Using Artificial Intelligence to create paintings:

How type of artist impacts WTP through emotional intelligence and perceived quality

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Dissertation written under the supervision of Filipa de Almeida

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ABSTRACT

Title: Using Artificial Intelligence to create paintings: How type of artist impacts WTP through emotional intelligence and perceived quality

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It is known that technological development continuously contributes to making people's lives more efficient. In particular, the development of artificial intelligence (AI) has impacted many different fields including medicine, transportation, public security, telecommunications, and so on. This dissertation addresses the influence of artificial intelligence in the field of art. More specifically, it aims to test how the type of artist (human vs. algorithm/robot) impacts willingness to pay through emotional intelligence and perceived quality. AI agents are perceived as beings without emotional intelligence and, as the art creation process is linked to the expression of emotions, people tend to think that these systems are not as capable of creating works of art as humans. On the other hand, AI-made artworks have been valued in the art auctions of renowned museums in recent years. Thus, it is interesting to understand how consumers evaluate the AI art, as it might revolutionize the art world in the future. The results of this study did not support expectations, however, they are a good starting point for future research on this topic.

Keywords: Artificial Intelligence, Art, Type of Artist, Emotional Intelligence, Emotions, Perceived Quality, Willingness to pay, Emotional Painting, Abstract Painting, Robot, Algorithm, Consumer Behavior

SUMÁRIO

Título: Utilizar a Inteligência Artificial para criar pinturas: como é que o tipo de artista impacta a disposição a pagar através da inteligência emocional e da qualidade percebida

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Sabe-se que o desenvolvimento tecnológico contribui continuamente para tornar a vida das pessoas mais eficiente. Em particular, o desenvolvimento da inteligência artificial (IA) tem impactado muitas áreas de estudo diferentes, incluindo medicina, transporte, segurança pública, telecomunicações, e assim por diante. Esta dissertação aborda a influência da inteligência artificial no campo da arte. Mais especificamente, visa testar como é que o tipo de artista (humano vs. algoritmo/robô) impacta a disposição a pagar por meio da inteligência emocional e da qualidade percebida. Os agentes de inteligência artificial são percebidos como seres sem inteligência emocional e, como o processo de criação de arte está ligado à expressão de emoções, as pessoas tendem a pensar que esses sistemas não são tão capazes de criar obras de arte quanto os humanos. Por outro lado, as obras de arte criadas por agentes de inteligência artificial têm sido valorizadas nos leilões de arte de museus renomados nos últimos anos. Assim, é interessante entender como é que os consumidores avaliam a arte IA, pois isso poderá revolucionar o mundo da arte no futuro. Os resultados deste estudo não apoiaram as expectativas, no entanto, são um bom ponto de partida para futuras pesquisas sobre este tema.

Palavras-chave: Inteligência Artificial, Arte, Tipo de Artista, Inteligência Emocional, Emoções, Qualidade Percebida, Disposição a pagar, Pintura Emocional, Pintura Abstrata, Robô, Algoritmo, Comportamento do Consumidor

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GLOSSARY

AGI Artificial General Intelligence

AI Artificial Intelligence

ANI Artificial Narrow Intelligence

ASI Artificial Super Intelligence

CANs Creative Adversarial Networks

CI Confidence Interval

EI Emotional Intelligence

GANs Generative Adversarial Networks

IoT Internet-of-Things

M Sample mean

MD Mean difference

p p-value

r Estimation of the Spearman correlation coefficient

SD Standard Deviation

SE Standard Error

US United States

WTP Willingness to pay

1. INTRODUCTION

Technologies are constantly evolving and changing the world. Artificial Intelligence (AI) is a famous topic that has become increasingly relevant over the years. The literature suggests different generations of AI, according to their capabilities and uses. Initially the AI machines were capable to only perform individual specific tasks, such as recognize the human voice (e.g., Apple's *Siri*) - Artificial Narrow Intelligence (ANI). Recently, these robots were improved to be able to autonomously solve problems in other areas (e.g., preparing coffee or even writing skills) – Artificial General Intelligence (AGI). Finally, according to the researchers, a third generation of AI will emerge in the future - Artificial Super Intelligence (ASI) – capable of outperform humans in all areas (Du & Xie, 2021).

Thus, it is clear that technological advances are moving towards covering all sectors of our daily lives, even the artistic field. Nowadays, it is already possible to buy a painting created, partially or completely, by an algorithm and/or intelligent robot. However, as this topic is still very recent, not much is known about how consumers rate AI-made paintings.

According to the literature, the process of artistic creation involves the expression of emotions (Coeckelbergh, 2017; Collingwood, 1938). Nevertheless, previous studies claim that the ability of AI machines to perform creative tasks is questionable, as algorithms and/or robots lack emotional intelligence (Kaplan & Haenlein, 2019; Gray et al., 2007; Huebner, 2010; Kurt & Wegner, 2012).

The lack of AI' emotional intelligence (EI) might influence consumers' perceived quality of paintings, a preponderant factor at the time of purchase, since according to studies, the WTP is directly related to the perceived quality (Anselmsson et al., 2014; Netemeyer et al., 2004; Sethuraman, 2000).

It is not clear how consumers will evaluate AI-made paintings. On the one hand, auctions of AI art in the past suggest that this art can be highly valued (e.g., Portrait of Edmond De Belamy), but on the other hand, the lack of EI might be a differentiating factor, playing a critical role in the perceived quality of paintings, and, consequently, in the WTP. Therefore, it would be pertinent to understand this context more comprehensively, studying the relation of these variables for different types of art (emotional vs. abstract).

1.1. Problem Statement

To better understand how an AI artist (e.g., algorithm and/or intelligent robot) would influence the perceived quality of a painting and consequently the WTP, I investigated the effect of artist type (human vs. AI agent) on the WTP, and the potential mediating effect of emotional intelligence and perceived quality. Thus, this study intends to answer the question: "How type of artist impacts WTP through emotional intelligence and perceived quality?". This problem statement can be divided into three main research questions:

RQ1: Does artist type influence consumer behavior for buying paintings?

RQ2: Does the artist's lack of emotional intelligence affect the perceived quality of the paintings, and, consequently, the WTP?

RQ3: What effect do emotional intelligence and perceived quality have on the relationship between artist type and WTP for paintings?

1.2. Relevance

This thesis combines art and AI agents (e.g., algorithm and/or intelligent robot) in an innovative manner, contributing to the existing literature on AI applications. More specifically, it integrates an artist who lacks emotional intelligence in the art world and investigates how this would affect consumers' perceived quality of paintings, and consequently, WTP. Furthermore, it contributes to large tech companies that are already exploring the field of art and robotics (e.g., Google), and product managers, contributing knowledge to what might be the future of art and consumer's response.

1.3. Structure

This thesis consists of five chapters. After this initial chapter, which includes problem statement, relevance and structure, this dissertation presents a literature review on AI definition, applications, and reactions. There is also content on Art Generating Networks, AI artworks, emotional intelligence, mental perceptions, and last but not least, different classifications of AI systems. Then, chapter 3 presents the methodology, which includes the research strategy and design, the description of the participants and procedure. Then, chapter 4 presents the results and chapter 5 discusses the main conclusions, limitations of the study and ideas for future research.

2. LITERATURE REVIEW

2.1. Definition of AI

There are many different definitions and perspectives on AI. According to existing research, AI *"refers to programs, algorithms, systems or machines that demonstrate intelligence"* (Davenport et al., 2020, p. 25; Shankar, 2018, p. vi). More specifically, it is *"manifested by machines that exhibit aspects of human intelligence"* (Davenport et al., 2020, p. 26; Huang & Rust, 2018, p. 155) and that *"mimic intelligent human behavior"* (Davenport et al., 2020, p. 26; Syam & Sharma, 2018, p. 136).

The concept of AI was established in 1956 at Dartmouth College in New Hampshire (US), by the renowned "AI fathers": John McCarthy, Marvin Minsky, Allen Newell, Herbert Simon, Claude Shannon, and other scholars (Pan, 2016). The group of scientists came together for a six-week summer research project on AI, in which it was defined as *"the ability of machines to understand, think, and learn in a similar way to human beings, indicating the possibility of using computers to simulate human intelligence"* (Pan, 2016, p. 410). Since then, AI has developed over the years due to its passage by both peaks and troughs (Bostrom, 2014; Du & Xie, 2021). Lately, the AI field has reached several advances in almost mimicking human intelligence, and this would not be possible without the growing availability of big data, Internet-of-Things (IoT), and the fast developments in computer processing speed (Du & Xie, 2021).

The literature suggests looking at AI through the lens of evolutionary stages, from narrow intelligence to general intelligence, to super intelligence (see Figure 1). The first generation of AI, Artificial Narrow Intelligence (ANI), describes the evolution situation of AI achieved until today, where its employment leads to the attainment of specific predefined tasks, with better performance than humans in limited fields (Du & Xie, 2021). For instance, it allowed Siri to recognize people's voices (Kaplan & Haenlein, 2019). Artificial General Intelligence (AGI) is the second generation of AI, which claims that in the very near future, AI will be able to solve problems independently, equaling human intelligence in many fields for which AI was never designed for. Finally, the highest stage of AI is Artificial Super Intelligence (ASI), which translates into conscious systems with self-improvement abilities that, to some extent, will make individuals unnecessary. These AI systems can outperform humans in all areas and attain creativity in science, skills in social fields, and common knowledge (Kaplan & Haenlein, 2019). There is some disagreement among AI scientists about whether and when this third stage of AI will occur (Du & Xie, 2021; Tegmark, 2017).

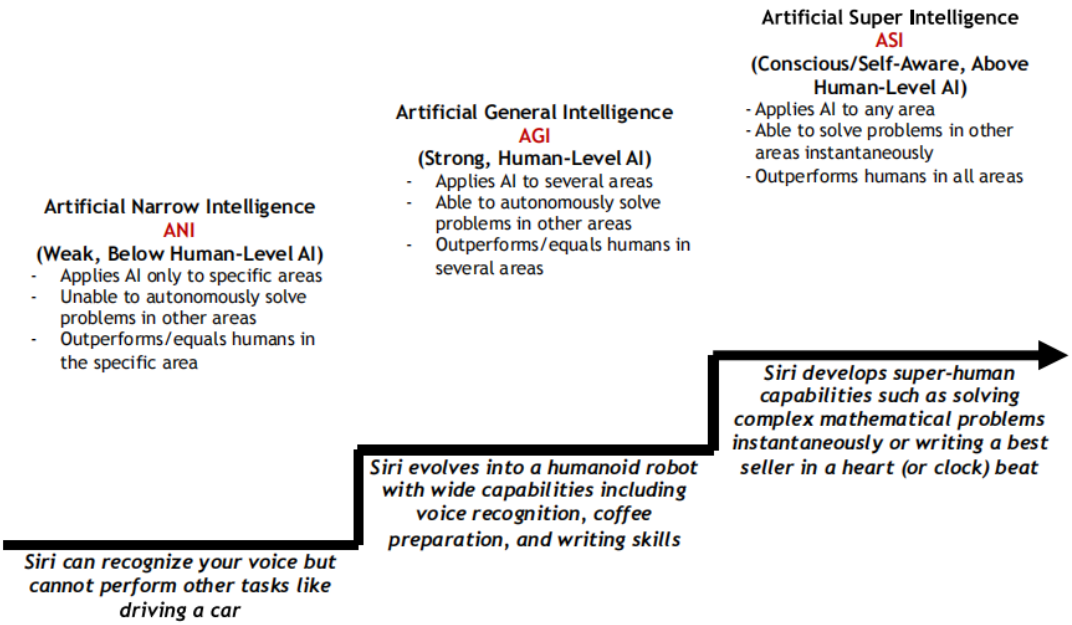

Figure 1. Stages of Artificial Intelligence

Source: Kaplan & Haenlein (2019, p. 16)

2.2. Applications of AI

Nowadays AI is considered a primary source of innovation and according to Professor Klaus Schwab (Founder and Executive Chairman of the World Economic Forum), we already are in the Fourth Industrial Revolution, since AI has transformed, on a global scale, a wide range of domains at an exponential pace (Huang & Rust, 2018; Schwab, 2015). What defines this Fourth Industrial Revolution is a mix of technologies that combine the physical, digital, and biological fields (Schwab, 2015).

Examples of areas that have witnessed the increasing impact of AI applications include: the telecommunication sector through digital device functionality (e.g., digital assistants, such as Amazon's *Alexa* and Apple's *Siri*); the automobile field with the appearance of vehicles with autonomous functions (e.g., Tesla self-driving cars); healthcare industry, through the emergence of virtual nurses; media, through the rising of new feeds with personalized recommendations, amongst others (Du & Xie, 2021; Haseeb et al., 2019).

However, the current scope of AI applications goes even further, including AI security robots to patrol outdoor spaces (e.g., robot *Knightscope K5*); welcome robots to inform and guide visitors (e.g., robot *Pepper);* AI blessing robots to offer spiritual support (e.g., robot *BlessU-2*); barista robots to handle simple customer service requests (e.g., the Robotic Coffee Bar *Cafe X*), and so on (Davenport et al., 2020).

If implemented effectively, AI applications can yield considerable benefits for people and societies. For instance, in the automobile field, self-driving vehicles are likely to avoid the numerous daily car crashes that result from people's distractions (Silberg et al., 2012). On the other hand, in the medical field, AI systems can reduce medical errors by providing accurate diagnoses and recommendations (Topol, 2019).

2.3. Reactions to AI

Despite the growing popularity and variety of applications, researchers have paradoxical perspectives on AI. Some believe that AI's advanced processing speed, unlimited memory, and self-enhancing learning capacity make it a useful tool that can attenuate people's workload, allowing them to enjoy more leisure time (Du & Xie, 2021). Google CEO Sundar Pichai warned in a speech at the World Economic Forum in Switzerland that AI is perhaps the most valuable thing humanity has ever worked on (Parker, 2018).

On the other hand, some critics believe that the advancement of unregulated AI poses an existential risk to humanity, as in the more distant future, machines that embody AI are likely to become super-intelligent (even smarter than humans) and take over the world. Tesla CEO Elon Musk supports that view, alarming that AI is "*humanity's biggest existential threat"* (Gibbs, 2014, p. 1). The late theoretical physicist Stephen Hawking expressed the same feeling, saying that *"the development of full artificial intelligence could spell the end of the human race"* (Cellan-Jones, 2014, p. 1).

Physicist Max Tegmark explained in his book, "Life 3.0: Being Human in the Age of Artificial Intelligence", that the main danger of artificial general intelligence is that it is too competent in performing its objectives, which might generate a problem if human goals are different from AI agents' goals (Tegmark, 2017).

Another scenario concerns the possibility of AI rendering human work positions useless and obsolete (Du & Xie, 2021; Hong & Curran, 2019). According to Professors Shuili Du and Chunyan Xie (2021), due to AI, some tasks performed by humans are becoming obsolete, thus generating unemployment. Furthermore, with the increasing development and enhancement of AI's capabilities, the previously stated trend tends to increase in the long run (Du & Xie, 2021). On the other hand, some researchers strongly believe that AI can augment and transform humans, rather than simply replacing them (Jarrahi, 2018). This is possible through a process known as "Human-AI symbiosis" which consists of valuable and useful interactions between AI agents and humans with the aim of sharing knowledge to make both parties more powerful

over time (Jarrahi, 2018). For instance, The Procter & Gamble Company has employed AI over the years not only to automate processes, but also to function as a tool from which workers can draw to do their job. The early adoption of cognitive technology is probably one of the main reasons why this corporation has been able to provide a continuously enhanced customer experience (Davenport & Bean, 2017).

2.4. Art Generating Networks

By employing key technologic tools, such as neural networks, machine learning and deep learning, AI reinforces its ability "*to interpret external data correctly, to learn from such data, and to use those learnings to achieve specific goals and tasks through flexible adaptation*" (Davenport et al., 2020, p. 26; Kaplan & Haenlein, 2019, p. 17).

It is known that researchers have explored the machine's ability to generate human-level creative products (Elgammal et al., 2017). For example, nowadays it is possible to buy a painting created partially, or even totally, by an algorithm and/or intelligent robot.

According to Ahmed Elgammal, Professor of Computer Science at Rutgers University, generative adversarial networks (GANs) are one of the most successful image synthesis models, introduced in 2014 by Goodfellow (Elgammal et al., 2017; Goodfellow et al., 2014). It is composed of two sub-adversary networks, a generator, and a discriminator, that are trained simultaneously. The discriminator receives both real images (i.e., images from the training dataset) and "fake" images (i.e., images from the generator) and aims to tell them apart. Success is achieved when the generator creates images that come from the same distribution as the training dataset without seeing them beforehand, and the discriminator is not able to tell the difference between the images produced by the generator and the real images from the training dataset (Creswell et al., 2018; Wang et al., 2017).

However, as GANs are limited in their creative function, a new model was proposed later known as creative adversarial networks (CANs). This model also has two sub-networks, a generator, and a discriminator, but in this case the discriminator learns how to differentiate art styles (e.g., expressionism, impressionism, and so on). Unlike GANs, the CANs generator receives two signals from the discriminator about the new generated image. The first signal is the art or non-art classification, and the second signal is the art style categorization. The purpose of the creative generator is both to produce works that the discriminator accepts and classifies as "art" and to confuse the discriminator about the style of the generated image, as it does not fit into the standard art styles (Elgammal et al., 2017).

2.5. AI Artworks

2.5.1. Edmond de Belamy

Edmond De Belamy (see Figure 2) is a famous GAN portrait created in 2018 by Obvious, a French art collective working with AI, composed by three researchers: Pierre Fautrel, Gauthier Vernier and Hugo Caselles-Dupré. This AI-generated artwork belongs to a fictional family composed by series of generative images known as "*La Famille de Belamy*" (Christie's, 2018).

Nearly 15,000 portraits from the 14th to the 20th centuries were provided to this AI system. Based on this database, the most realistic images were produced by the generator with the purpose of deceiving the discriminator into believing that the new images are human-made portraits (Christie's, 2018).

Edmond De Belamy was sold for 432,500 US Dollars in October 2018 at a Christie's auction in New York. This sale exceeded approximately forty times its high estimate of 10,000 US Dollars, announcing the advent of AI art popularity on the world auction stage (Christie's, 2018).

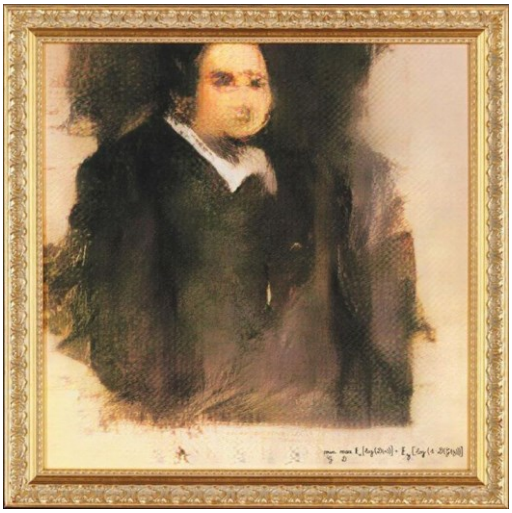

Figure 2. Edmond de Belamy, from La Famille de Belamy, 2018

Source: https://www.christies.com/lot/lot-edmond-de-belamy-from-la-famille-de-6166184/?from=salesummery&intObjectID=6166184&sid=18abf70b-239c-41f7-bf78-99c5a4370bc7

2.5.2. Memories of Passersby I

Memories of Passersby I is an autonomous creative agent developed in 2018 by Mario Klingemann, capable of producing a continuous sequence of unique images in real time on-

screen. Klingemann is a pioneer in the field of AI art and his machine is part of an international arts project based in Madrid known as "*Colección SOLO"*.

For some people, it is considered a special work of art because it is presented as an installation piece. This means that the AI machine is stored in a wooden cabinet that hosts the "brain" of AI and supplementary hardware, connected to two large digital displays (Sotheby's, 2019; see Figure 3).

Initially, Memories of Passersby I was developed and trained using thousands of images from the 17th to the 19th centuries, but later it became capable to "think" in real time to independently generate an infinite stream of portraits of human faces (Sotheby's, 2019).

The output results from a system of neural networks composed of several GANs without a database, so that the portraits are neither programmed nor repeated (Sotheby's, 2019). This famous Klingemann's artwork was sold in 2019, during the Sotheby's Contemporary Art Day Auction in London for 40,000 British Pounds (Sutton, 2019).

Figure 3. Memories of Passersby I, 2018

Source: https://www.sothebys.com/en/auctions/ecatalogue/2019/contemporary-art-day-auction-l19021/lot.109.html

2.5.3. AICAN

AICAN is an autonomous AI artist and a collaborative creative partner developed in 2017 by Professor Ahmed Elgammal, Founder and Director of the Art and Artificial Intelligence Laboratory at Rutgers University (US). Artsy, the world's largest online art marketplace, praised

Elgammal's work on AI-generated art, claiming in an editorial that it was the greatest artistic achievement of the year 2017 (Chun, 2017).

Ahmed Elgammal believes that original visual art is not well executed by emulative systems like GANs, so he developed his own image generator known as CAN. As CAN is a creative agent, the works produced by this model do not follow standard styles (Chun, 2017).

To learn about the aesthetics and evolution of existing works of art, *AICAN* was fed with more than 80,000 western paintings from the 15th to the 20th centuries. Later, the machine gained autonomy to choose the subject, style, colors, and composition of the painting (Chun, 2017).

The artwork titled as "St. George Killing the Dragon" (see Figure 4) was the first *AICAN*'s collection piece that was offered for sale. It was sold in November 2017 at an auction in New York for 16,000 US Dollars (Elgammal, 2018). Since then, *AICAN*'s artworks have been exhibited at different art venues across the United States.

Figure 4. "St. George Killing the Dragon", 2017

Source: https://theconversation.com/meet-aican-a-machine-that-operates-as-an-autonomous-artist-104381

2.5.4. Ai-Da

Last but not least, Ai-Da is another example of a well-known AI painter. She is the world's first ultra-realistic artist robot conceived by Aidan Meller and built by Engineered Arts, the UK's leading manufacturer of humanoid robots. The name Ai-Da was inspired by the first female computer programmer, Ada Lovelace (Who Is Ai-Da? (N.d.). Retrieved January 30, 2022, from Ai-Da: https://www.ai-darobot.com/about).

The main difference between Ai-Da and the aforementioned AI artists is their appearance and personality (see Figure 5). This intelligent robot is incorporated with facial tracking technology, so it can process and interpret what its "eyes" see (Block, 2019; St John's College, 2019).

Ai-Da's first art exhibition, "*Unsecured Futures*", was launched in June 2019 at the Barn Gallery, St John's College (Oxford). The art pieces of Ai-Da include not only painting, but also drawing, sculptures, and video art. In 2021, she exhibited works at a major museum in London, the Design Museum, and in January 2022 she had an exhibition at the Ashmolean Museum (Oxford), showing that her performance has been a success over the years (Who Is Ai-Da? (N.d.). Retrieved January 30, 2022, from Ai-Da: https://www.ai-darobot.com/about).

Figure 5. Portrait of Ai-Da by Victor Frankowski

Source: https://designmuseum.org/exhibitions/ai-da-portrait-of-the-robot

2.6. Emotional Intelligence

The major perceived difference between AI artists and humans is the AI's lack of emotional intelligence (EI). EI can be generally defined as *"the set of abilities (verbal and non-verbal) that enable a person to generate, recognize, express, understand, and evaluate their own and others' emotions in order to guide thinking and action that successfully cope with environmental demands and pressures"* (Harms & Credé, 2010, p. 6; Rooy & Viswesvaran, 2004, p. 72).

The concept of EI caught great public interest in 1995, when renowned psychologist Daniel Goleman released his book, "Emotional Intelligence: Why It Can Matter More Than IQ". As a

result of popularity, many research teams began to work in parallel rather than relying on existing research, which led to many different theories and assessments (MacCann et al., 2020).

To provide a useful framework for researchers exploring individual differences in emotion-related abilities, a theoretical model of EI was proposed by Mayer and Salovey, in which EI was defined as *"the ability to monitor one's own and others' feelings and emotions, to discriminate among them, and to use this information to guide one's thinking and action"* (Salovey & Mayer, 1990, p. 189). This definition of EI was later refined and split into four related ability branches, including perceiving, using, understanding, and managing emotions (Salovey & Grewal, 2005).

While the branch of perceiving emotions is concerned with the ability to recognize and interpret one's and others' emotional cues, the branch of using emotions is the ability to harness emotions to facilitate thinking, creativity, problem solving, or other cognitive activities. For example, creative thinking can be stimulated by a happy mood (Isen et al., 1985; Salovey & Grewal, 2005). On the other hand, the third branch of EI is the ability to understand the language of emotions, while the branch of managing emotions is being able properly control the emotions of oneself and others (Salovey & Grewal, 2005; Schutte & Malouff, 2011).

Similarly, scholars have suggested a distinction between two main theoretical models to assessing EI —mixed and ability models (MacCann et al., 2020). The mixed model conceptualizes EI as a vast combination of constructs driving emotionally intelligent behavior, which involves features related to character, emotional capabilities, and motivational components (MacCann et al., 2020). On the other hand, the ability approach conceptualizes EI as a cognitive ability, mastering emotions instead of words and numbers (MacCann et al., 2020; Mayer et al., 2000; Stough, Saklofske, Parker, et al., 2009).

According to past meta-analyzes, EI is positively related to better job performance (Joseph & Newman, 2010; O'Boyle et al., 2015; O'Boyle JR. et al., 2011) and well-being outcomes (Martins et al., 2010; Schutte et al., 2007). Furthermore, in Daniel Goleman's popular science book, "Emotional Intelligence: Why It Can Matter More Than IQ", it was proposed that emotional skills have a greater impact on predicting success in life than intellectual skills (MacCann et al., 2020).

2.7. From Mechanical to Feeling AI

To classify different types of AI systems, researchers explored studies related to the skills shared by above-average performance workers and affluent managers (Boyatzis, 2008; Hopkins & Bilimoria, 2008; Kaplan & Haenlein, 2019; Koman & Wolff, 2008; Luthans et al., 1988; McClelland & Boyatzis, 1982).

Before classifying AI systems, it is important to underline that human-programmed rules in the form of "if-then" statements (also known as "expert systems") do not have the capability to learn independently from external data, and therefore, are not considered to be part of real AI systems. Moreover, real AI assumes that human intelligence can work in a behavior-based approach by mimicking the human brain structure (e.g., through neural networks) and using large data volumes to acquire information autonomously (Kaplan & Haenlein, 2019). In contrast, expert systems use a knowledge-based approach, which means that if an expert system had a preset to remember a face, a selection of criteria would be verified to arrive at a judgment based on established knowledge. The mentioned criteria may include the appearance of specific shapes, a nose, two eyes, and so on (Kaplan & Haenlein, 2019).

Management literature commonly suggests that excellent performance is strongly associated with three main skills: cognitive, emotional, and social intelligence (Kaplan & Haenlein, 2019). Based on this skills, Kaplan and Haenlein (2019) classify AI systems concerning their business use into three main groups known as Analytical AI, Human-Inspired AI and Humanized AI (see Figure 6). Analytical AI shows only cognitive intelligence characteristics, and such systems generally use previous learning experiences to make future decisions (e.g., self-driving cars). Human-Inspired AI has traits consistent with emotional and cognitive intelligence. These AI systems can be trained to recognize human emotions (for example, through facial microexpression analysis) and adapt their reactions accordingly. Last but not least, Humanized AI has elements of cognitive, emotional and social intelligence (Kaplan & Haenlein, 2019).

	Expert Systems	Analytical AI	Human-Inspired AI	Humanized AI	Human Beings
Cognitive Intelligence	×	✓	✓	✓	✓
Emotional Intelligence	×	×	✓	✓	✓
Social Intelligence	×	×	×	✓	✓
Artistic Creativity	×	×	×	×	✓
		Supervised Learning, Unsupervised Learning, Reinforcement Learning			

Figure 6. Types of AI systems

Source: Kaplan & Haenlein (2019, p. 18)

Additionally, several researchers have tried to classify AI systems based on the types of intelligence that are utilized in such systems. A three-level technological innovation framework comprising automated, thinking, and feeling technology (Huang & Rust, 2021; Rafaeli et al., 2017) was later refined into four levels of AI intelligence: mechanical, analytical, intuitive, and empathetic (Huang & Rust, 2018). However, Huang et al. (2019) simplified the four levels into three (mechanical, thinking, and felling AI intelligence), as they believed that AI is driving the economy from mechanical, to thinking, to feeling (Huang et al., 2019; Huang & Rust, 2021).

More specifically, the three levels of AI intelligence refer to different ways of converting data into performance. The first, mechanical intelligence, is already well-established and refers to the ability to perform standardized and repetitive tasks (e.g., service process automation). The second level, thinking intelligence, is expanding rapidly, and is designed to make rational decisions, as well as learn and adapt from data autonomously (e.g., complex, rule-based tasks, such as predictive analytics or computing creativity). Lastly, feeling intelligence is the intelligence of the future since it is slowly emerging, and it is associated with the ability to comprehend human emotions and respond like a human would during a conversation (Huang et al., 2019; Huang & Rust, 2021). Speech emotion recognition and sophisticated chatbots are examples of AI applications designed for this level of intelligence.

Although thinking and feeling intelligence have always been considered to be exclusive domain of human abilities, today AI research is extending to these types of intelligence (McDuff & Czerwinski, 2018).

2.8. Does AI have a mind? Mind the Creative AI

According to Gray et al. (2007), there are two main criteria for determining perception of mind: agency and experience. An agentic mind relates to the capacity of self-control, reasoning, communicating, and planning. On the other hand, an experiential mind relates to having a personality and expressing emotions. Researchers found that animals and babies are perceived by people as having low agentic but high experiential mind, while AI systems are identified as having moderate agentic and low experiential mind (Gray et al., 2007; Huebner, 2010; Shank et al., 2019).

Kaplan & Haenlein (2019) have doubts about the potential of AI systems for the field of creativity. According to them, it is questionable whether AI has the ability to perform creative tasks because *"AI is based on pattern recognition or curve fitting (i.e., finding a relationship that explains an existing set of data points, while "creativity is intelligence having fun" as Albert Einstein put it"* (Kaplan & Haenlein, 2019, p. 19).

There are several views on what it means to create artistically. One of the modern views on the artistic process is the "expressivist" view, which states that the art creation process is an expression of something inner, such as an emotion. Art is the creation of an invented experience or action by the human mind that expresses feelings (Coeckelbergh, 2017; Collingwood, 1938). Again, since AI systems do not have an inner state, it seems unlikely that they will be able to engage in deep artistic creation (Coeckelbergh, 2017).

These findings lead us to assume that tasks that require emotional skills tend to be perceived as "human tasks", which are unexpected to be successfully performed by algorithms and/or intelligent robots due to the absence of EI. Shank et al. (2019) supports this view, stating that the experiential and emotional human traits constitute the differences between the human mind and others, like AI. Thus, AI might differ from individuals' expectations when people expect this technology feels or experiences like humans (Kurt & Wegner, 2012; Shank et al., 2019).

This standpoint is even more prominent when it comes to the field of art, as it has been assumed over the years that emotions play an important role in the processing of artworks (Menninghaus et al., 2019). According to Kurt & Wegne (2012), the current perception is that individuals have a higher capacity to experience emotions and sensations when compared to robots and other machines (Gray et al., 2007; Huebner, 2010; Kurt & Wegner, 2012). Thus, in activities related

to the artistic creativity field, humans are likely to have an advantage over AI agents (Kaplan & Haenlein, 2019).

It is not clear how people will evaluate AI art. If, on the one hand, the value offered by this art in the past suggests that it can be evaluated well, on the other hand, the lack of emotional intelligence can lead to the opposite effect. So, perhaps it is pertinent to look at different types of art, depending on whether they are more or less associated with EI.

Therefore, due to the lack of EI of the AI systems, for all the previous considerations, I hypothesize the following:

H1a: Emotional paintings generated by AI systems will be perceived as having lower quality compared to emotional paintings generated by human beings.

H1b: Emotional paintings generated by AI systems will be perceived as having lower quality compared to abstract paintings generated by AI systems.

The above hypotheses lead us to our third hypothesis. The reason behind the potentially low perceived quality of an emotional painting created by an AI artist may be the lack of emotional intelligence of the AI system - *"machines and AI systems can obviously not experience emotions themselves"* (Kaplan & Haenlein, 2019, p. 18; Menninghaus et al., 2019). Thus, I hypothesize the following:

H2: The AI systems lack of emotional intelligence will impact the perceived quality of AI paintings.

Willingness to pay (WTP) *"is the maximum amount of money a customer is willing to spend for a product or service"* (Homburg et al., 2005, p. 85). According to empirical studies, perceived quality has a positive impact on customers' WTP, meaning that people are likely to be willing to pay more for a painting with a higher perceived quality (Anselmsson et al., 2014; Netemeyer et al., 2004; Sethuraman, 2000).

As mentioned earlier, emotional paintings created by humans are perceived to be of superior quality than emotional paintings created by AIs, because AI systems lack emotional intelligence. Therefore, I hypothesize that:

H3a: The WTP for an emotional painting created by an AI system will be lower than the WTP for an emotional painting created by a human.

By the same logic, since AI-made emotional paintings are expected to have a lower perceived quality compared with AI-made abstract paintings (due to the AI absence of EI), I also hypothesize that:

H3b: The WTP for an emotional painting created by an AI system will be lower than the WTP for an abstract painting created by an AI system.

Considering the previous information supporting the mediating effect of emotional intelligence and perceived quality in the relationship between type of artist (human vs. AI agent) and willingness to pay, I also hypothesize that:

H4: The relationship between the type of artist and the WTP will be mediated by emotional intelligence, and consequently by the perceived quality.

2.9. Conceptual model

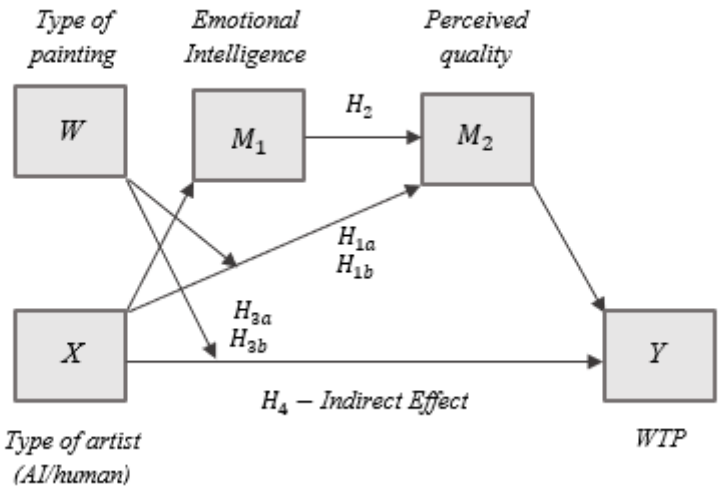

Figure 7. Conceptual model

3. METHODOLOGY

3.1. Research strategy and design

In this study, I aimed to test whether artist type (human vs. AI agent) impacts consumers' WTP through emotional intelligence and perceived quality. In order to do this, an experimental research study was developed, in which Qualtrics was the online tool used for data collection, and SPSS was the software used to analyse the data through statistical procedures.

In this experiment, participants were randomly assigned to four scenarios (type of artist: human vs. AI agent) x (type of art painting: emotional vs. abstract). A mixed measures design was conducted, in which the type of artist (human vs. AI agent) was randomized between participants, and the type of art (emotional vs. abstract) was randomized within participants.

Thus, half of the respondents were exposed to two different paintings (an emotional painting plus an abstract painting) and were told that both were created by an AI artist, while the other half were told that the same two paintings were made by a human artist. In reality, they were all done by an AI artist, and we compared the answers to see if there are any variations resulting from the difference regarding the expectation for artist type.

3.2. Participants

Participants were asked to complete an online questionnaire with several multiple questions (the experiment was available in portuguese and english). I collected 146 valid answers from a total of 157 voluntary responses. Given that this study has four cells (type of artist: human vs. AI agent) x (type of art painting: emotional vs. abstract) this results in approximately 37 participants per cell. Considering the valid sample of 146 participants, 59.6% were female, 39.7% male and 0,7% non-binary or other. Regarding the ages, the respondents belonged predominantly to the range “18-23 years old" (84.9%) and the mean age was 22.7 years old. Finally, regarding the educational level, most participants have a bachelor’s degree (55.5%) or a master’s degree or higher (37.7%). For more demographic information see Appendix B, Table 1.

3.3. Procedure

The study started with a brief introduction, including the purpose of the research and the informed consent form. The participants were informed that they were contributing to an academic research study that aims to gather insights on the perception of paintings.

After accepting the informed consent form, respondents answered simple demographic questions (gender, age, and education level) and, on a 7-point scale (1= Extremely poor; 7= Extremely strong), they were asked to measure their knowledge of AI.

In the next section of the experiment, some questions about consumer buying habits are presented. Participants were asked how often and where they typically buy a painting, and on a 7-point scale (1 = Not at all important; 7 = Extremely important), they were questioned how important the artist was to them when purchasing a painting.

Next, respondents were randomly assigned to one of two conditions (AI-made paintings vs. Human-made paintings). The paintings and related questions of both condition groups were exactly the same, with the only difference being the author's name of the paintings mentioned in the description.

In both conditions, participants were asked to imagine that they were considering buying a painting to decorate their home or to offer to someone. Firstly, they are asked to answer questions about an abstract painting, and then the same questions are asked, but about an emotional painting.

Participants indicated the maximum amount in euros they would be willing to pay for the paintings. In addition, to identify careless responses, participants answered an attention check question about the author of the paintings. As this information was given earlier (when the painter was described), an attentive participant would know how to correctly answer this attention verification question.

To assess the artists' emotional intelligence (human vs. AI agent), 6 items from the Schutte Emotional Intelligence Scale were used (Schutte et al., 1998). In both conditions, participants were asked to rate their agreement with the 6 items on a 5-point scale (1- Strongly disagree; 5- Strongly agree).

The experiment ended by thanking the respondents for their participation and informing them about the real objectives of the study. Participants were invited to leave their email address to learn more about this study or access the results. For detailed information on the experiment guide, see Appendix A.

3.4. Independent variable

Human vs. AI Artist: In this experimental research design, the independent variable was the type of artist. Thus, each participant was randomly assigned to one of these conditions: paintings made by AI artists vs. paintings made by humans. Respondents had to imagine that they were thinking of buying a painting to decorate their home or to offer to someone. Since I have two different conditions, I expect that all the differences in the answers to be due to the artist type.

3.5. Measurement variables

3.5.1. Dependent variable

WTP: In this study, the dependent variable was WTP. To measure the participants' WTP, I asked: "What is the maximum euro amount (€) that you would be willing to pay for this painting?" and eight different price ranges were presented.

3.5.2. Mediator variable

Emotional Intelligence: In order to measure participants' perceptions about artists' EI, I used an adaptation of the Schutte Emotional Intelligence Scale (Schutte et al., 1998). This scale is based on the original model of emotional intelligence by Salovey and Mayer (1990), which is composed of 33 items. For more detailed information on the original scale, see Appendix D.

Petrides and Furnham (2000), Ciarrochi et al. (2001), and Saklofske et al. (2003) performed factor analysis studies that resulted in the identification of four factors for the 33 items of the scale (Stough, Saklofske, & Parker, 2009). These four factors currently correspond to the most widely used subscales, and at the time they were described as follows: perception of emotion, managing own emotions, managing others' emotions and utilization of emotion.

For each condition, human-made paintings vs. AI-made paintings, I included 6 items of this scale. For instance, in AI condition, the items presented were the following: "When AI agents are faced with obstacles, they remember times they faced similar obstacles and overcame them"; "It is difficult for AI agents to understand why people feel the way they do"; "AI agents expect that they will do well on most things they try"; "Other people find it easy to confide in AI agents"; "When AI agents are in a positive mood, solving problems is easy for them"; "AI agents have control over their emotions". In the human condition, the items used were exactly the same, but the phrases were adapted for human artists rather than AI agents. The adapted scale with 6 items was presented on a 5-point scale ranging from 1 (*Strongly disagree*) to 5

(*Strongly agree*). For more detailed information on the adapted scale used, see the online experiment guide in Appendix A.

In the analyses, the adapted EI scale was used in two different ways: as a whole (i.e., the new variable was created with the mean of the 6 items) and divided into different subscales of specific EI components. Of the 6 items selected for this study, three of them belong to the subscale "Managing Own Emotions" and, therefore, a new variable was created with the average of these three items, while the remaining items all belonged to different subscales and so were used as representatives of each of these subscales.

The criterion used to choose the items of the EI scale was the simplicity and/or clarity of the sentences. My objective was to measure the perception of EI in a simple and brief way, therefore, only 6 of the 33 items were used.

Perceived Quality: There is another mediating variable in this experimental research design, the perceived quality. To measure the participants' perception of perceived quality, I asked: "How would you rate this painting in terms of its quality?". It was presented in a 7-point scale ranging from 1 (*Extremely poor*) to 7 (*Extremely good*).

This variable is anticipated to be a second mediator, between emotional intelligence attributions and WTP.

4. RESULTS

4.1. Data preparation and cleaning

From a sample of 157 respondents, 11 were excluded because they had a progress score of less than 50% (i.e., they had not completed more than half of the questionnaire).

As previously explained, an attention test was included in the experiment to improve the quality of the results. Participants were asked “Who is the author of this painting?” (Human vs. AI agent), after this information was provided in the painting's description. It was a multiple-choice question with three response options: "Human", "AI agent (intelligent robot)" and "I am not sure". Although most participants correctly answered the attention question, there were a few "I am not sure" answers, which lead me to believe that the attention question was not clear to all participants. For example, this might have happened because the participants are afraid to affirm something (e.g., they read about humans but after seeing the question, they wonder if there would be any mention of AI). For the reasons above, and also because excluding them would have resulted in a too small sample size, I decided to include these responses in the analysis.

4.2. Hypothesis testing

4.2.1. The effect of type of artist on perceived quality

Hypothesis 1a predicted that emotional paintings generated by AI systems will be perceived as having lower quality compared to emotional paintings generated by human beings. To test statistical differences between the means of two independent groups (human/AI artist), I ran an Independent Samples t-Test. In this analysis I considered the type of artist (human vs. AI agent) as independent variable and perceived quality as the dependent variable. In this specific hypothesis testing, emotional painting appeared as a fixed condition. The results showed that the average perceived quality for AI-made paintings *(M=3.48, SD=1.584)* was 0.164 points lower than the average perceived quality for human-made paintings *(M = 3.64, SD = 1.597)*. The Levene’s Test for Equality of Variances is not significant *(p=.698)*, so I proceeded with the analysis. There was no significant difference in the mean perceived quality between AI agents and humans *(t(139) = -.612, p = .542)*. Therefore, contrary to expectations, Hypothesis 1a is not supported. For more detailed information, please see Appendix C, Tables 2 and 3.

Hypothesis 1b predicts that emotional paintings generated by AI systems will be perceived as having lower quality compared to abstract paintings generated by AI systems. To compare the means of two measurements taken from the same group (AI systems), I ran a Paired Samples t-

Test. In this analysis I considered the perceived quality as the dependent variable, measured for two different conditions: emotional painting and abstract painting. The results showed that perceived quality scores of AI emotional paintings and AI abstract paintings were weakly and positively correlated *(r=.244, p=.040)*. There was a significant average perceived quality difference between AI abstract paintings and AI emotional paintings *(t (70) = 2.670, p =.009)*. On average, the perceived quality of AI abstract paintings were 0.535 points higher than perceived quality of AI emotional paintings *(95% CI [0.135, 0.935])*. According to these findings, hypothesis 1b is supported. For more detailed information, please see Appendix C, Tables 4,5, and 6.

I believe that the intrinsic beauty of the painting itself can influence participants' responses (i.e., participants might like one painting more than the other, regardless of the artist who created it or the type of art it represents – abstract vs. emotional). So, as an additional test of interest, I examined whether the difference in the degree of quality is significantly greater for one of the conditions than for the other (human vs AI agent). If the results obtained are significant, I know that the difference in the degree of quality is due to the artist and not the intrinsic beauty of the painting. To test this, I ran a mixed measures ANOVA with the artist type as a between factor and the type of painting (emotional vs abstract) as a repeated measures factor. The results showed that the difference between the perceived quality of AI-made paintings is smaller than the difference between the perceived quality of human-made paintings. However, as the *p-value =.906*, these findings are not statistically significant (see Appendix C, Tables 7 and 8), so we cannot conclude that the fact that the perceived quality of abstract painting is superior to that of emotional painting is due to the author. Thus, as mentioned earlier, the difference in the perception of quality might be related to the intrinsic beauty of the paintings.

4.2.2. The effect of emotional intelligence on perceived quality

Hypothesis 2 predicts that the AI systems lack of emotional intelligence will impact the perceived quality of AI paintings. To test this hypothesis, two linear regression analyses were performed, in which I considered as a dependent variable the perceived quality of emotional paintings in one of the regressions and the perceived quality of abstract paintings in the other regression.

It is important to note that, according to several studies, the scale used in this experiment to measure emotional intelligence has good reliability. However, I performed a reliability analysis of the adapted 6-item scale to confirm what the literature claims. The results obtained show that

Cronbach's alpha is 0.356 (Appendix C, Table 9), which indicates a low level of internal consistency for our scale with our sample. This may be related to the fact that the 6 items belong to different subscales. Therefore, I use the EI subscales to test this hypothesis, instead of using the EI scale as a whole (i.e., the average of the 6 items).

Four subscales of emotional intelligence were considered as independent variables: the "managing own emotions" subscale is the average of three items, while the remaining subscales ("managing others' emotions", "utilization of emotion" and "perception of emotion") consist of only one item each.

Even though this means that some scales had only one item, which could potentially have some disadvantages, such as simplification of multidimensional topics (Konrath et al., 2014), there are also advantages for one-item scales. For instance, in specific contexts (e.g., experiences in which participants are not very attentive because they are not interested in the topic of the study), single-item scales are beneficial as they avoid participant fatigue, mitigating the number of respondents who give up responding to the experiment (Brailovskaia et al., 2020). Moreover, many studies showed how one item scales provide similar results to multi-item scales (Szrek et al., 2012; Konrath et al., 2014; Riordan et al., 2018; Nichols & Webster, 2013).

The results of the emotional condition were not statistically significant *(F=.665, p=.617, R Square=.019).* Likewise, the results of the abstract condition were not statistically significant either *(F=1.542, p=.193, R Square=.043)* (Appendix C, Tables 10 and 11). Hence, it was not possible to observe that the AI systems lack of emotional intelligence impacts the perceived quality of AI paintings.

4.2.3. The effect of type of artist on WTP

Hypothesis 3a predicted that the WTP for an emotional painting created by an AI system will be lower than the WTP for an emotional painting created by a human. To test statistical differences between the means of two independent groups (AI/human artist), I ran an Independent Samples t-Test. In this analysis I considered the type of artist (human vs AI agent) as independent variable and WTP as the dependent variable. In this hypothesis testing, emotional painting appeared as a fixed condition. The results showed that the average WTP for AI-made paintings *(M = 1.32, SD=.732)* was 0.105 points lower than the average WTP for human-made paintings *(M = 1.43, SD=.941)*. The Levene's Test for Equality of Variances is not significant *(p=.104)*, so I proceeded with the analysis. Since p>.05, there was no significant difference in the mean WTP between AIs and humans *(t(139)=-.737, p=.462)*, and therefore

hypothesis 3a is not supported. For more detailed information, please see Appendix C, Tables 12 and 13.

Hypothesis 3b predicts that the WTP for an emotional painting created by an AI system is lower than the WTP for an abstract painting created by an AI system. To compare the means of two measurements taken from the same group (AI systems), I ran a Paired Samples t-Test. In this analysis I considered the WTP as the dependent variable, measured under two different conditions: emotional and abstract painting. The results showed that WTP for emotional AI paintings and abstract AI paintings were moderately and positively correlated *(r=.574, p<.001)*. There was not a significant average WTP difference between AI abstract paintings and AI emotional paintings *(t(70)=-.376, p=.708)*, and therefore hypothesis 3b is not supported. On average, WTP of AI abstract paintings were 0.028 points lower than the WTP of AI emotional paintings *(95% CI [-0.178, 0.121])*. For more detailed information, please see Appendix C, Tables 14,15 and 16.

4.2.4. Serial mediation model

Hypothesis 4 predicted that the relationship between the type of artist and the WTP will be mediated by emotional intelligence, and consequently by the perceived quality. I used Hayes PROCESS Macro model 6 in SPSS to test whether a serial mediation model was supported. This regression analysis allows us to study how the type of artist, AI vs. human, will influence WTP through EI, and consequently by the perception of quality. This analysis was performed with a 95% confidence interval and 5.000 bootstrap samples.

The model was performed twice for the two conditions of different types of paintings: emotional and abstract.

In the experiment, 6 items from the Schutte Emotional Intelligence Scale were used to measure EI. Each item belongs to a specific subscale (Managing Own Emotions; Managing Own Emotions; Utilization of Emotion; Perception of Emotion).

I ran the model 6 in SPSS for the EI scale scenario as a whole (i.e., a new variable was created with the mean of the 6 items), and I also ran the model 6 in SPSS for each of the four EI-specific component subscales.

4.2.4.1. Scenario with EI scale (Emotional Condition)

I started by running the model for the emotional condition. The dependent variable (Y) considered in this statistical test was the WTP for emotional painting, the EI scale composed of

the average of the 6 items was used as the first mediator (M1) and the perceived quality of emotional painting as the second mediator (M2). Later I re-ran the model considering each subscale of the emotional intelligence scale as a mediator.

In the emotional condition, the results of this serial mediation show that the EI scale, composed of the average of the 6 items used in this study, does not mediate the relationship between the type of artist and the WTP for emotional paintings *(b=.032, SE=.024, 95% CI [-.004, .089]).* Likewise, the perceived quality variable does not mediate this relationship either *(b=.015, SE=.044, 95% CI [-.064, .118]).*

The model results also show that the relationship between the artist type and the WTP for emotional paintings is not mediated by the EI scale, and consequently by the perception of quality *(b=.009, SE=.010, 95% CI [-.007, .032]).* Thus, none of the mediations are significant for emotional paintings, as the zero value is within the confidence intervals (Appendix C, Tables 17 and 18).

4.2.4.2. Scenario with EI scale (Abstract Condition)

When the model was calculated for the abstract condition, it was also similarly concluded that the EI scale does not mediate the relationship between the artist and the WTP for abstract paintings *(b=.024, SE=.030, 95% CI [-.029, .091]).* Likewise, perceived quality does not mediate this relationship *(b= .082, SE=.048, 95% CI [-.002, .188]).* The findings show that the direct relationship between the artist type and the WTP for abstract paintings is not mediated by the EI scale, and consequently by the perception of quality *(b= -.006, SE=.011, 95% CI [-.032, .014]).* Thus, none of the mediations are significant for abstract paintings, as the zero value is within the confidence intervals (Appendix C, Tables 19 and 20).

4.2.4.3. Scenario with 4 EI subscales (Emotional Condition)

As previously stated, I re-ran the model considering each subscale of the emotional intelligence scale as a mediator.

Initially, this model was used for the emotional condition. Therefore, WTP of emotional painting was considered as the dependent variable (Y), artist type as the independent variable (X), each of the four EI-specific component subscales as the first mediator (M1), and perceived quality of emotional painting as the second mediator (M2).

The results showed that the **EI subscale "Perception of Emotion"** does not mediate the relationship between type of artist and WTP for emotional paintings *(b= -.031, SE=.045, 95%*

CI [-.132, .052]). Furthermore, the perceived quality of emotional paintings does not mediate the relation between type of artist and WTP for emotional paintings *(b= .024, SE=.044, 95% CI [-.051, .125]).* Last but not least, the relationship between the type of painter and the WTP for emotional paintings is not mediated by the EI subscale "Perception of Emotion" and consequently by the perception of quality of emotional paintings *(b= .001, SE=.015, 95% CI [-.034, .031]).* Thus, none of the mediations are significant for emotional paintings, as the zero value is within the confidence intervals (Appendix C, Tables 21 and 22).

Similarly, when the **EI subscale "Utilization of Emotion"** was used, the findings also indicated that this scale does not mediate the relationship between artist type and WTP for emotional painting *(b= .073, SE=.048, 95% CI [-.011, .182]).* Moreover, perceived quality of emotional paintings does not mediate the relation between type of artist and WTP for emotional paintings *(b= .003, SE=.046, 95% CI [-.078, .107]).* The results also revealed that the relationship between the type of painter and the WTP for emotional paintings is not mediated by "Utilization of Emotion" subscale of EI and consequently by the perception of quality of emotional paintings *(b= .020, SE=.018, 95% CI [-.014, .059]).* So, none of the mediations are significant for emotional paintings because the zero value is within the confidence intervals (Appendix C, Table 23).

Likewise, the relationship between artist type and WTP for emotional paintings was not mediated by the **EI subscale "Managing Others' Emotions"** *(b= .022, SE=.034, 95% CI [-.045, .095]).* The results showed that the perceived quality of emotional paintings does not mediate the relationship between type of artist and WTP for emotional paintings *(b= .027, SE=.047, 95% CI [-.058, .132]).* The relationship between the type of painter and the WTP for emotional paintings is not mediated by "Managing Others' Emotions" subscale of EI and consequently by the perception of quality of emotional paintings *(b= -.002, SE=.016, 95% CI [-.034, .028]).* None of the mediations are significant for emotional paintings because the zero value is within the confidence intervals (Appendix C, Table 24).

Finally, the **EI subscale "Managing Own Emotions"** also does not mediate the relation between type of artist and WTP for emotional paintings *(b= .007, SE=.016, 95% CI [-.017, .049]).* The results showed that the perceived quality of emotional paintings does not mediate the relation between type of artist and WTP for emotional paintings *(b= .020, SE=0.044, 95% CI [-.059, .120])* and that the direct relationship between the type of painter and the WTP for emotional paintings is not mediated by "Managing Own Emotions" subscale of EI and

consequently by the perception of quality of emotional paintings *(b= -.004, SE=.007, 95% CI [-.005, .022])*. Therefore, none of the mediations are significant for emotional paintings because the zero value is within the confidence intervals (Appendix C, Table 25).

4.2.4.4. Scenario with 4 EI subscales (Abstract Condition)

Secondly, this model was used for the abstract condition. Hence, WTP of abstract painting was considered as the dependent variable (Y), artist type as the independent variable (X), each of the four EI-specific component subscales as the first mediator (M1) and perceived quality of abstract painting as the second mediator (M2).

The results showed that the **EI subscale "Perception of Emotion"** does not mediate the relationship between type of artist and WTP for abstract paintings *(b= .033, SE=.061, 95% CI [-.072, .171])*. Additionally, perceived quality of abstract paintings does not mediate the relation between type of artist and WTP for abstract paintings *(b= .054, SE=.044, 95% CI [-.020, .151])*. The results indicated that the direct relationship between the type of painter and the WTP for abstract paintings is not mediated by "Perception of Emotion" subscale of EI and consequently by the perception of quality of abstract paintings *(b= .019, SE=.015, 95% CI [-.007, .051])*. Hence, none of the mediations are significant for abstract paintings because the zero value is within the confidence intervals (Appendix C, Tables 26 and 27).

Likewise, when the **EI subscale "Utilization of Emotion"** was used, the findings indicated that this scale does not mediate the relationship between artist type and WTP for abstract paintings *(b= .148, SE=.066, 95% CI [.032, .293])*. Moreover, perceived quality of abstract paintings does not mediate the relation between type of artist and WTP for abstract paintings *(b= .089, SE=.055, 95% CI [-.009, .209])*. The results also revealed that the direct relationship between the type of painter and the WTP for abstract paintings is not mediated by "Utilization of Emotion" subscale of EI and consequently by the perception of quality of abstract paintings *(b= -.010, SE=.021, 95% CI [-.057, .028])*. So, none of the mediations are significant for emotional paintings because the zero value is within the confidence intervals (Appendix C, Table 28).

Similarly, the relationship between artist type and WTP for abstract paintings was not mediated by the **EI subscale "Managing Others' Emotions"** *(b= .035, SE=.055, 95% CI [-.072, .146])*. The results showed that the perceived quality of abstract paintings does not mediate the relation between type of artist and WTP for abstract paintings *(b= .101, SE=.051, 95% CI [.011, .209])*. The direct relationship between the type of painter and the WTP for abstract paintings is not

mediated by “Managing Others’ Emotions” subscale of EI and consequently by the perception of quality of abstract paintings *(b= -.023, SE=.018, 95% CI [-.065, .008]).* None of the mediations are significant for emotional paintings because the zero value is within the confidence intervals (Appendix C, Table 29).

Last but not least, the **EI subscale “Managing Own Emotions”** also does not mediate the relation between type of artist and WTP for abstract paintings *(b= -.001, SE=.017, 95% CI [-.032, .041]).* The results showed that the perceived quality of abstract paintings does not mediate the relation between type of artist and WTP for abstract paintings *(b= .072, SE=.046, 95% CI [-.006, .176])* and that the direct relationship between the type of painter and the WTP for abstract paintings is not mediated by “Managing Own Emotions” subscale of EI and consequently by the perception of quality of abstract paintings *(b= .003, SE=.006, 95% CI [-.008, .018]).* Therefore, none of the mediations are significant for emotional paintings because the zero value is within the confidence intervals (Appendix C, Table 30).

5. DISCUSSION

5.1. Main conclusions, limitations, and future research

This dissertation aims to study the role of artist type (human vs. AI agent) on WTP for paintings, through emotional intelligence and perceived quality. In this sense, I decided to focus my study on four key relationships (i.e., the effect of artist type on perceived quality; the effect of emotional intelligence on perceived quality; the effect of artist type on WTP; and finally, how artist type influence WTP through emotional intelligence and perceived quality), trying to fit all into a comprehensive study on the subject.

5.1.1. The effect of artist type on perceived quality

First of all, I tried to understand the effect of artist type on painting's perceived quality. So, my first hypothesis (1a) to approach this section was that the emotional paintings created by AI systems will be perceived as having lower quality compared to emotional paintings generated by human beings. According to the expectation, the fact that AI systems lack EI could cause people to fail to appreciate the transmission of emotions in paintings made by these soulless beings, thus devaluing the paintings in terms of quality, when compared to the same painting developed by an artist who possesses EI (i.e., human). However, this hypothesis 1a was not supported since the difference between the results is not statistically significant. One possible explanation for the non-confirmation of expectations might have to do with the size of the sample universe. The recommended minimum sample size for an experimental study is 30 participants per cell (Wilson, Vanvoorhis, & Morgan, 2007). Given that this study has four cells (type of artist: human vs. AI) x (type of art painting: emotional vs. abstract) and I collected 146 valid answers, this results in approximately 37 participants per cell. Thereby, the small sample size might have contributed to decrease the likelihood of having significant results in this study. I cannot admit these results as being a clear trend on this issue, however it is an interesting topic to be deepened in future studies.

Also, within this segment, I further explored the second hypothesis (1b) which states that emotional paintings generated by AI systems will be perceived as having lower quality compared to abstract paintings generated by AI systems. This hypothesis was supported statistically with the results obtained. However, I would like to point out that there are independent factors in this study that may have made the answers to this question somewhat biased. For example, this study does not take into consideration the personal taste for the two styles of paintings presented (i.e., emotional vs. abstract). Thus, I cannot guarantee that the

lower quality attributed to the emotional painting is linked with the AI artists' lack of EI, since it might be related to the fact that the participant appreciates abstract paintings more than emotional paintings.

In addition to this factor, the intrinsic beauty of the painting itself can be a differentiating factor. Specifically, participants might have liked the orange sky more than the angry general, as at first glance, one might seem more attractive than the other. Nevertheless, if the reason for the perceived quality of the abstract painting being higher than that of the emotional painting is solely the intrinsic beauty of the painting, this should be the case for both the AI condition and the human condition. Indeed, I verified that this happens in both scenarios (see Appendix C, Tables 31 and 32).

It would be valuable to explore deeper into this topic in future studies, trying to present participants with emotional and abstract paintings with a similar intrinsic beauty, which might be a challenge, as personal taste is something quite subjective. Another alternative is to present a set of emotional and abstract paintings, so that the participants' assessment is not based on a single image, thus avoiding discrepancies in the results associated with the intrinsic beauty of the favorite painting.

Another limitation of the study concerns the order in which the paintings were presented. The evaluation of the first painting might have implications for the second, so I recommend that future research do a randomization of the order of the paintings (e.g., half of the participants should see the abstract painting first and then the emotional painting, and the other half the opposite).

5.1.2. The effect of emotional intelligence on perceived quality

Next, I tried to understand how the AI systems' lack of EI affects the perceived quality of paintings. On the one hand, the value offered by AI art in the past suggests that this art will be highly valued, but on the other hand, can AI artists' lack of EI influence the perceived quality of paintings? To study this question, I formulated hypothesis 2: "The AI systems lack of emotional intelligence will impact the perceived quality of AI paintings", which was not supported.

Several studies suggest that the scale used in this dissertation to measure EI, the Assessing Emotions Scale (also known in the literature as the Schutte Emotional Intelligence Scale, the

Emotional Intelligence Scale, or the Self-Report Emotional Intelligence Test), has good reliability and reasonable evidence of validity.

The original scale consists of 33 items (see Appendix D), but in this study, I evaluated only 6 of these 33 items, so that the research was not too extensive and complex. In both conditions (human vs. AI), participants were asked to rate their agreement with the 6 items on a 5-point scale (1- Strongly Disagree; 5- Strongly Agree). For instance, if a participant belonged to the condition AI, he would have to assess his perception of EI on AI artists.

A reliability analysis of the adapted scale with 6 items was performed. The reliability coefficient found was low, which might be related to the fact that the 6 items belong to different subscales. This might have compromised the results, thus being a possible reason for hypothesis 2 not to be supported. Therefore, I suggest that future studies use the original scale with all items so that they can correctly assess EI and obtain high reliability coefficients.

5.1.3. The effect of artist type on WTP

Later, I continued my study by exploring another relationship: the effect of artist type on WTP, composed by two hypotheses.

Hypothesis 3a, according to which the WTP for an emotional painting created by an AI system will be lower than the WTP for an emotional painting created by a human, is not supported. A possible reason for this non-significant result might be related, once again, to the sample size. Another possible explanation might be the effectiveness of the measurement method and/or scale used to assess WTP.

Furthermore, it is important to point out that future studies should explore other variables that influence WTP (e.g., painting sales place and seller empathy). For instance, when people are traveling it is common to see some street artists with incredible artworks and individuals might be predisposed to pay more because they value the moment and the way that person presents their work (i.e., sales pitch). However, if the same artwork is for sale online, it might not attract so much attention, as we might not feel the empathy for the work developed and we cannot appreciate the painting in person. Thus, I can expect that the approach through which the paintings are presented might influence the outcomes, which is an interesting topic for future research.

Hypothesis 3b states that the WTP for an emotional painting created by an AI system will be lower than the WTP for an abstract painting created by an AI system. This hypothesis comes

from a human stereotype framed in the idea that AI systems have no feeling or soul, and since art is such a close environment between feeling and artist, I might predict that the lack of EI would affect consumer's WTP. However, after statistical analysis, this hypothesis was not supported.

A potential explanation for this hypothesis 3b not being supported might have to do with our participants' lack of knowledge about AI. In the questionnaire, participants were asked to rate their knowledge of AI on a 7-point scale (1=extremely poor; 7= extremely strong), and the average response was approximately four, meaning that respondents' knowledge about AI was mostly rated as “neutral”. In this way, the relationship between EI and AI systems might be a factor that is not clarified in the minds of the participants, thus influencing the quality of the responses. Future studies should direct the study to a specific target to potentiate improved findings (e.g., people who appreciate paintings or people knowledgeable about AI).

Finally, another possible reason might be related to what the consumer appreciates most in a painting. Ideally, more individual information would have been collected that could have been used as a covariate.

5.1.4. Serial mediation model

Finally, hypothesis 4, according to which the direct relationship between the type of artist and the WTP is mediated by EI, and consequently by the perceived quality, was also not supported. Which means that, according to the results obtained with the serial mediation model, the adapted EI scale with 6 items does not mediate the relationship between the type of artist and the WTP for emotional and abstract paintings.

A possible reason for this hypothesis not being supported might be related to the EI measurement method chosen. As previously explained, the EI scale with only 6 items belonging to different subscales did not obtain good results in the reliability analysis. Therefore, future studies should use an EI scale in its entirety (i.e., with all its items) to obtain reliable findings.

Another possible reason for the non-significant findings might be related to the fact that some participants answered, in the attention question included in the experiment, that they were not sure who the author of the paintings is. As explained earlier, I did not exclude participants who responded "I am not sure" from the analysis because some participants might be afraid to make statements and might have been confused about what they read earlier in the painting's

description. However, on the other hand, I cannot guarantee that the participants paid enough attention to the experience, which raises doubts about the quality of the data.

5.2. Academic and managerial relevance

Based on literature, consumer behavior managers can expect different responses to AI and human art. The process of creating art is often associated with the ability to convey emotions and/or inner states. However, unlike humans, AI agents lack emotional intelligence, so they are not expected to be able to successfully perform tasks that require emotional and creative skills, such as creating a painting. According to my results, it is less clear that differences can be expected, but I suggest that future studies investigate this matter.

I believe that AI contributes to shaping consumer behavior. AI systems are increasingly being used to organize relevant information, which is particularly useful in helping consumers overcome the problem of information overload, allowing them to get a better match with reduced search costs. Specifically, the application of AI in the field of art is a recent topic about which little is known, however, I hope this study will be a starting point for thinking about the future of art and consumer response. I recommend that consumer behavior managers closely monitor the evolution of AI applications and their response from consumers, so they can predict trends and find opportunities to benefit from the use of AI in their business.

6. CONCLUSION

Regardless of the conclusions drawn from this study, the AI-art relationship is a very recent field of research and, consequently, very little is known about the impact of artist type (human vs. AI agent) on painting quality perception and WTP. This dissertation is just one of the first steps to better understand the evolution of AI artists in the art world, as well as to realize that the type of artist might influence human decision making about buying a painting.

It is important to note from this study that AI's involvement in the most diverse fields provides added value, so people should explore opportunities to benefit from these soulless beings, whether in the field of art or any other field.

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8. APPENDICES

8.1. Appendix A: Online Experiment Guide

A. Informed Consent Form

Dear participant,

Thank you for participating in this study on the perception of paintings. I am conducting this experiment as part of my Master's Thesis at Católica Lisbon School.

The study consists of answering to several multiple questions and it will take about 4 minutes to complete.

Please answer as honestly as possible. All answers will be kept strictly confidentially and are anonymous. This means that there will be no way to link your responses to your identity. The data collected will be used for research purposes only.

If you have any questions about this study, please email Rute Guerreiro (rute.g@outlook.pt). By continuing you agree to participate.

Thank you!

B. Demographic Questions

1- What is your gender?

- Female
- Male
- Non-binary or other

2- What is your age?

_____

3- What is your education level?

- Up to high school
- Bachelor's degree
- Master's degree or higher
- No formal education

4- How would you rate your knowledge of Artificial Intelligence (AI)?

- 1 (Extremely poor)
- 2
- 3
- 4 (Neutral)
- 5
- 6
- 7 (Extremely strong)

C. Consumer purchasing habits

5- How often do you buy a painting?

- Once a year
- Every 2 years
- Every 3 years
- Every 5 years
- Every 10 years
- I never bought a painting

6- Where do you usually buy a painting?

- Informal shop / shopping center (e.g.: El Corte Inglés, Leroymerlin, Zara Home…)
- Galleries of art
- Online
- Other, please specify: _____

7- How important is the artist to you when buying a painting?

- 1 (Not at all important)
- 2 (Low importance)
- 3 (Slightly important)
- 4 (Neutral)
- 5 (Moderately important)
- 6 (Very important)
- 7 (Extremely important)

D. Painting evaluation - GROUP A (Condition: AI Paintings)

Imagine you were thinking of buying a painting to decorate your home or to offer to someone.

Artificial Intelligence (AI) refers to programs, algorithms, systems, and machines that demonstrate intelligence and behaviors similar to humans. AI agents are able to interpret external data correctly, to learn from such data, and to use those learnings to achieve specific goals and tasks through flexible adaptation.

We have reached a point where we already have AI agents who create paintings. Next, we will show you an abstract painting made by an AI artist (intelligent robot) and we will ask you to answer some questions about it.

"*Orange sky*" **by intelligent robot Paki** (2018)

8- How likely would you be to buy this painting?

- 1 (Extremely unlikely)
- 2 (Very unlikely)
- 3 (Slightly unlikely)
- 4 (Neutral)
- 5 (Moderately likely)
- 6 (Very likely)
- 7 (Extremely likely)

9- What is the maximum euro amount (€) that you would be willing to pay for this painting?

- (0€ - 50€)
- (51€ - 100€)

- (101€ - 150€)
- (151€ - 200€)
- (201€ - 250€)
- (251€ - 300€)
- (301€ - 350€)
- (351€ - 400€)

10- How would you rate this painting in terms of its quality?

- 1 (Extremely poor)
- 2 (Very poor)
- 3 (Slightly poor)
- 4 (Neutral)
- 5 (Moderately good)
- 6 (Very good)
- 7 (Extremely good)

11- Do you think this painting involves emotions?

- 1 (Definitely not)
- 2 (Probably not)
- 3 (Neutral)
- 4 (Probably yes)
- 5 (Definitely yes)

12- Who is the author of this painting?

- Human
- AI agent (intelligent robot)
- I am not sure

Again, imagine you were thinking of buying a painting to decorate your home or to offer to someone. We are going to show you **an emotional painting created by another AI artist (intelligent robot)**, and we are going to ask you to answer some questions.

"*Angry General*" **by intelligent robot** Alfa (2018)

13- How likely would you be to buy this painting?

- 1 (Extremely unlikely)
- 2 (Very unlikely)
- 3 (Slightly unlikely)
- 4 (Neutral)
- 5 (Moderately likely)
- 6 (Very likely)
- 7 (Extremely likely)

14- What is the maximum euro amount (€) that you would be willing to pay for this painting?

- (0€ - 50€)
- (51€ - 100€)
- (101€ - 150€)
- (151€ - 200€)
- (201€ - 250€)
- (251€ - 300€)
- (301€ - 350€)
- (351€ - 400€)

15- How would you rate this painting in terms of its quality?

- 1 (Extremely poor)
- 2 (Very poor)
- 3 (Slightly poor)

- 4 (Neutral)
- 5 (Moderately good)
- 6 (Very good)
- 7 (Extremely good)

16- Do you think this painting involves emotions?

- 1 (Definitely not)
- 2 (Probably not)
- 3 (Neutral)
- 4 (Probably yes)
- 5 (Definitely yes)

17- Who is the author of this painting?

- Human
- AI agent (intelligent robot)
- I am not sure

D. Painting evaluation - GROUP B (Condition: Human Paintings)

Imagine you were thinking of buying a painting to decorate your home or to offer to someone. Next, we will show you **an <u>abstract painting</u> made by an artist,** and we will ask you to answer some questions about it.

"*Orange sky*" **by José Pedro Almeida** (2018)

18- How likely would you be to buy this painting?

- 1 (Extremely unlikely)

- 2 (Very unlikely)
- 3 (Slightly unlikely)
- 4 (Neutral)
- 5 (Moderately likely)
- 6 (Very likely)
- 7 (Extremely likely)

19- What is the maximum euro amount (€) that you would be willing to pay for this painting?

- (0€ - 50€)
- (51€ - 100€)
- (101€ - 150€)
- (151€ - 200€)
- (201€ - 250€)
- (251€ - 300€)
- (301€ - 350€)
- (351€ - 400€)

20- How would you rate this painting in terms of its quality?

- 1 (Extremely poor)
- 2 (Very poor)
- 3 (Slightly poor)
- 4 (Neutral)
- 5 (Moderately good)
- 6 (Very good)
- 7 (Extremely good)

21- Do you think this painting involves emotions?

- 1 (Definitely not)
- 2 (Probably not)
- 3 (Neutral)
- 4 (Probably yes)
- 5 (Definitely yes)

22- Who is the author of this painting?

- Human
- AI agent (intelligent robot)
- I am not sure

Again, imagine you were thinking of buying a painting to decorate your home or to offer to someone. We are going to show you **an <u>emotional painting</u> created by another artist,** and we are going to ask you to answer some questions.

"*Angry General*" **by Francisco Miguel Tavares** (2018)

23- How likely would you be to buy this painting?

- 1 (Extremely unlikely)
- 2 (Very unlikely)
- 3 (Slightly unlikely)
- 4 (Neutral)
- 5 (Moderately likely)
- 6 (Very likely)
- 7 (Extremely likely)

24- What is the maximum euro amount (€) that you would be willing to pay for this painting?

- (0€ - 50€)
- (51€ - 100€)
- (101€ - 150€)
- (151€ - 200€)
- (201€ - 250€)

- (251€ - 300€)
- (301€ - 350€)
- (351€ - 400€)

25- How would you rate this painting in terms of its quality?

- 1 (Extremely poor)
- 2 (Very poor)
- 3 (Slightly poor)
- 4 (Neutral)
- 5 (Moderately good)
- 6 (Very good)
- 7 (Extremely good)

26- Do you think this painting involves emotions?

- 1 (Definitely not)
- 2 (Probably not)
- 3 (Neutral)
- 4 (Probably yes)
- 5 (Definitely yes)

27- Who is the author of this painting?

- Human
- AI agent (intelligent robot)
- I am not sure

E. Consumer perceptions about AI artists

28- Do you think the artist in question is capable of representing emotions?

- 1 (Definitely not)
- 2 (Probably not)
- 3 (Neutral)
- 4 (Probably yes)
- 5 (Definitely yes)

29- Artificial Intelligence (AI) refers to programs, algorithms, systems, and machines that demonstrate intelligence and behaviors similar to humans. AI agents are able to interpret external data correctly, to learn from such data, and to use those learnings to achieve specific goals and tasks through flexible adaptation. How do you rate AI-made paintings in comparison with human-made paintings?

- 1 (AI-made paintings are likely better)
- 2
- 3
- 4 (Neutral)
- 5
- 6
- 7 (Human-made paintings are likely better)

30- What factors influence your decision?

- AI artists are not familiar
- Human job losses
- AI artists are eerie
- AI artists lack of emotional intelligence
- Other, please specify: _____

31- When you are buying a painting, what factors really matter to you?

	1 (Not at all important)	2 (Low importance)	3 (Slightly important)	4 (Neutral)	5 (Moderately important)	6 (Very important)	7 (Extremely important)
Price	○	○	○	○	○	○	○
Artist	○	○	○	○	○	○	○
Quality	○	○	○	○	○	○	○

Type of art ○ ○ ○ ○ ○ ○ ○

Assessing Emotions Scale - Humans Condition

32- Each of the following items asks you about humans' emotions or reactions associated with their emotions. After deciding whether a statement is generally true for humans, use the 5-point scale to respond to the statement:

	1 (Strongly disagree)	2 (Somewhat disagree)	3 (Neither agree nor disagree)	4 (Somewhat agree)	5 (Strongly agree)
When humans are faced with obstacles, they remember times they faced similar obstacles and overcame them.	○	○	○	○	○
It is difficult for humans to understand why people feel the way they do.	○	○	○	○	○
Humans expect that they will do well on most things they try.	○	○	○	○	○
Other people find it easy to confide in humans.	○	○	○	○	○
When humans are in a positive mood, solving problems is easy for them.	○	○	○	○	○
Humans have control over their emotions.	○	○	○	○	○

Assessing Emotions Scale - AI Agents Condition

33- Each of the following items asks you about AI agents' emotions or reactions associated with their emotions. After deciding whether a statement is generally true for AI agents (intelligent robots), use the 5-point scale to respond to the statement:

	1 (Strongly disagree)	2 (Somewhat disagree)	3 (Neither agree nor disagree)	4 (Somewhat agree)	5 (Strongly agree)
When AI agents are faced with obstacles, they remember times they faced similar obstacles and overcame them.	○	○	○	○	○
It is difficult for AI agents to understand why people feel the way they do.	○	○	○	○	○
AI agents expect that they will do well on most things they try.	○	○	○	○	○
Other people find it easy to confide in AI agents.	○	○	○	○	○
When AI agents are in a positive mood, solving problems is easy for them.	○	○	○	○	○
AI agents have control over their emotions.	○	○	○	○	○

F. Debriefing

Thank you for your participation. In this study, we actually want to verify whether the type of artist (human vs AI agent / intelligent robot) influences people's perceptions of paintings.

For that, half of the participants were exposed to two paintings (emotional vs abstract) in which they were told they were made by an AI artist. Another half of the participants were told that the same two paintings were made by a human artist. In reality, they were all done by an AI artist, and we will compare the answers and see if there are any differences that result from here.

If you want to know more information about this study or have access to the results, please leave your email in the following link: https://ucplbusiness.co1.qualtrics.com/jfe/form/SV_5mBB1j30dEFKZUh

8.2. Appendix B: Demographic data

Table 1 - Demographic characterization of the valid sample

		N	**%**
Gender	Female	87	59,6%
	Male	58	39,7%
	Non-binary or other	1	0,7%
		146	**100%**
Age	18-23 years old	124	84,9%
	24-51 years old	22	15,1%
		146	**100%**
Education Level	Up to high school	10	6,8%
	Bachelor's degree	81	55,5%
	Master's degree or higher	55	37,7%
	No formal education	0	0%
		146	**100%**

8.3. Appendix C: Results

8.3.1. Independent Samples t-Test (Hypothesis 1a)

Table 2 – Group Statistics

	N	M	SD	SE Mean
AI condition	71	3,48	1,584	0,188
Human condition	70	3,64	1,597	0,191

Table 3 – Independent Samples Test

	F	Sig.	t	df	Sig. (2-tailed)	MD	SE Difference
Equal variances assumed	0,151	0,698	-0,612	139	0,542	-0,164	0,268
Equal variances not assumed			-0,612	138,930	0,542	-0,164	0,268

8.3.2. Paired Samples t-Test (Hypothesis 1b)

Table 4 – Paired Samples Statistics

	M	N	SD	SE Mean
Abstract condition	4,01	71	1,089	0,129
Emotional condition	3,48	71	1,584	0,188

Table 5 – Paired Samples Correlations

	N	Correlation coefficient (r)	Sig.
Pair	71	0,244	0,040

Table 6 – Paired Samples Test

	M	SD	SE Mean	95% CI		t	Df	Sig. (2-tailed)
Pair	0,535	1,689	0,200	0,135	0,935	2,670	70	0,009

Table 7 – Descriptive Statistics

	Artist Type	Mean	SD	N
Quality_Abstract_How would you rate this	AI	4,01	1,089	71
	Human	4,34	1,020	70

painting in terms of its quality?	Total	4,18	1,064	141
Quality_Emotional_How would you rate this painting in terms of its quality?	AI	3,48	1,584	71
	Human	3,64	1,597	70
	Total	3,56	1,587	141

Table 8 – Box's Test of Equality of Covariance Matrices

Box's M	0,566
F	0,186
Df1	3
Df2	3500489,272
Sig.	0,906

8.3.3. Linear Regression (Hypothesis 2)

Table 9 – Reliability Statistics (adapted EI Scale)

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0,356	0,350	6

Table 10 - Model Summary

	R	R Square	Adjusted R Square	SE of the Estimate
Emotional condition	0,139	0,019	-0,010	1,595
Abstract condition	0,208	0,043	0,015	1,056

Table 11 - ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Emotional condition	6,768	4	1,692	0,665	0,617

Abstract condition	6,881	4	1,720	1,542	0,193

8.3.4. Independent Samples t-Test (Hypothesis 3a)

Table 12 – Group Statistics

	N	M	SD	SE Mean
WTP: AI condition	71	1,32	0,732	0,087
WTP: Human condition	70	1,43	0,941	0,113

Table 13 – Independent Samples Test

	F	Sig.	t	df	Sig. (2-tailed)	MD	SE Difference
Equal variances assumed	2,672	0,104	-0,737	139	0,462	-0,105	0,142
Equal variances not assumed			-0,736	130,218	0,463	-0,105	0,142

8.3.5. Paired Samples t-Test (Hypothesis 3b)

Table 14 – Paired Samples Statistics

	M	N	SD	SE Mean
WTP: abstract condition	1,30	71	0,619	0,073
WTP: emotional condition	1,32	71	0,732	0,087

Table 15 – Paired Samples Correlations

	N	Correlation coefficient (r)	Sig.
Pair	71	0,574	<0,001

Table 16 – Paired Samples Test

	M	SD	SE Mean	95% CI		t	df	Sig. (2-tailed)
Pair	-0,028	0,632	0,075	-0,178	0,121	-0,376	70	0,708

8.3.6. Serial mediation model (Hypothesis 4)

8.3.6.1. Scenario with EI scale (Emotional Condition)

Table 17 - Indirect effect key

Ind1	Artist type	EI Scale	WTP_Emo	
Ind2	Artist type	Quality_Emo	WTP_Emo	
Ind3	Artist type	EI Scale	Quality_Emo	WTP_Emo

Table 18 - EI scale

	Effect (b)	BootSE	BootLLCI	BootULCI
Ind1	0,032	0,024	-0,004	0,089
Ind2	0,015	0,044	-0,064	0,118
Ind3	0,009	0,010	-0,007	0,032

8.3.6.2. Scenario with EI scale (Abstract Condition)

Table 19 - Indirect effect key

Ind1	Artist type	EI Scale	WTP_Abs	
Ind2	Artist type	Quality_Abs	WTP_Abs	
Ind3	Artist type	EI Scale	Quality_Abs	WTP_Abs

Table 20 - EI scale

	Effect (b)	BootSE	BootLLCI	BootULCI
Ind1	0,024	0,030	-0,029	0,091
Ind2	0,082	0,048	-0,002	0,188
Ind3	-0,006	0,011	-0,032	0,014

8.3.6.3. Scenario with 4 EI subscales (Emotional Condition)

Table 21 - Indirect effect key

Ind1	Artist type	EI Subscale	WTP_Emo	
Ind2	Artist type	Quality_Emo	WTP_Emo	
Ind3	Artist type	EI Subscale	Quality_Emo	WTP_Emo

Table 22 - EI subscale “Perception of Emotion”

	Effect (b)	BootSE	BootLLCI	BootULCI
Ind1	-0,031	0,045	-0,132	0,052
Ind2	0,024	0,044	-0,051	0,125
Ind3	0,001	0,015	-0,034	0,031

Table 23 - EI subscale “Utilization of Emotion”

	Effect (b)	BootSE	BootLLCI	BootULCI
Ind1	0,073	0,048	-0,011	0,182
Ind2	0,003	0,046	-0,078	0,107
Ind3	0,020	0,018	-0,014	0,059

Table 24 - EI subscale “Managing Others’ Emotions”

	Effect (b)	BootSE	BootLLCI	BootULCI
Ind1	0,022	0,034	-0,045	0,095
Ind2	0,027	0,047	-0,058	0,132
Ind3	-0,002	0,016	-0,034	0,028

Table 25 - EI subscale “Managing Own Emotions”

	Effect (b)	BootSE	BootLLCI	BootULCI
Ind1	0,007	0,016	-0,017	0,049

Ind2	0,020	0,044	-0,059	0,120
Ind3	0,004	0,007	-0,005	0,022

8.3.6.4. Scenario with 4 EI subscales (Abstract Condition)

Table 26 - Indirect effect key

Ind1	Artist type	EI Subscale	WTP_Abs	
Ind2	Artist type	Quality_Abs	WTP_Abs	
Ind3	Artist type	EI Subscale	Quality_Abs	WTP_Abs

Table 27 - EI subscale “Perception of Emotion”

	Effect (b)	BootSE	BootLLCI	BootULCI
Ind1	0,033	0,061	-0,072	0,171
Ind2	0,054	0,044	-0,020	0,151
Ind3	0,019	0,015	-0,007	0,051

Table 28 - EI subscale “Utilization of Emotion”

	Effect (b)	BootSE	BootLLCI	BootULCI
Ind1	0,148	0,066	0,032	0,293
Ind2	0,089	0,055	-0,009	0,209
Ind3	-0,010	0,021	-0,057	0,028

Table 29 - EI subscale “Managing Others’ Emotions”

	Effect (b)	BootSE	BootLLCI	BootULCI
Ind1	0,035	0,055	-0,072	0,146
Ind2	0,101	0,051	0,011	0,209
Ind3	-0,023	0,018	-0,065	0,008

Table 30 - EI subscale “Managing Own Emotions”

	Effect (b)	BootSE	BootLLCI	BootULCI
Ind1	-0,001	0,017	-0,032	0,041
Ind2	0,072	0,046	-0,006	0,176
Ind3	0,003	0,006	-0,008	0,018

8.3.7. Other Results

Table 31 – Paired Samples Statistics (Human Condition)

	Mean	N	SD	Std. Error Mean
Abstract_How would you rate this painting in terms of quality?	4,33	69	1,024	0,123
Emotional_How would you rate this painting in terms of quality?	3,70	69	1,546	0,186

Table 32 – Paired Samples Correlations (Human Condition)

	N	Correlation	Sig.
Pair 1	69	0,344	0,004

8.4. Appendix D: The assessing emotions scale (Schutte Emotional Intelligence Test)

Directions: Each of the following items asks you about your emotions or reactions associated with emotions. After deciding whether a statement is generally true for you, use the 5-point scale to respond to the statement. Please circle the ‘‘1’’ if you strongly disagree that this is like you, the ‘‘2’’ if you somewhat disagree that this is like you, ‘‘3’’ if you neither agree nor disagree that this is like you, the ‘‘4’’ if you somewhat agree that this is like you, and the ‘‘5’’ if you strongly agree that this is like you.

There are no right or wrong answers. Please give the response that best describes you.

1=strongly disagree

2=somewhat disagree

3=neither agree nor disagree

4=somewhat agree

5=strongly agree

1.	I know when to speak about my personal problems to others.	1	2	3	4	5
2.	When I am faced with obstacles, I remember times I faced similar obstacles and overcame them.	1	2	3	4	5
3.	I expect that I will do well on most things I try.	1	2	3	4	5
4.	Other people find it easy to confide in me.	1	2	3	4	5
5.	I find it hard to understand the non-verbal messages of other people.	1	2	3	4	5
6.	Some of the major events of my life have led me to re-evaluate what is important and not important.	1	2	3	4	5
7.	When my mood changes, I see new possibilities.	1	2	3	4	5
8.	Emotions are one of the things that make my life worth living.	1	2	3	4	5
9.	I am aware of my emotions as I experience them.	1	2	3	4	5
10.	I expect good things to happen.	1	2	3	4	5
11.	I like to share my emotions with others.	1	2	3	4	5
12.	When I experience a positive emotion, I know how to make it last.	1	2	3	4	5
13.	I arrange events others enjoy.	1	2	3	4	5
14.	I seek out activities that make me happy.	1	2	3	4	5
15.	I am aware of the non-verbal messages I send to others.	1	2	3	4	5
16.	I present myself in a way that makes a good impression on others.	1	2	3	4	5
17.	When I am in a positive mood, solving problems is easy for me.	1	2	3	4	5
18.	By looking at their facial expressions, I recognize the emotions people are experiencing.	1	2	3	4	5
19.	I know why my emotions change.	1	2	3	4	5
20.	When I am in a positive mood, I am able to come up with new ideas.	1	2	3	4	5

21. I have control over my emotions.	1	2	3	4	5
22. I easily recognize my emotions as I experience them.	1	2	3	4	5
23. I motivate myself by imagining a good outcome to tasks I take on.	1	2	3	4	5
24. I compliment others when they have done something well.	1	2	3	4	5
25. I am aware of the non-verbal messages other people send.	1	2	3	4	5
26. When another person tells me about an important event in his or her life, I almost feel as though I have experienced this event myself.	1	2	3	4	5
27. When I feel a change in emotions, I tend to come up with new ideas.	1	2	3	4	5
28. When I am faced with a challenge, I give up because I believe I will fail.	1	2	3	4	5
29. I know what other people are feeling just by looking at them.	1	2	3	4	5
30. I help other people feel better when they are down.	1	2	3	4	5
31. I use good moods to help myself keep trying in the face of obstacles.	1	2	3	4	5
32. I can tell how people are feeling by listening to the tone of their voice.	1	2	3	4	5
33. It is difficult for me to understand why people feel the way they do.	1	2	3	4	5

Note: The authors permit free use of the scale for research purposes.