OPEN ACCESS

European Journal of Behavioral Sciences
ISSN 2538-807X

Behavioral Biases in Investment Decisions: A Comparative Analysis of the Stock Market and the Art Market

Urvi Sukhani

United World College of South East Asia, Singapore

ARTICLE INFO

Keywords:
Behavioral and Social Sciences,
Cognitive Psychology,
Behavioral Biases,
Disposition Effect,
Overconfidence Bias

ABSTRACT

Investment decisions are often influenced by the behavior of the investor. To empirically evaluate, this study aims to comparatively analyze how behavioral biases differ between various investments, in particular, art and stocks. In addition, the research examined the gender differences within the biases for both art and stock investments. Therefore, three objectives were assessed in this paper: 1) To analyze the differences in behavioral biases between stocks and arts, 2) To assess how behavioral biases differ between females and males while investing in art, and 3) To evaluate how behavioral biases differ between females and males while investing in stocks. A detailed quantitative survey was used where participants (n=30), primarily from Singapore, answered 19 questions on the biases based on standardized scales. Data was processed using a paired t-test, Levene's test, and independent t-tests. The findings revealed that the Disposition and Herding biases are significantly greater in the stock investments than in the art ones. However, endowment bias is significantly greater in art as compared to stocks. Lastly, Overconfidence bias did not significantly differ across art and stock assets. Additionally, no significant differences were found in all the behavioral biases tested between males and females. The similarity in gender was consistent across both the Stock investments and the Art investments. In conclusion, this study enables investors to make informed decisions and strategies while investing in art and stocks, considering the effect of behavioral biases.

1. Introduction

Throughout the world, investing has become a fundamental aspect of global economies, and a way for people to generate secondary income and save money in secure assets. An investment is an asset or item that the investor predicts will make a profit in the long run, to generate income or gain appreciation. In other words, it is recognized to be a commitment of money in the present time that hopefully will reap future benefits (Bodie et al., 2013). There are a plethora of assets that investors can acquire to invest successfully. Firstly, there are real assets such as land, labor, and capital which are used in the economy to generate income and be more productive. However, there are also financial assets such as stocks, bonds, and securities that individuals can purchase to generate income from real assets. For instance, if someone cannot own technological machinery, they can invest in Apple or any other firm in a similar market to generate income derived from the production of electronics.

* Corresponding author's E-mail address: urvisukhani@gmail.com

Cite this article as:
Sukhani, U. (2025). Behavioural Biases in Investment Decisions: A Comparative Analysis of the Stock Market and the Art Market. *European Journal of Behavioral Sciences, 8*(2): 16-31. https://doi.org/10.33422/ejbs.v8i2.1561

The most widely accessible, used, and known financial asset to invest in is the stock market. Stocks are shares of a company, which represent owning a fraction of a company, and the dividends are divided among shareholders. In 2024, the New York Stock Exchange's worth will surpass 25 trillion dollars (Wikipedia contributors, 2025). However, the stock market's performance is largely linked to macroeconomic trends. For example, during COVID-19, particularly in March 2020, the stock market crashed and petroleum, real estate, and hospitality stocks fell drastically (Mazur et al., 2020), negatively impacting the profits earned by shareholders. Furthermore, it is found that economic development and growth positively impact the stock market (Pan & Mishra, 2017), so when economies grow and increase their GDP per capita, it reflects in the stock market index (valuation and performance of that particular market).

It is also important to note that even though stocks are a classic investment instrument, other assets, such as art, are also just as valuable and profitable. Over the past decades, art pieces have risen tremendously and are predicted to continue increasing as valuable investment assets for traders and investors worldwide (Coslor, E., & Spaenjers, C., 2013). The art market grossed 552.03 billion dollars globally in 2024 and has continuously increased in popularity (Research & Bothare, 2024). This is evident in the rise of art investment references in literature over the last century (Coslor, E., & Spaenjers, C., 2013). Art as an asset is unique, containing features that contrast heavily with conventional financial assets (eg, stocks, securities). Art is not only considered an investment by people but also a tangible object that has an intrinsic beauty and aesthetic, making it multi-dimensional and holding emotional sentiments. This is because, throughout history, art has held cultural significance as it may resonate with the investors' community, mental state, and personal taste, making it a more attractive asset (Glăveanu, 2017). However, it can also be noticed that art is very illiquid, which poses obstacles for buyers to respond to short-term changes in the market (Kraeussl & Logher, 2010).

It is indispensable to recognize that grouping the global art market isn't insightful, as different cultures affect investors who purchase art pieces. Different art markets should be treated separately due to the social norms in the country and the culture of the art there. For example, empirical research by Shi et al. (2017) found a large gap in the global arts versus the art in China, in which buyers in China have fully exploited the benefits of Chinese art investment. Furthermore, the chinese art market has different characteristics such as high returns and greater risk volatility. This exemplifies the fact that art markets should all be considered individually and not grouped as a whole, as that ignores all the niche aspects of each market. Adding to the fact that art is unique in many different aspects, research has also shown that, unlike stocks, art is not only considered an investment but also a consumption good (Mandel, 2013). Evidence has found that, contrary to stocks, art responds to permanent income changes rather than temporary shocks (Mandel, 2013). This shows that art pieces shouldn't only be considered investment instruments, but rather consumption pieces for decoration, cultural homage, and more.

In Singapore, the art industry has grown increasingly (*Arts Industry*, 2024). Singapore's export of works of art is increasing at 2.6% per year, projected to reach 468 million dollars by 2026 (Report Linker, 2022). Similar to Singapore, India has seen a rapid boom in art recently. Since 1995, Modern Indian art has rapidly popularized and been considered an artistic movement with works worth 2 million dollars (Hawkins, J. R. & Saini, V., 2016), competing with art markets on a global scale and reaching a new level of growth. Across the Pacific, New York is considered an art metropolis, with museums such as MoMA being a tourist attraction all over the world. This means that research needs to be conducted to understand the intricacies of these new markets.

Given that, behavioral biases are prominent in the financial decisions investors make, influencing their behavior to a great extent. Following the behavioral economics school of thought, which differs from classical economics, humans behave irrationally and use cognitive biases to make decisions and purchases (Raghunathan, 2022). This indicates that understanding how these biases work and interact is fundamental to deepening the knowledge surrounding investors' behaviors in the stock and art markets. There are various heuristics, such as disposition bias, endowment bias, overconfidence bias, and herding bias, that influence human cognitive capabilities and decisions.

The disposition effect amongst investors is one of the angles to analyze behaviors in these markets; the disposition effect is the tendency of investors to sell assets that have gained value while holding onto assets that have lost value (Pilat D., & Sekoul D., 2021). This tendency is rooted in many psychological biases and schemas. A key influence is the loss aversion theory, or prospect theory, which is where humans place more value on losses than gains (Zahera & Bansal, 2019). They would rather not win than lose, as it's found that loss has a greater emotional impact, therefore, they would rather hold on to a losing asset than face the cost. Another key factor in play is regret aversion theory; that is, where humans are urged to avoid regret and make the wrong decision, and as a result, make the wrong decision. This can be seen as investors who usually exhibit disposition effects are fearful of feeling regret in selling the depreciating asset, as it may gain value after, and therefore hold onto it. Herding bias is when investors exhibit herding tendencies and therefore result in them following the actions of other investors with little to no due diligence or any reasoning as to why they would follow through with this decision (Qasim et al., 2018). This results in individuals grouping and following larger trends and social ‘norms’ in the asset market. Overconfidence bias is another iconic bias that impacts almost all investors and individuals outside the markets as well. This is when investors overestimate their performance, knowledge, and ability. It, similar to what the name means, makes investors overconfident in their actions. This can lead to highly risky decisions and taking on a higher level of risk as they instinctively are confident in themselves, they create speculative bubbles and block out outside perspectives (Scheinkman & Xiong, 2003). Finally, endowment bias is when investors are more likely to hold onto investments they have inherited or bought. This is for a multitude of reasons, such as fear of betraying past generations, comfort of familiarity, triggering tax costs, and more. This results in the investor overvaluing their assets (Bobde et al., 2017).

Visual arts are now increasingly becoming a popular asset to invest in, and in order to comprehend how investors act, understanding behavioral biases is crucial. Therefore, the primary goal of this paper is to investigate how the Disposition effect, Herding bias, Overconfidence bias, and Endowment bias differ between the stock market and the art market. Moreover, the study evaluated the gender differences in these biases related to art and stock investments.

2. Literature Review

Due to the plethora of cognitive biases and the popularity of stock investment, many researchers have contributed to assessing the behavioral biases in stocks. One such study aimed to identify and quantify how overconfidence bias and herding bias influence investors' decisions in the stock market in Pakistan. In the study conducted by Qasim et al. (2018), 150 participants from Pakistan were given a questionnaire to measure their overconfidence and herding bias. By running a regression test, the results showed that indeed, herding bias and the overconfidence bias have a positive and strong impact on investment decisions.

According to them, one of the reasons for this significant herding bias is due to the underdevelopment of the Pakistani stock market. Investors use herding bias as a heuristic to protect themselves from losses and maximize profits. The study also found that as education qualifications increase, so does overconfidence bias; therefore, there is a positive relationship between overconfidence bias and education level.

The previous study qualitatively analysed overconfidence bias, but Pikulina et al. (2017) looked at quantitative data, providing a different approach to understanding overconfidence bias. This research paper investigated the potentially beneficial effects of overconfidence in financial investments and quantified a measure of the extent of overconfidence. The experimental design was divided into 2 parts: 1, the participants were their managers to assess their overconfidence in investing, and 2, the participants did a series of tasks/projects to see if they were aligned with their actual skill or the skill level they believed they had. In order to further assess their confidence and skill, all the participants from the Netherlands answered 20 questions with alternative answers and had to select the level of confidence in their choice. The results found that individuals who were characterized as having high levels of confidence tended to invest high amounts or overinvest. Additionally, overconfident people's decisions may be suboptimal in high-stakes conditions, generating increased financial losses. Therefore, this shows that overconfidence can lead to poor decision-making; however, with individuals of high financial literacy, the decisions are improved and better.

Overconfidence bias isn't the only heuristic that influences behavior, therefore, the next two studies investigated the disposition effect. Zahera and Bansal (2019) is a study that compiles the causes and different factors influencing the disposition effect through analysis of existing literature that usually includes secondary data, and the experiments used multiple methodologies like ANOVA, t-test, and regression to understand the extent to which the disposition effect is prevalent in the markets. The results compile the causes and show that this is prevalent in the stock market. The study also reveals how individual differences, such as sex, age, and investment experience, impact the disposition effect displayed, while financial professionals are less likely to exhibit these qualities. Finally, the study touches on the subconscious usage of reference points, tax planning, and cognitive biases to increase the likelihood of displaying the disposition effect.

Another research conducted by Weber and Camerer (1991) highlighted the extent of the disposition bias, specifically in trading securities. The paper claims that the principal cause of this effect is due to prospect theory: the tendency for people to value losses more than gains and therefore, do all in their power to avoid the confrontation of these losses by avoiding risks when faced with gains. During the study, participants were studied in a simulation over 14 periods, and during each one, they were allowed to buy and sell 6 risky assets in which the prices fluctuated randomly by the experimenter. The results showed that the disposition effect was significantly greater when the participants could choose to hold stocks, but was less when stocks were sold automatically. Conclusively, there was a strong presence of the disposition effect in all stocks.

Building upon this research, a study conducted in Taiwan's stock market emphasized how individual investors act concerning the disposition effect in Taiwan (Goo et al., 2010). It understands the individual characteristics of the disposition effect. They used a survey to test 3 main components of the disposition effects: the disposition effect, the emotional aspect theory, the sunk and opportunity cost, the pride and regret aspect of the disposition effect, and the demographics. The study found that the level of education heavily correlates with the disposition effect, with investors who hold degrees exhibiting these qualities of the disposition effect less. It also concluded that gains in a bull market were only reported by a

small number of investors, this is because of the selling of stocks before they have been able to mature.

A current piece of literature, Guo (2024), aims to understand the significance and application of the endowment bias and relates it to the loss aversion effect, a known cause of the disposition effect. It compiles 3 main applications of this bias through looking at previous literature: Pricing in consumer behavior, Investment decisions, and Negotiations. It was found that businesses use endowment bias in the form of the anchoring effect to create reference prices for consumers, and therefore, they may tend to think this is a better deal. Furthermore, through limited time frames and the idea of scarcity, consumers tend to overvalue these products. In investment, the endowment effect was attributed to the sunk cost fallacy, as since these investors have already given ample resources towards their portfolio, they may simply continue that and tend to exaggerate its value due to the time and money put into it. Finally, through information gaps between the seller and the buyer, bids in which individuals may pay excess due to their emotional significance, and by investors feeling that things need to be 'fair' (the concept of fairness is included in the value of the asset), endowment bias may emerge in negotiations. This paper highlights some ways to mitigate endowment bias, such as third-party mediators or alternative considerations.

Experimental data is equally as important in understanding endowment bias, so a different study based in India, by using a survey, analyzed endowment bias and self-control bias (Bobde et al., 2017). The results showed that behavioral biases largely affect decisions in financial markets. Also, this piece of research found that parties increasingly use this endowment bias in inherited securities for reasons of familiarity with the investment, comfort, commission aversion, and many more. In these assets, investors also lack self-control and fail to see the long-term profits as they are focused on short-term ease and simplicity.

In these pieces of literature, it can be seen that there is a predominance of stocks, securities, and traditional investments as a focal point for examining behavioral biases and their prevalence and causes. Existing literature does not account for and evaluate the Behavioral biases in art and alternative investment by themselves, making it difficult to understand how investors in the market for visual arts operate and ideate. Furthermore, there is a lack of comparison studies that compare art markets with stock markets and how investors in those markets use behavioral biases. Therefore, there is a gap in the overall understanding and research of this phenomenon.

To highlight the importance of mending this gap in literature, researchers can look at the trends in visual arts in Asia. In recent years, countries such as China, India, Singapore, and Japan have grown tremendously, and it is becoming even more important to understand the investment factors that are specific to these nations, due to their global impact and growing scale. For instance, in Singapore, the financial market has an overpowering presence in the economy, and the art market is growing heavily, therefore, there needs to be more research done on the intersection between the two industries, particularly investment in the art industry. Additionally, in the literature available, behavioral biases are mainly honed in on the stock market and neglect these phenomena in art investments, therefore, there is a gap in the existing literature that should be addressed to gain a broader perspective on the psychological effects of investing.

Therefore, this study is collecting data using a survey from individuals investing in stocks as well as art, mainly belonging to Singapore and other Asian countries. By measuring the behavioral biases in stocks and art investments, a comparative analysis has been conducted.

This paper will compare how behavioral biases (disposition effect, herding bias, overconfidence bias, and endowment bias) differ in stock market investors and art investors.

3. Methodology

3.1. Aim

The primary aim of this study is to comparatively analyze how behavioral heuristics-disposition bias, herding bias, overconfidence bias, and endowment bias- differ between various investments, in particular, art and stocks. There are 3 main objectives of the paper:

1) To analyze the differences in behavioral biases between stocks and arts.
2) To assess the differences between females and males exhibiting behavioral biases in art investments.
3) To evaluate the differences between males and females exhibiting behavioral biases in stock investments

3.2. Research Hypotheses

Objective 1 accounted for all 4 behavioral biases studied. The null hypotheses being tested were as follows.

- Hypothesis 1: There is no difference between the average disposition bias in art and the disposition bias in stocks.
- Hypothesis 2: There is no difference between the average herding bias in art and the herding bias in stocks.
- Hypothesis 3: There is no difference between the average overconfidence bias in art and the overconfidence bias in stocks.
- Hypothesis 4: There is no difference between the average endowment bias in art and the endowment bias in stocks.

Objective 2 only took into consideration the metric variables disposition in art, herding in art, overconfidence in art, and endowment in art using the nominal variable gender. Four null hypotheses were tested for the same as follows.

- Hypothesis 5: There is no significant difference between males and females with respect to disposition bias in art investments.
- Hypothesis 6: There is no significant difference between males and females with respect to herding bias in art investments.
- Hypothesis 7: There is no significant difference between males and females with respect to overconfidence bias in art investments.
- Hypothesis 8: There is no significant difference between males and females with respect to endowment bias in art investments.

Objective 3 also aimed to study the differences in gender, however, in stocks instead. For the same four individual hypotheses concerning each bias was tested.

- Hypothesis 9: There is no significant difference between males and females with respect to disposition bias in stock investments.
- Hypothesis 10: There is no significant difference between males and females with respect to herding bias in stock investments.

- Hypothesis 11: There is no significant difference between males and females with respect to overconfidence bias in stock investments.
- Hypothesis 12: There is no significant difference between males and females with respect to endowment bias in stock investments.

3.3. Sampling and Sample Characteristics

Initially, the sample consisted of 121 respondents. However, since only 30 participants invested in both stocks and art, the sample was reduced to 30. The population was sampled by convenience, judgment, and snowball sampling. Primarily, participants who were nearby and available were contacted to fill out the survey. Furthermore, participants who were already known to have been investing in stocks and art were contacted to get a larger number of individuals who invested in both assets, and then, these participants sent the survey to other people with similar characteristics to answer the survey. The final sample consisted of 30 individuals, with a perfectly even split of males and females. These individuals were largely from Singapore. 20 of the participants held master's degrees, 8 held a bachelor's degree, and only 2 were high school graduates. One-third of the sample was earning an income of above SGD 1,000,000 per year, and out of those, 8 were earning above SGD 2,000,000 per year.

3.4. Scales and Tools

The study collected the data in the form of a survey. The questionnaire included basic questions regarding the demographics of participants, such as sex, age, location, schooling history, and annual income, to assess the trends of the results based on individual characteristics. These questions were answered on a multiple-choice scale based on the question. Moreover, a filter question: “Do you invest in stocks, art, or both?” was applied to make sure that the target participants, i.e., the individuals who invest in both art and stocks, answered the survey. Then, the other 19 questions were asked based on behavioral biases, in particular, overconfidence bias, disposition bias, herding bias, and endowment bias. The scale used for the disposition effect has been taken from Rathod (2018) and has a Cronbach's alpha value of 0.72, which is greater than 0.7 and is therefore considered a reliable scale. For the other three biases, scales were considered from Armansyah (2022). These scales have a Cronbach's alpha of more than 0.7, which seems to be reliable. Lastly, for the bias-related statements, the Likert Scale of 5 points (1-5), which had a range of strongly disagree to strongly agree, was used, where 1 is strongly disagree and 5 signifies strongly agree.

3.5. Process of Collecting Data

The survey was translated into Google Forms and was circulated through WhatsApp, Gmail, and Facebook. Using the snowball sampling technique, participants could share the form with other people, which suited the research question to gain a larger data sample required to perform statistical tests. After the data was collected, the results were electronically and automatically linked to a spreadsheet where the data was cleaned and organized by filtering out the individuals investing in both stocks and art.

3.6. Statistical Tools and Techniques

To evaluate objective 1, a paired T-test was used, where each individual was accounted for, and then the results were averaged (Hayes, 2024). The t value is calculated, and a higher absolute value indicates a greater degree of difference between the 2 variables (Hayes, 2024).

For this study, 0.05 is considered the significance level. Therefore, for any hypothesis, if the given p-value is smaller than 0.05, it is required to reject the null hypothesis, and the results will be considered statistically significant. Additionally, the mean/average and standard deviation were calculated to understand not only the central tendency of the data but also the spread of the data to obtain a better idea of the data and see which variable was greeted by looking at the mean values.

For objectives 2 and 3, an independent t-test was utilised where the individual results were averaged and then compared. Moreover, to test equal or unequal variances, a Levene's test should be considered as it will eventually impact the t-statistic and p-value for the t-test. The assumption of equal variances is a null hypothesis and should be rejected if the Levene's p value is less than the statistically significant threshold: 0.05. Subsequently, an independent t-test is evaluated based on the p-value. If the p-value is less than 0.05, then there is a significant difference between the two groups. Data tab, a website that does statistical tests immediately, was used to conduct all the tests required to see if the null hypothesis should be accepted or rejected.

3.7. Ethical Considerations

In this study, various ethical precautions were considered, such as informed consent, where participants were aware of what would happen with the data post-collection and the overarching purpose of the survey, which was given in the briefing sent along with the survey. Additionally, all respondents could withdraw from this study by canceling their scores or leaving the survey incomplete at any point. This ensures the individual's right to withdraw and guarantees that all participation is voluntary throughout the study. All data was collected without any personal details such as name, phone number, and address to maintain Anonymity. In addition, none of the data was shown to third parties to keep all the results confidential and maintain the privacy of the participants. Furthermore, due to the nature of the experiment, there was no harm to the participants as they were answering questions that wouldn't provoke any discomfort in the individuals.

4. Results and Discussion

4.1. Differences in Behavioral Biases Between Stocks and Arts

Table 1 represents the results of the four hypotheses tested under objective 1. In the table, DE stands for disposition effect, HB for herding bias, OB for overconfidence bias, and EB for endowment bias. Additionally, the subscript A (eg, DE_A) stands for art investments, and the subscript S (eg, DE_S) stands for stock investments.

Table 1. Statistical Outcomes from Objective 1

Hypotheses		N	Mean	SD	t-statistic	p-value
DE_A - DE_S	DE_A	30	12.2	3.04	-20.46	0.001***
	DE_S	30	29.07	3.98		
HB_A -HB_S	HB_A	30	7.6	2.76	-4.01	0.001***
	HB_S	30	7.9	2.45		
OB_A -OB_S	OB_A	30	22.4	6.06	1.01	0.322
	OB_S	30	21.4	5.52		
EB_A -EB_S	EB_A	30	17.6	3.78	3.64	0.001***
	EB_S	30	14.87	3.03		

*Where *** represents a p-value < 0.05*

For hypothesis 1, the results led to the conclusion that the null hypothesis should be rejected, due to the p-value (0.001) of the t-test being less than 0.05. This means that there are significant differences between the mean value of the disposition effect in Stocks and Art. By looking at the mean values, it can be depicted that the mean value of DE_S (29.07) is greater than DE_A (12.2); therefore, according to both the t-test and mean, the disposition effect in stocks is greater than art, with a significant difference.

The difference in disposition effect between the art market and stock market for the whole population can be attributed to differences regarding the characteristics of art pieces and markets. The art market has lower liquidity compared to other investments, such as stocks or bonds, which react to economic shocks quickly and can be turned into cash quickly (Kraeussl & Logher, 2010). This therefore results in a difference in the speed at which investors can buy and sell assets, so in the stock market, which is highly liquid, investors can react quicker to profits and react to their emotional biases, in this case, the disposition effect, more easily. Therefore, it means that higher liquidity results in a higher rate of disposition effect, as it's easier to display these behavioral biases. However, in the art market, entities are much more careful and slow with transactions, resulting in investors acting less using heuristics and impulses due to the lower liquidity and being unable to react impulsively. Furthermore, the art market is much more opaque, and valuations are harder in this market compared to stocks (Coslor, 2016). Art pieces use many non-price factors in determining prices, such as the artist's name, originality of the piece, and time taken to make or recover the artwork. This, therefore, results in much more complex valuations which take longer to do and make it harder for investors to understand the pricing, or even find the true price of the art due to the complexity of the pricing system (Coslor, 2016). This poses challenges for investors to compare the values of different works and actualize losses and gains, making it harder for the disposition effect to take place in investors' cognition. Stocks, on the other hand, have much easier pricing systems which are readily available on the stock markets, so investors see the losses and gains in real-time, resulting in disposition effects being more prevalent and higher, as seen in the results.

The results for the second hypothesis also illustrate that the hypothesis was rejected due to the produced p-value of the test (0.001) being less than 0.05. It implies that there is a significant difference between the herding bias in stocks and arts. Furthermore, by comparing the mean values, the mean of HB_A (mean=7.6, s.d=2.76) is less than HB_S (mean=7.9, s.d=2.45), denoting greater herding bias in stocks as compared to art investments, with the difference being significant.

Herding bias, according to the results, is significantly higher in stocks than in art investments as well. This can be accounted for due to the barriers regarding entry and exit in the art market (Worthington & Higgs, 2003). Art pieces are usually much more expensive, with some ranging between the tens of millions of dollars (Irises by Van Gogh was sold at 53.9 Million USD) (Worthington & Higgs, 2003). Additionally, art is usually sold at auctions, which require insider knowledge of the market and expertise in the field. This results in barriers to entry, resulting in lower participation, and therefore, fewer people display this herding bias. Stocks, on the other hand, can be invested in by people with any experience and income, making them more susceptible to herding bias to take place. Another notable point is that art investors don't buy art just based on its value, however, the personal value, emotional connection, and trust in the artist influence the purchase of art (Nidal & Albaity, 2024). This means that there are unique psychological factors affecting different investors, and due to the motives for these investors being different, the effect of herding bias is reduced as their actions are less swayed by the whole market and others' influences.

The null hypothesis of hypothesis 4 was rejected as the p-value showed 0.001, which is less than the statistical threshold of significance: 0.05. This signifies that the difference between Endowment bias in stocks and art is noteworthy and significant, and according to the mean values, EB_A (mean=17.6, s.d=3.78) is greater than the mean of EB_S (mean= 14.87, s.d=3.03) hence, it is valid to conclude that the endowment bias in arts is significantly greater than the endowment bias in stocks.

Endowment bias is significantly greater in art than in stocks. This can easily be attributed to the emotional connection and sentimental value that art investors have (Nidal & Albaity, 2024). This strong attachment and emotion make investors reluctant to sell their art, not because of the financial performance, but because of the sentimental value. This doesn't occur in stocks as much because it's viewed more as a financial asset than something with emotion and life. Furthermore, art is seen to be linked deeply to community and personal identity, serving as a means of identifying someone's roots or history (Mccarthy, 2006). Therefore, it makes investors with this personal identity linked to the art tend to overvalue the piece compared to stocks, making them more reluctant to sell due to this personal value, which isn't included in the price.

However, Hypothesis 3 is the only hypothesis that was accepted as the p-value (0.332) is greater than 0.05. It reveals that the Overconfidence bias in stocks and art has no significant difference. Hindsight bias is a catalyst for overconfidence bias and is a heuristic that impacts all investors, no matter the asset. Hindsight bias is the “I knew it all along” mentality, where investors believe an event was predicted after it took place when, in reality, it was unexpected (Roese & Vohs, 2012). The immediate consequence of this is overconfidence bias, as outlined in Roese and Vohs (2012), and due to the universal nature of this bias, it means that all investors, no matter the gender or asset, are equally susceptible to overconfidence in decisions, which explains the results found from Hypothesis 3.

4.2. Gender Differences in Behavioural Biases Within Art and Stock Investments

The outcomes of the hypotheses tested to assess objective 2 are depicted in Table 2. Herein, DE_A stands for disposition effect in art, HB_A for herding bias in art, OB_A for overconfidence bias in art, and EB_A for endowment bias in art. Furthermore, since there are 2 nominal variables, the superscript F (e.g., DE^F_A stands for Disposition Effect in Arts for Females) stands for females, and the superscript M (e.g., DE^M_A stands for Disposition Effect in Arts for males).

In order to test whether the variances between the groups were equal or unequal, Levene's test was used for all the hypotheses in Table 2. The results were consistent in that all the produced p-values from Levene's test were greater than 0.05, resulting in the assumption that there are equal variances being accepted, signifying that the groups have equal variances for all behavioral biases in the art market. Furthermore, for the t-test, the null hypotheses for all the biases regarding art between males and females are accepted as the p-value for each hypothesis is greater than 0.05 (DE= 0.237, HB= 0.364, OB= 0.814, EB= 0.925). This means that differences, if any, between males and females in all behavioral biases in the art market are insignificant.

Table 2. Statistical Outcomes from Objective 2

Hypotheses		N	Mean	SD	Levene's test p-value	t-statistic	T-test p-value
DE^F_A - DE^M_A	DE^F_A	15	12.87	2.53	0.232	-1.21	0.237
	DE^M_A	15	11.53	3.44			
HB^F_A -HB^M_A	HB^F_A	15	8.07	2.43	0.493	-0.92	0.364
	HB^M_A	15	7.13	3.07			
OB^F_A-OB^M_A	OB^F_A	15	22.67	5.04	0.487	-0.24	0.814
	OB^M_A	15	22.13	7.11			
EB^F_A-EB^M_A	EB^F_A	15	17.67	3.81	0.738	-0.09	0.925
	EB^M_A	15	17.53	3.89			

Objective 3 includes hypotheses 9-12, in which the hypotheses predict the behavior of males compared to females regarding the four behavioral biases in the stock market. DE_s, an abbreviation used in the table, stands for disposition effect in stocks, HB_s for herding bias in stocks, OB_s for overconfidence bias in stocks, and EB_s for endowment bias in stocks. Furthermore, since there are 2 nominal variables, the superscript F (e.g., DE^F_s) stands for Females, and the superscript M (e.g., DE^M_s) stands for males.

Table 3. Statistical Outcomes from Objective 3

Hypotheses		N	Mean	SD	Levenes test p-value	t-statistic	T-test p-value
DE^F_S- DE^M_S	DE^F_S	15	29.4	3.18	.247	-0.45	.655
	DE^M_S	15	28.73	4.74			
HB^F_S -HB^M_S	HB^F_S	15	10	2.2	.271	-0.22	.828
	HB^M_S	15	9.8	2.76			
OB^F_S-OB^M_S	OB^F_S	15	20.27	4.62	.435	1.16	.254
	OB^M_S	15	22.6	6.22			
EB^F_S-EB^M_S	EB^F_A	15	14.4	2.26	.408	0.84	.408
	EB^M_A	15	15.33	3.66			

Similar to art investments, hypotheses 9, 10, 11, and 12 considered for stock investments are all consistent with the outcomes of the t-test and the test for variances, Levene's test. For Levene's test, the p-value for each hypothesis is greater than 0.05 (DE= 0.247, HB=0.271, OB= 0.435, EB= 0.408). This indicates that researchers should not reject the null hypothesis of this test, proving that the data have equal variances. This means that to evaluate the t-test, the p-values with equal variances have been considered. The findings of the t-test were that all the hypotheses had probability values greater than 0.05 (DE= 0.655, HB= 0.828, OB= 0.254, EB= 0.408). This leads to the fact that the null hypothesis should not be rejected for all behavioral biases in stocks, therefore suggesting that there are no significant differences between males and females in all behavioral biases in the stock market as well.

From the results, it is evident that no differentiation between the 2 genders in this study in the art, as well as the stock market, for all behavioral biases. These consistent results for both of the investing instruments can be attributed to the cognitive biases regarding investments. In both the art and the stock market, humans use heuristics in order to make decisions. One of them is the tendency to be loss-averse. Loss aversion can lead to the Disposition effect, as losses are felt as greater than gains, therefore, it is hard to accept losses, forcing the investors to hold the investments with losses (Baker & Nofsinger, 2010). Under endowment bias, individuals don't want to accept the loss of an owned investment (Baker & Nofsinger, 2010), and therefore, loss aversion is a cause of this bias. Similarly, herding bias can be associated with loss aversion, as in order to minimize losses, investors follow herd-like behavior to be in a crowd that is presumed to be making the right decision, negating losses. Therefore, results found that there is no difference between males and females in any of these biases, and this

can be explained using the concept of loss aversion. Normally, society usually stereotypes women as being more risk-averse, careful, and loss-averse (Schubert et al., 1981). However, this (Schubert et al., 1981) study found that using contextual evidence, women and men exhibit the same level of loss and risk aversion. This shows that women are not more 'loss averse' or 'irrational' and that these cognitive biases are universal and play in the cognition of both men and women, supporting the claim that there are no gender differences. Moreover, most of the individuals in the sample are highly educated and earning, indicating similar characteristics of both groups. Therefore, there can be a low or no difference in these behavioral tendencies because their underlying bias, loss aversion, and demographics are similar. Hence, it can be concluded that there's no notable disparity between men and women in all the biases tested. Identically in both markets, Herding bias stems from social validation and being supported by peers. This is because humans are social animals and have the tendency to form groups. Research has found that social validation is common, affecting both males and females equally (Shrauger & Jones, 1968). Therefore, it is reasonable to conclude that herding bias is also equal in both genders in both asset markets, as this tendency to yearn for social validation isn't exclusive to one market.

In order to further account for no gender differences in the art market, it is important to note that culture is fundamental to the creation of art and heavily impacts visual art creativity (Glăveanu, 2017). This influences all people regardless of sex (Schwartz & Rubel, 2005). Hence, most of the investors in art would feel a significant attachment to their choice of art due to their cultural identity. From this attachment, they would exhibit endowment bias (value this piece greater), or disposition effect (the ability to evaluate losses and gains is skewed). As this phenomenon is universal and isn't known to have any difference between genders, it can support the results that found that all biases are equal between men and women in the art market (Schwartz & Rubel, 2005). Furthermore, visual arts use colors, expressions, and a plethora of visual techniques, resulting in art being linked to cognition in multiple ways (eg, perceiving different colors and compositions as emotions) (Solso, 1994). Therefore, it is ubiquitous that art evokes intense emotions, resulting in the owner of the art feeling more heavily toward this piece and overvaluing it (Solso, 1994). This could also result in investors being less willing to sell a losing art asset or an investor being overconfident in their decision, as they feel a special attachment to the piece from these emotions. As a result, endowment bias and overconfidence bias would be considered equal amongst the 2 genders, supporting the results for no gender differences. Furthermore, an important thing to consider surrounding the results of overconfidence bias is that even though women were more likely than men to receive an arts degree, men are more likely to attend art presentations and exhibitions (Glăveanu, 2017). This means that overall, exposure to art is equal, and this means that their confidence in choices would be similar, supporting the fact that overconfidence bias is similar in both.

5. Conclusion

This study aimed to evaluate the behavioral biases present in different markets for investors, particularly arts and stocks. Within this, it was also investigated how behavioral biases differ between males and females in the stock market and art market individually. Using a survey with standardized scales to measure disposition effect, herding bias, overconfidence bias, and endowment bias in the stock as well as the art market, 30 data points were assessed. Paired t-test, independent t-test, and Levene's test, along with descriptive statistics, were used to analyze the data. Overall, results found that disposition effect and herding bias were significantly greater in stocks than art, endowment bias was significantly greater in art than stocks, and there was no significant difference in overconfidence bias between art and stocks.

The disposition effect being greater in stocks than in art can be attributed to the fact that the art market is relatively more opaque (Coslor, 2016) and is much less liquid than the stock market (Kraeussl & Logher, 2010), making transactions harder and speculation higher. Herding bias being greater in stocks than art is also a result of the barriers to entry and individuality/personality of the art market, which is much more personal. Endowment bias being greater in the art market can be a result of the personal and psychological value of art, other than just the price. In regard to gender, there was no significant difference between males and females in all biases in both arts and stocks. Herein, the research found that the similarity in all the cognitive biases studied was due to the universal similarity in the characteristics of the markets and the sample. For example, cognitive biases (loss aversion and social validation) are universally applicable to education levels approximately the same in regard to art, and information is readily accessible to all with minimal gender differences. The results from this study can be utilized by specialized art investors to be more aware of biases they may exhibit. Furthermore, this could be useful for sellers in the art market, as if they made certain changes to the nature of the art market (eg, opacity, price valuation), investors could behave more rationally. So, these results call for a more transparent art market. Additionally, these results could also be used by government bodies to find reasons to enforce regulations and legislation surrounding the pricing and setup of art exhibitions for more transparent price valuations and ease in realizing gains. In the current world, the findings of no gender differences between all biases in all assets need to be made more public, as it can empower women in order to take charge of their investment decisions.

6. Limitations

However, due to the sample, the results can only be extrapolated to Southeast Asia and mainly Singapore. This means that if the study were to be replicated in a lower-income country with greater gender inequality, results would likely be different, as it would mean education levels and means for investing differ from this sample size. A large limitation of this study is the number of participants or the sample size. There were only 30 subjects who were considered, and as a result, there may be random variation in the results and a larger margin of error and uncertainty (Cao et al., 2024).

References

Armansyah, R. F. (2022). *Herd instinct bias, emotional biases, and information processing biases in investment decisions*. Jurnal Manajemen Dan Kewirausahaan, *24*(2), 105–117. https://doi.org/10.9744/jmk.24.2.105-117

Arts industry. (2024). MOE. https://www.moe.gov.sg/sgis/sponsoring-organisations/industries/arts

Baker, H. K., & Nofsinger, J. R. (2010). *Behavioral finance*. In Wiley eBooks. https://doi.org/10.1002/9781118258415

Bobde, A. P., Bagde, P. T., & Goje, N. S. (2017). An analytical study of psychological behavior of investors investing in mutual funds with reference to endowment bias & self-control bias. *International Journal of Engineering Development and Research*, *5*(4), 644–645. https://www.ijedr.org

Bodie, Z., Kane, A., & Marcus, A. (2013). EBOOK: *Essentials of investments: Global edition.* McGraw Hill.

Cao, Y., Chen, R. C., & Katz, A. J. (2024). Why is a small sample size not enough? *The Oncologist*, *29*(9), 761–763. https://doi.org/10.1093/oncolo/oyae162

Coslor, E. (2016). Transparency in an opaque market: Evaluative frictions between "thick" valuation and "thin" price data in the art market. *Accounting, Organizations and Society*, *50*, 13–26. https://doi.org/10.1016/j.aos.2016.03.001

Coslor, E., & Spaenjers, C. (2013). Organizational and epistemic change: The growth of the art investment industry. *Academy of Management Proceedings*, *2013*(1). https://rest.neptune-prod.its.unimelb.edu.au/server/api/core/bitstreams/e299a35d-7503-5c55-a634-e503f4836231/content

Glăveanu, V. P. (2017). *The Palgrave handbook of creativity and culture research*. Springer.

Goo, Y., Chen, D., Chang, S. S., & Yeh, C. (2010). A study of the disposition effect for individual investors in the Taiwan stock market. *Emerging Markets Finance and Trade*, *46*(1), 108–119. https://doi.org/10.2753/ree1540-496x460110

Guo, Y. (2024). Unveiling the endowment effect: Understanding its significance and applications. *Advances in Economics, Management and Political Sciences*, *60*(1), 199–205. https://doi.org/10.54254/2754-1169/60/20231219

Hawkins, J. R., & Saini, V. (2016). Returns on Indian art during 2000–2013. *Investopedia*, *42*(2). http://www.jstor.org/stable/24694059

Hayes, A. (2024, October 4). T-test: *What it is with multiple formulas and when to use them*. Investopedia. https://www.investopedia.com/terms/t/t-test.asp#:~:text=Higher%20values%20of%20the%20t,between%20the%20two%20sample%20sets

Kraeussl, R., & Logher, R. (2010). Emerging art markets. *Emerging Markets Review*, *11*(4), 301–318. https://doi.org/10.1016/j.ememar.2010.07.002

Mandel, B. R. (2013). Investment in visual art: Evidence from international transactions. In *Handbook of the economics of art and culture* (pp. 233–260). https://doi.org/10.1016/b978-0-444-53776-8.00010-6

Mazur, M., Dang, M., & Vega, M. (2020). COVID-19 and the March 2020 stock market crash: Evidence from S&P1500. *Finance Research Letters*, *38*, 101690. https://doi.org/10.1016/j.frl.2020.101690

McCarthy, J. (2006). Regeneration of cultural quarters: Public art for place image or place identity? *Journal of Urban Design*, *11*(2), 243–262. https://doi.org/10.1080/13574800600644118

Nidal, N., & Albaity, M. (2024). "To buy or not to buy" the intention to purchase visual arts in the UAE. *Journal of Open Innovation: Technology, Market, and Complexity*, *10*(3), 100350. https://doi.org/10.1016/j.joitmc.2024.100350

Pan, L., & Mishra, V. (2017). Stock market development and economic growth: Empirical evidence from China. *Economic Modelling*, *68*, 661–673. https://doi.org/10.1016/j.econmod.2017.07.005

Pikulina, E., Renneboog, L., & Tobler, P. N. (2017). Overconfidence and investment: An experimental approach. *Journal of Corporate Finance*, *43*, 175–192. https://doi.org/10.1016/j.jcorpfin.2017.01.002

Pilat, D., & Sekoul, D. (2021). Disposition effect - The Decision Lab. *The Decision Lab*. https://thedecisionlab.com/biases/disposition-effect

Qasim, M., Hussain, R. Y., Mehboob, I., & Arshad, M. (2018). Impact of herding behavior and overconfidence bias on investors' decision-making in Pakistan. *Accounting*, 81–90. https://doi.org/10.5267/j.ac.2018.7.001

Raghunathan, V. (2022). *Irrationally rational: Ten Nobel Laureates script the story of behavioural economics*. Penguin Random House India Private Limited.

Rathod, P. (2018). *A study of disposition effect and its impact on individual investors in Indian stock market* [Doctoral dissertation]. http://hdl.handle.net/10603/237568

Report Linker. (2022). *Singapore art industry outlook 2022 - 2026*.

Straits Research & Bothare, V. B. (2024). Art market size, revenue, buyers and suppliers, forecast 2033. https://straitsresearch.com/report/art-market

Roese, N. J., & Vohs, K. D. (2012). Hindsight bias. Perspectives on Psychological Science, *7*(5), 411–426. https://doi.org/10.1177/1745691612454303

Scheinkman, J. A., & Xiong, W. (2003). Overconfidence and speculative bubbles. *Journal of Political Economy*, *111*(6), 1183–1220. https://doi.org/10.1086/378531

Schubert, R., Brown, M., Gysler, M., & Brachinger, H. W. (1999). Financial decision-making: Are women really more risk-averse? *American Economic Review*, *89*(2), 381–385.

Schwartz, S. H., & Rubel, T. (2005). Sex differences in value priorities: Cross-cultural and multimethod studies. *Journal of Personality and Social Psychology*, *89*(6), 1010–1028. https://doi.org/10.1037/0022-3514.89.6.1010

Shi, Y., Conroy, P., Wang, M., & Dang, C. (2017). The investment performance of art in mainland China. *Emerging Markets Finance and Trade*, *54*(6), 1358–1374. https://doi.org/10.1080/1540496x.2017.1281800

Shrauger, J., & Jones, S. C. (1968). Social validation and interpersonal evaluations. *Journal of Experimental Social Psychology*, *4*(3), 315–323. https://doi.org/10.1016/0022-1031(68)90059-0

Solso, R. L. (1994). *Cognition and the visual arts*. MIT Press.

Statista. (2025, March 10). *Largest stock exchange operators worldwide 2025, by market capitalization*. https://www.statista.com/statistics/270126/largest-stock-exchange-operators-by-market-capitalization-of-listed-companies/

Weber, M., & Camerer, C. F. (1998). The disposition effect in securities trading: An experimental analysis. *Journal of Economic Behavior & Organization*, *35*(2), 167–184. https://hdl.handle.net/10419/161406

Wikipedia contributors. (2025, February 16). *New York Stock Exchange*. Wikipedia. https://en.wikipedia.org/wiki/New_York_Stock_Exchange

Worthington, A. C., & Higgs, H. (2003). Art as an investment: Short and long-term comovements in major painting markets. *Empirical Economics*, *28*(4), 649–668. https://doi.org/10.1007/s00181-003-0152-x

Zahera, S. A., & Bansal, R. (2018). A study of prominence for disposition effect: A systematic review. *Qualitative Research in Financial Markets*, *11*(1), 2–21. https://doi.org/10.1108/qrfm-07-2018-0081