI-authored artworks in both sections, but the participants were not aware of this. Before rating the first six paintings, they were told the following statements (these instructions were taken from the seminal work with permission from the authors):

> "6 paintings created by some artists will be presented. You will be asked to rate them. There are no right or wrong answers. Only your opinion counts. Please respond spontaneously according to your feelings" (Ragot et al. 2020, 3).

This is the "human condition" as participants have no previous knowledge at this point about any AI artworks in the mix. However, when the participants were asked to rate the next six artworks, the priming message was:

> "6 paintings created by some Artificial Intelligence will be presented. You will be asked to rate them. There are no right or wrong answers. Only your opinion counts. Please respond spontaneously according to your feelings" (Ragot et al. 2020, 3).

Therefore, participants would rate paintings #1-6 believing they were authored by humans, and paintings #7-12 believing that they were authored by artificial intelligence. The reasoning behind this was that by presenting the "human" primed artworks prior to the introduction of AI primed artworks, a participant's usual artwork evaluation patterns may be recorded. The Human-Primed section would serve as a control group. Then, if other factors are held constant but only the identity of the artist (Human → AI) is manipulated, any changes in their ratings for the next six paintings would reveal the effect that the knowledge of an AI artist had on their evaluations. Higher, lower, or similar ratings between the Human-Primed and AI-Primed sections would signal a potential bias and give an indication into how the AI artist was perceived or accepted.

Part 2: Questionnaire

Upon completion and submission of the artwork ratings test, Google forms displays an ending message. In this, a link was provided that would direct participants to the questionnaire portion of the study where three questions were asked:

1. "What criteria do you use to determine if an object, idea, or work is creative or not creative? Please list 3 criteria."
2. "Please list 3 factors that you believe ascribe value to artworks."
3. "What groups do you believe can possess creativity? Why these groups over others?"

Additionally, as this was a blind study (participants were not aware of the AI artist throughout), a document debriefing the participant about the true nature of the study was linked upon completion of both parts of the test.

Ethics

An informed consent form was distributed to all interested individuals before the test. An attestation to a valid year of birth as well as a preferred method of contact (for the raffle compensation) was the only personal information collected. All other data, once processed, would be wiped.

Findings

Test Details

To reiterate, all 12 artworks across both sections of the ratings test were a mix of human and AI-authored pieces. However, the participants rated artworks #1-6 believing they were human artworks, and #7-12 believing they were AI artworks. Therefore, the first section will be referred to as "Human-Primed" and the second section will be referred to as "AI-Primed".

Ratings Test – Data Analysis

Upon conclusion of the study, 118 responses were gathered (n=118). The artwork ratings test generated quantitative data. Therefore, Repl.it, a browser-based integrated development environment (coding platform), Pandas, a library commonly used for processing data in the Python coding language, and simple formulas in Google Sheet were used to analyze the numbers. Google Forms additionally has the option to download responses into a CSV (comma separated values) format which made it a favorable choice since csv files are compatible with Pandas. With these tools, a two sample T-interval test was conducted. Two sample T-interval tests calculate whether the true means of two population samples are equivalent (Zach 2020). Since the main purpose of the ratings test was to determine whether there is a statistically significant difference between the Human-Primed and AI-Primed ratings, two-sample T-interval tests would be appropriate. A confidence interval using this test was calculated across all four categories of Liking, Beauty, Novelty, and Meaning, as well as for the total scores which combined these four categories (See Table 1).

Table 1. 2-Sample T Intervals for Human-Primed v. AI-Primed Scores

Artwork Rating Category	2-Sample T-Interval
Total Scores	(-6.39, 5.958)
Liking	(-1.298, 1.8908)
Beauty	(-1.677, 1.6852)
Novelty	(-1.818, 1.7824)
Meaning	(-2.452, 1.4254)

Upon conducting a 2-sample T value interval test, it was found with 95% confidence that the true difference of means was between (-6.39, 5.958), (-1.298, 1.8908), (-1.677, 1.6852), (-1.818, 1.7824), and (-2.452, 1.4254) for the categories, respectively. All of these intervals include the value zero. Therefore, with 95% confidence, it was concluded that there was no statistically significant difference between Gen Z's ratings of artworks, across all categories, whether the participants believed the artworks were created by human artists or AI artists.

Ratings Test – Discussion

As represented by the 2-sample T-tests (Table 1), there was no statistically significant difference between the participants' ratings of the artworks, whether they were human-primed or AI- primed. Therefore, this suggests that the supposed identity of the artwork's author (human or AI) did not influence Generation Z's evaluations, and that it does not matter greatly to them - Gen Z will rate the artworks similarly. Therefore, in reference to the research question - what are Generation Z's attitudes towards AI-authored artworks – it was concluded that Gen Z had a **neutral** attitude towards AI artists. These results were in opposition to the findings of Ragot et al. which found a negative bias towards AI-primed artworks within adults.

Therefore, the data appears to support the initial research hypothesis that Generation Z will have more favorable attitudes towards AI-primed artworks in comparison to adult generations, as neutral attitudes are more favorable to negative attitudes. A possible explanation for this difference across generations could be the level of integration and accustomization to digital technologies. As discussed in the literature review, Gen Z are especially "connected to electronics and the digital world" (Singh and Dangmei 2016, 2). This could have led them to find more connection to paintings and regard them with less stigma than older generations when it comes to "artificial" and "machine-made" pieces and art (Ragot et al. 2020).

True Identity – Data Analysis

At the end of each section, participants were asked which artwork they favored most of the six they had just evaluated.
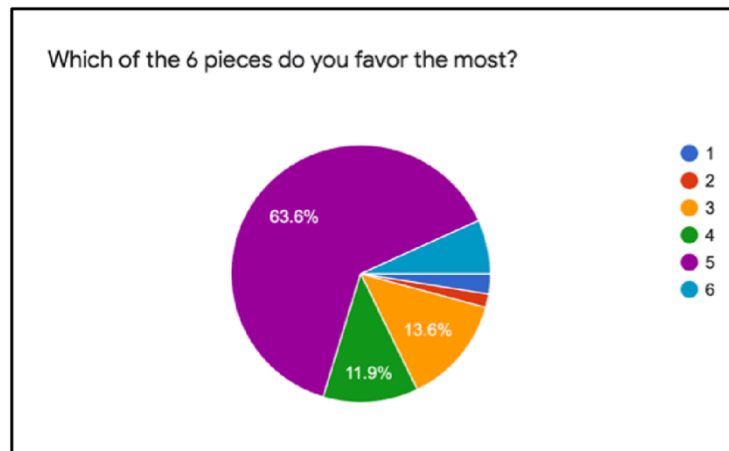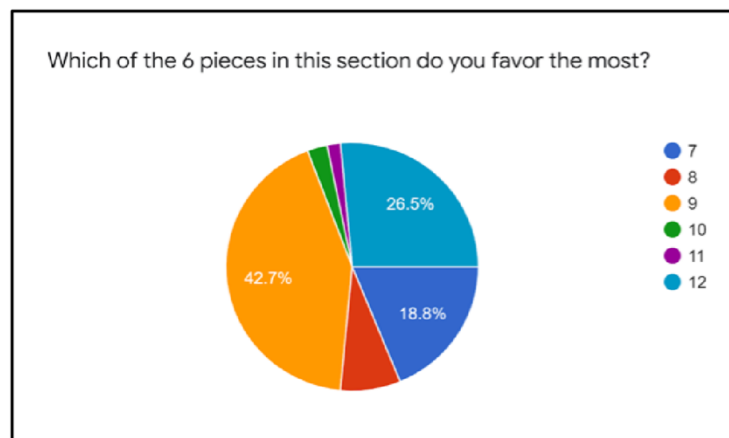

Figure 4. Human-Primed Section's Most Favored Artworks

Figure 5. Artwork #5 in Ratings Test. *The Golden Sunset*. AI-generated by GLOBIX, via AI Art Gallery

In the human-primed section, Artwork #5 was most favored (See Figure 4, Figure 5). In the AI-primed section, Artwork #9 was most favored (See Figure 6, Figure 7).

Figure 6. AI-Primed Section's Most Favored Artworks

Figure 7. Artwork #5 in the Ratings Test. *A Slight Touch*. AI-generated by GLOBIX. via AI Art Gallery

Interestingly, the true identities of both artworks #5 and #9 were landscape paintings authored by artificial intelligence. Furthermore, a simple mean was taken to compare the general evaluations of true artwork identities against their priming statements. The artworks were separated into True Human / Human-Primed, True Human / AI-Primed, True AI / AI-Primed, and True AI / Human-Primed categories. The total possible score was 21 since each category consisted of three paintings with ratings from 1-7.

Table 2. Average Priming Statement to True Artist Identity Category Scores from Participant Evaluations (Out of 21)

	True Human	True AI
Human-Primed	17.39	18.47
AI-Primed	17.03	17.59

As shown in Table 2, the means of the scores were similar across all categories, which supports the previous data that suggests the priming statements had no effect on the participant's evaluation of an artwork.

Furthermore, regardless of what the participants believed, the researcher sought to investigate which categories of art appealed to Gen Z most. The twelve artworks were separated into human-portrait, human-landscape, AI-portrait, and AI-landscape categories based on their true identities. An average score out of 21 was again calculated (See Table 3).

Table 3. Average Landscape/Portrait & True Artist Identity Category Scores from Participant Evaluations (Out of 21)

	Human	AI
Landscape	18.67	20.27
Portrait	15.75	15.79

Once again, the AI-authored landscape artworks were the most highly rated with 20.267 out of 21 total points. These findings supported the previous conclusions drawn from Figures 4 and 6.

Questionnaire – Data Analysis

Lastly, in the questionnaire portion of the study, participants were asked:

1. "What criteria do you use to determine if an object, idea, or work is creative or not creative? Please list 3 criteria."
2. "Please list 3 factors that you believe ascribe value to artworks."

These responses were qualitative data. Therefore, it was analyzed using a word cloud generator software. Word clouds take in text and process it to arrange the text in a "cloud". More frequently occurring words appear larger, whereas less frequently occurring words are arranged around it in smaller fonts. Therefore, words clouds were ideal because common themes in textual data could be easily summarized and understood at a glance.

The responses were processed to combine similar words such as "Emotion" and "Emotions" (the software only combines exact matches), then inputted into a word cloud software created by Jason Davies.

Figure 8. *"What criteria do you use to determine if an object, idea, or work is creative or not creative? Please list 3 criteria."* Word Cloud Responses

Figure 9. *"Please list 3 factors that you believe ascribe value to artworks."* Word Cloud Responses

For Question 1, it was found that "New", "Original", "Color", and "Meaning" were said to be among the greatest factors in determining creativity in an artwork (See Figure 8). For Question 2, "Meaning", "Beauty", "Colors", and "Effort" were said to be the greatest factors in ascribing value to an artwork (See Figure 9).

True Identity and Questionnaire – Discussion

The AI-authored landscape paintings were the most highly rated category of artworks (20.27 out of 21 total points in comparison to 18.67, 15.79, and 15.75), and were consistently chosen as the most favored artworks across both the Human-Primed and AI-Primed sections. Therefore, regarding Gen Z's attitudes towards the AI *artwork* itself (rather than artist), it was concluded that AI art appeals to the Generation Z participants' artistic tastes given its repeated popularity across multiple categories of analysis.

These findings align with current progressions in the AI-art industry where landscape and abstract artworks are further developed whereas facial construction and portrait works remain distorted or more difficult to construct (Mazzone and Elgammal 2019, 2). This could also be influenced from the fact that humans can sensitively recognize abnormalities in faces in comparison to natural and rugged landscapes (Mazzone and Elgammal 2019, 3).

Furthermore, the questionnaire responses can also be said to support this conclusion. "Color" and novelty criteria ("New", "Original", "Unique") were commonly cited to attribute creativity, as well as "Beauty" for value. AI's delicate, semi-blended style in Artwork #5 (Figure 5), or vibrant, nearly abstract but discernible style in Artwork #9 (Figure 7) adhere to these criteria. Criteria such as "Meaning" and "Emotion", however, can be argued. Does meaning refer to deeper thoughts an artwork can prompt in the viewer, or meaning during the creation of the artwork itself? Can meaning and emotion be considered to translate from the programmer to the AI artwork? This raises additional questions and further investigations must be conducted to specify exactly how these criteria apply to AI and non- human artists.

Research Question – Conclusion

This study investigated Generation Z's attitudes towards AI- authored artworks, and concluded that Gen Z participants in this study had an overall **accepting** attitude towards AI art. As previously discussed, if the Gen Z participants did not favor nor reject AI artists (neutral response), but responded rather well to AI landscape paintings, it can be concluded that Gen Z was overall accepting of AI art in general and what it has to offer.

Implications

The implications of these findings are that there may be a broader market for AI-authored art in the future. What is accepted and considered art is arbitrary and depends on the current population's attitudes. Therefore, since Gen Z will grow up to be artists, programmers, and art buyers to populate the creative fields, Gen Z's definition of art that encompasses AI could indicate a future in partnership with this technology. For instance, human artist Rafik Anadol has utilized data as his "pigment" in order to craft mesmerizing installations. Each pixel in the fluid display represents a data point (Benney 2021). Therefore, if Gen Z participants in this study enjoyed AI artworks on a similar level to human artworks and were accepting of it in the context of art, this could indicate that a broader population may think so as well, and that AI could exist and thrive as another category or medium of creation (just like oil paints or charcoal) within the art industry.

Additionally, landscape pieces with vivid colors or atmospheric depictions were very well received in this study. This indicates that further investment into the GANs algorithms, or development of original machine learning models tailored to this art style may be profitable and worthwhile. Their marketability to Gen Z expresses potential for the expansion of AI landscape artworks.

Lastly, in the Human-Computer Interaction fields, researchers seek to understand the patterns in which people think and interact with technology to design online systems and user interfaces (Burnham 2020). This study's conclusion that Generation Z participants had different reactions to adult populations raises significant questions about how responses to AI may vary across generations. Additional research in HCI fields may need to be conducted in order to take differing age groups into account if they possess unique responses.

Limitations

However, some flaws in the study involve the selection of artworks. With just twelve artworks, the patterns and conclusions drawn from the data could have been specific to these twelve paintings in particular. Additionally, there is a possibility for bias in that the paintings in both sections were merely different, and that ratings were not solely

influenced by the human and AI priming statements. Generalizability of the results to a greater population is limited as a result. Therefore, the same test must be conducted with a much broader selection of paintings in order to verify that Human- Primed and AI-Primed paintings are similarly reviewed with any combination of artworks.

Additionally, knowledge about AI algorithms and the process in which AI art is created was not normalized across participants. Some participants may have been very knowledgeable regarding the inner workings of GAN/neural network algorithms and rated the art with this in mind, whereas others may have been less knowledgeable and based their evaluations on personal assumptions about AI. This variance was not accounted for due to the anonymous nature of the participants. In future studies, a debrief within the instructions that informs participants on AI art may be necessary to normalize assumptions on AI.

Lastly, the participants retained anonymity. Thus, it could not be determined if an equal distribution of ages within the spectrum of Generation Z individuals was captured and represented in the results. Collecting basic demographic information may be valuable for future studies.

Conclusion

With disagreement on the exact boundaries of what can be and cannot be considered art, it is no surprise the rise of AI artworks has caused contentious debate in the art, as well as artificial intelligence communities. Regardless, as the evaluator plays a major role in determining how the artwork is received (as demonstrated by Duchamp's *Fountain*), it is worth examining Gen Z's perspectives on AI art. Unlike previous works, this study focused on Gen Z participants in particular and their responses to AI-authored artworks. It concluded that across multiple categories - Liking, Beauty, Novelty, and Meaning (Ragot et al. 2020, 1) - Gen Z evaluated the paintings similarly, whether they believed they were authored by human or AI artists. This suggests that the supposed identity of the artist did not influence their ratings, nor matter greatly to Gen Z. These findings were in opposition to Ragot et al's study which discovered a negative bias towards AI-art in the evaluations of adult participants.

Therefore, the main contributions of this paper are that it raises significant discussions about how responses to artificial intelligence may vary across generations. In the Human-Computer Interaction fields, additional research may need to be conducted to take different age groups into account if their associations with technology will cause them to respond uniquely. Additionally, in future creative industries, it reveals potential for a broader definition of "art" if Gen Z professionals are accepting of AI as a new category of creativity and art medium. However, further studies with larger selections of artworks must be conducted to generalize these patterns to a larger population. Lastly, AI's art style in depictions of landscapes catered well to Gen Z participants' tastes. Additional research and analysis on the reasons behind its appeal to Gen Z, as well as pursuits into advancing the software in landscape creation may be profitable for future expansion of the AI-art industry.

Acknowledgments

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