Kasetsart Journal of Social Sciences

journal homepage: http://kjss.kasetsart.org

The effect of behavioral bias on cryptocurrency trading and its consequences in Thailand: Mindfulness meditation as a moderator

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Abstract

Many individuals are motivated to invest in cryptocurrency owing to the anticipated high rate of return. A dual-system model is applied in this study to investigate how behavioral bias and mindfulness meditation impact the cognitive processes and trading performance of cryptocurrency traders. Despite more interest in the practice of mindfulness meditation among investors, to date, there is no empirical evidence to support its benefits, such as reducing behavioral bias to improve trading performance. Data were collected from 400 independent traders in Thailand using non-probabilistic sampling. The results reveal that behavioral bias increases the impulse purchase of cryptocurrency and lowers trading performance. Conversely, mindfulness meditation reduces behavioral bias, which lessens impulse purchase, thereby improving trading performance. By fostering mindfulness meditation to maintain emotional stability, investors could optimize their profits while achieving long-term financial benefits.

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Introduction

Cryptocurrency trading has now become an interesting investment alternative among investors worldwide, with the enormous price appreciation in just a few years attracting an increasing number of investors looking to maximize their returns. However, it is evident that not every trader can be successful when taking this path. Indeed, knowledge and skills in fundamental and technical analysis are not sufficient to succeed in cryptocurrency transactions. It is widely accepted that one personal characteristic that prevents many traders from achieving profitable trade is the inability to control their emotions. Particularly, uncontrolled emotions have often been identified as significant barriers, tempting traders at all levels to deviate from carefully thought-out tactics, ultimately leading to them acting on impulse (Hofmann et al., 2009). Almansour (2020) suggests that behavioral bias causes individuals to have no control over their emotions, which leads them to act impulsively.

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When investors act irrationally and fail to consider all available information in the decision-making process, they tend to make suboptimal decisions. Consequently, being able to regulate behavioral bias is critical for those seeking to maximize returns while minimizing the unnecessary risk connected with impulsive decisions.

In this research, the concept of mindfulness meditation is proposed as a personal characteristic that significantly helps an individual to enhance their focus and ability to regulate behaviors, resulting in a better performance outcome in various aspects. The benefits of mindfulness meditation on investment have frequently been portrayed in the media, but the body of literature pertaining to the advantages of mindfulness meditation on investment is limited (Charoensukmongkol & Aumeboonsuke, 2018). To the best of the authors' knowledge, no empirical study presents statistical evidence proving the relationship between behavioral bias and mindfulness meditation. Hence, this research gap needs to be filled.

The objective of this study is to examine the impact of behavioral bias on the cognitive processes of cryptocurrency investors and trading performance. The contribution of mindfulness toward reducing the consequences of behavioral bias is then investigated. Particularly, impulsive trading can lead cryptocurrency traders to make dangerous, irrational decisions, exposing them to unnecessary risk. To address this issue, mindfulness meditation is proposed to help individuals achieve better trading performance. Consequently, investors may maximize profits while establishing long-term financial stability.

The results of this research offer beneficial implications for investors by providing suggested practices that can assist them in boosting their trading performance. From a theoretical perspective, this study employs dual-process theory to explain how behavioral biases and mindfulness meditation can affect impulsivity toward the purchase of cryptocurrency.

Literature Review

Dual-System Theory

According to dual-systems theory, the mind of an individual is propelled by two distinct fundamental systems: reflexive and reflective (Lieberman, 2007; Soror et al., 2015). The concept revolves around how the two approaches fight to control an individual's behavior. Decision-making can be reflexive, meaning that information is processed quickly and effortlessly, or reflective, meaning the information is processed deliberately and analytically. When the two systems come into contact, competition ensues, affecting human behavior (Hofmann et al., 2009; Soror et al., 2015). Consumers tend to invest speculatively in cryptocurrency when urged to do so by an external signal (e.g., high volatility and high returns), triggering an overpowering urge to invest impulsively in cryptocurrency and compromising the individual's self-control (Ryu & Ko, 2019). The likelihood of an investor making a speculative investment is positively correlated to their strong impulses. The temptation of drivers eventually leads an investor to make a speculative investment without having any backup plan. In this research, behavioral bias is considered a part of reflexive thinking since it can influence the individual to think irrationally. Mindfulness meditation, on the other hand, enhances their self-control ability, reducing the likelihood of impulsive actions.

Behavior Bias Theory

According to behavioral finance academics, investors have inescapable psychological biases preventing them from making rational investment decisions, thereby reducing market efficiency. Several studies have shown that markets are generally inefficient, driven by the persistence of anomalies. Irrational behavior and inefficiency are attributed to bounded rationality, cognitive and emotional biases, fundamental heuristics, intuitive reasoning, limited information, and reliance on historical performance, past experiences, and expectations (Hidajat, 2019; Kartini & Nahda, 2021). Additionally, many researchers (Chhapra et al., 2018; Kim, 2017) have concluded that Asian investors have a greater tendency to suffer from cognitive bias than those from other cultures. This research focuses on herding bias and overconfidence bias.

Impulse Buying

Impulse buying refers to an unplanned decision by a customer to buy a product spontaneously and without reflection (Franses & Paap, 2001; Friese & Hofmann, 2009). It is characterized as encompassing purchases with high emotional activation, low cognitive control, and largely reactive behaviors (ibid.). A range of factors can trigger consumer impulses. For instance, it has been demonstrated that shifts in customer mood

or situational elements of the retail environment might affect impulsive buying (Ozer & Gultekin, 2015). Furthermore, consumers often experience regret and guilt after impulse purchases. According to Ryu and Ko (2019), impulse purchase usually leads to undesirable consequences.

Effect of Herding Bias on Impulse Buying of Cryptocurrency

Herding behavior represents the trait of an individual to imitate a person or group when making up their minds rather than coming up with a decision themselves (Ajaz & Kumar, 2018). The term originates from the concept of animals moving in the same direction together as a group to prevent them from being chased down by predators. This bias occurs because people have bounded rationalities; they have limited knowledge of some issues and, therefore, rely on the opinions of others. While investors tend to make decisions based on the collective information from a group of investors, the majority's decision needs are not the best (Vidal-Tomás et al., 2019).

In the realm of cryptocurrency trading, several findings indicate a relationship between the herding effect and cryptocurrency investment. A study conducted by Ajaz and Kumar (2018) tested whether herding was prevalent in cryptocurrency exchanges. By using the cross-sectional absolute deviation of returns method, information based on yield from six main cryptocurrencies, and data on market indexes from August 2015 to January 2018, they were able to validate the existence of herding behavior in the cryptocurrency market. Additionally, herding tends to occur among investors in emerging markets, predominantly during situations of market stress (Kartini & Nahda, 2021). According to Sahoo, Sethi, and Acharya (2019), Bitcoin trading volume, as an indicator of new information, leads to price increases, and substantial positive price movements stimulate additional trading activity. Indeed, herding can cause an increase in trading volume. Furthermore, Vidal-Tomás et al. (2019) reveal that smaller cryptocurrency is herding with Bitcoin; the movement of Bitcoin and other alternative coins looks similar. According to Ryu and Ko (2019), Bitcoin speculation in South Korea is driven by a strong impulse and weak self-control, leading to negative penalties. The same results are also expected regardless of the cryptocurrency coin. Consequently, the first hypothesis is proposed as follows:

H1: Herding bias has a significant positive relationship with impulse buying of cryptocurrency.

Effect of Overconfidence Bias on Impulse Buying of Cryptocurrency

Overconfidence is defined as a person's belief that they are superior, smarter, and more knowledgeable than others (Barber & Odean, 2001). Investment is a challenging process—comprising data collection, data processing, and making an informed choice in light of those data. However, overconfidence leads investors to misjudge the veracity of the data obtained and overrate their analytical abilities. Overconfidence also tends to occur following a period of success. Due to self-attribution bias, individuals mistakenly assume that chance plays no part in failure but a major role in achievement. Investors often act in an overconfident manner after realizing some degree of market success. Pompian and Wood (2006) posited that overconfidence stems in part from the illusion of knowledge, defined as the tendency for people to believe that the accuracy of their forecasting increases with more information. That is, more information increases an individual's knowledge about something and improves their decisions. Useful information can increase the accuracy of predictions while boosting investor confidence. Bhandari and Deaves (2006) postulated that risk-taking behavior among investors was caused by overconfidence. Investors with sound judgment always look to reduce risk while maximizing rewards, while overconfident investors misjudge the amount of inherent risk, thereby increasing their propensity to lose money. The portfolios of overconfident investors are likely to be overexposed to risks. Such investors tend to trade in penny shares and derivatives rather than strong fundamental stocks (Bregu, 2020; Chen & Sabherwal, 2019).

Overconfidence can also influence investor behavior in cryptocurrency trading (Hidajat, 2019). That is, when the value of a coin increases, most investors take some profit from the rapid rise in asset value. This price increase may be due to chance, but investors feel they have above-average knowledge and the ability to succeed in the market and gain profit from this speculative investment. Since their guesses are mostly correct, they tend to be quite optimistic about the market and thus invest more actively. Accordingly, the second hypothesis is proposed as follows:

H2: Overconfidence bias has a significant positive relationship with impulse buying of cryptocurrency.

Effect of Impulse Buying on Cryptocurrency Trading

Many researchers have proposed that behavioral bias can lead to impulse purchase (Ozer & Gultekin, 2015; Ryu & Ko, 2019). Specifically, behavioral bias creates a strong urge in individuals to become involved in actions that could be risky if performed (Hofmann et al., 2009). Impulse buying is usually associated with negative connotations and is held responsible for many past financial crises.

Impulse buying can also influence trading performance. Particularly, the behavioral bias tricks buyers into purchasing overvalued assets and selling them later for profit, believing that it is always possible to find someone willing to pay a higher price for an asset to maximize profit without any regard for its fundamental value. Eventually, when the bubble bursts, the price of the asset drops dramatically to a fair market value. If the investor cannot sell the asset as planned, this leads to financial loss. As a result, the third hypothesis is posited as follows:

H3: Impulse buying has a significant negative relationship with trading performance.

Mindfulness Meditation

Mindfulness meditation is a technique intended to encourage a heightened state of awareness and focus (Brown & Ryan, 2003). Gautama Buddha discovered it about 2500 years ago and presented it as a universal treatment for body and mind illnesses. This non-sectarian technique aims to eradicate mental impurities, resulting in better well-being. It is a way of self-transformation through self-observation. It focuses on the deep interconnection between mind and body, which can be attained by continuously paying disciplined attention to our five senses, including sight, sound, smell, taste, and touch (Bishop et al., 2004). Indeed, several studies have demonstrated that mindfulness meditation can play an essential role in assisting individuals to control their impulses, potentially improving their overall well-being. Zeidan, Johnson, Diamond, David, and Goolkasian (2010) examined whether brief meditation training affects cognition and mood in comparison to an active control group. They found that meditation effectively improved mood while reducing fatigue and anxiety, resulting in increased mindfulness. In the same vein, Brown and Ryan (2003) reported that participants attending mindfulness meditation training exhibited a significant reduction in anxiety levels.

The Role of Mindfulness Meditation in Lowering Impulse Buying

Mindfulness meditation can also impact financial decisions. Kumar (2009) investigated the link between stock market volatility and mindfulness. He discovered that the behavioral bias of investors was amplified by uncertainty at both individual stock and market levels, with more knowledgeable investors making fewer attempts to take advantage of such bias. Charoensukmongkol and Aumeboonsuke (2018) studied mindfulness practice and stock trading performance in Thailand, positing that mindfulness meditation enhanced mindfulness and subsequently improved stock trading performance.

This research postulates that mindfulness meditation can negatively influence behavioral bias and impulse buying of cryptocurrencies. Investors who practice mindfulness meditation tend to have greater trading discipline and do not let emotions cloud their judgment. Thus, they avoid behavioral bias and strictly follow their trading systems, resulting in positive investment returns. Consequently, the fourth proposed hypothesis is divided into H4a and H4b:

H4a: Mindfulness meditation weakens the effect of herding bias on the impulse purchase of cryptocurrency.

H4b: Mindfulness meditation weakens the effect of overconfidence bias on the impulse purchase of cryptocurrency.

Methodology

Participants and Data Collection Procedure

The participants of this research consisted of independent cryptocurrency investors. The data were collected using a self-administered questionnaire. The participants were selected based on non-probabilistic convenience sampling. According to the Taro Yamane equation (Malhotra, 2019), at least 400 participants are required to ensure a 95% confidence interval. The participants were recruited from various locations in Bangkok, including universities, offices, shopping malls, and social media (e.g., Facebook, Line, and email). Participants who currently invested more than 100,000 THB in cryptocurrency and had more than 30 days' trading experience were selected and invited to join the study. The participants were then asked to register and trade in cryptocurrency for 30 days on the Crypto Parrot simulation platform.

They received a phone call after 30 days and were asked to complete the questionnaire. The data collection process was carried out from October to December 2022, with 600 participants contacted by the researchers. A total of 458 surveys were obtained, with a response rate of 76 percent. The participants in the study were voluntary, and their confidentiality was assured.

After successfully collecting the data, the raw data were coded and cleaned to ensure their readiness for analysis. The common types of data errors that incurred during the data collection process were incomplete records and overly consistent values (i.e., tick one number throughout the survey). A total of 58 erroneous survey forms were discarded, and around 400 datasets were then brought for further analysis. The demographics of the participants are summarized in Table 1.

Table 1 Demographics and characteristics of the research participants

Variable	Frequency	%
Gender		
Male	267	67
Female	133	33
Age		
20–29	207	52
39–39	126	32
40–49	34	8
>49	33	8
Education		
Vocational College	49	12
Undergraduate	265	66
Postgraduate	82	21
Doctoral	4	1
Investment Experience		
0–1 year	19	5
2–4 years	282	71
4–6 years	86	22
>6 years	13	2
Meditation Practice		
Yes	163	41
No	237	59
Trading Performance		
< -10%	27	7
-1%–10%	180	45
0%	100	25
1–10%	71	18
>10%	22	5

Measures

To achieve acceptable content validity, a survey was developed based on an intensive literature review of all the constructs. Herding bias was assessed by eliciting responses to four questions developed by Przybylski et al. (2013). Five questions were developed for overconfidence, adopted from the study by Pompian and Wood (2006). The questions indirectly asked the respondents to reflect on their degree of overconfidence. Indirect questions can reduce social desirability bias for sensitive questions. Impulse buying was assessed by developing four questions from the study by Ryu and Ko (2019), who posited that impulse can cause speculative Bitcoin investment. The more profit or loss the investors incurred, the greater the amount of their investment. All items were measured using a 5-point Likert scale, with 1 meaning strongly disagree, and 5 meaning strongly agree. Trading performance was measured by asking the respondents to identify the level of gain/loss they achieved from the trading simulation using an ordinal scale ranging from 1 (more than 10% loss) to 5 (more than 10% gain). Lastly, the mindfulness meditation section contained four items developed from the study by Brown and Ryan (2003). This variable was coded on an ordinal scale, with a higher score, meaning they practiced meditation more frequently. Measurements for all constructs are shown in Table 3. The questionnaires were reviewed by experts and pretested with 50 respondents to ensure the respondents clearly understood the questions.

Data Analysis

Partial least squares regression (PLS regression) was used in this research to analyze the data since the objective was to quantify the relationship among different variables. Partial least squares structural equation modeling (PLS-SEM) is a powerful, multivariate technique for testing and evaluating multiple relationships simultaneously in terms of measurement and the structural model (Weston & Gore-Jr., 2006). This type of structural equation modeling does not require the data to be normally distributed and is applicable for use on smaller sample sizes (Hair et al., 2010). PLS-SEM was performed in WARP-PLS 8.0. A one-tailed test was conducted to compare the sample and population mean in one direction.

Results

Measurement analysis was performed prior to the PLS model estimation. Construct validity was assessed using Cronbach's alpha (CA) and composite reliability (CR). Fornell and Larcker (1981) suggested that the reliability coefficient should exceed 0.7 to be valid. The reliability coefficients in this study were all above 0.7, implying that the data collected were reliable (Table 2). Discriminant validity was assessed using the heterotrait-monotrait ratio of correlations (HTMT). Wong (2013) postulated that an HTMT with a value below 0.9 implies that the discriminant validity likely existed between the constructs, whereas an HTMT value above 0.9 indicates a lack of discriminant validity. The HTMT values of all variables in this study were below 0.9, thus meeting the specified requirement (Table 2). Convergent validity was assessed using factor loadings. Hair et al. (2010) postulated that a minimum of 0.5 should be achieved for good convergent validity. The factor loadings of all constructs in this study were above 0.5, thus meeting the minimum requirement (Table 3). All fit indices of the PLS model, including average path coefficient (APC = 0.250; p = .004), average r-squared (ARS = 0.369; p < .001), average full collinearity (AFVIF = 2.104), Sympson's paradox ratio (SPR = 0.818), r-square contribution ratio (RSCR = 0.987), and statistical suppression ratio (SSE = 0.99) were satisfactory.

Table 2 Cronbach's alpha and HTMT correlations among the variables

Construct	CR	CA	AVE	HTMT Correlation			
				HERD	OVER	IMP	MED
Herding bias (HERD)	0.91	0.898	0.907	1.00			
Overconfidence bias (OVER)	0.886	0.881	0.894	0.74	1.00		
Impulse purchase (IMP)	0.901	0.9	0.769	0.71	0.74	1.00	
Mindfulness meditation (MED)	0.867	0.857	0.874	0.73	0.50	0.73	1.00

Table 3 Component analysis results of endogenous and exogenous variables

Latent Variables	Observed Variables		Factor Loading
Herding bias (HERD)	HERD 1	I fear that others have more rewarding experiences than I do. (1) Not true → (5) true	0.898
	HERD 2	I get worried when I discover that my friends are having fun without me.	0.815
	HERD 3	Sometimes, I wonder if I spend too much time keeping up with what is going on.	0.885
	HERD 4	When I go on vacation, I continue to keep tabs on what my friends are doing.	0.875
Overconfidence bias (OVER)	OVER 1	How easy do you think it is to predict the next collapse of the cryptocurrency bubble? (1) Difficult, (2) Somewhat difficult, (3) Moderate, (4) Somewhat easy, (5) Easy	0.78
	OVER 2	Give an estimate of the distance to the moon in miles. (1) 0–100,000 miles, (2) 0–200,000 miles, (3) 0–300,000 miles, (4) 0–400,000 miles, (5) 0–500,000 miles	0.802
	OVER 3	Relative to other drivers on the road, how good a driver are you? (1) Cannot drive, (2) Below average, (3) Average, (4) Above average, (5) Well above average	0.89
Overconfidence bias (OVER)	OVER 4	Suppose you are asked to read this statement: "Cape Town is the capital of South Africa." Do you agree or disagree? How confident are you that you are correct? (1) 20%, (2) 40%, (3) 60%, (4) 80%, (5) 100%	0.857
	OVER 5	How much control do you believe you have in picking investments that will outperform the market? (1) Absolutely no control, (2) Little control, (3) Some control, (4) A fair amount of control, (5) Absolute control	0.823
Impulse purchase (IMP)	IMP 1	I often invest in cryptocurrency on impulse (1) Not true → (5) true	0.859
	IMP 2	After a gain, I increase my trading budget for cryptocurrency.	0.899
	IMP 3	After a loss, I trade more to mitigate the previous loss.	0.893
	IMP 4	I end up investing more in cryptocurrency than the original amount intended.	0.856
Mindfulness meditation (MED)	MED 1	Minutes of meditation practice (1) <10 mins, (2) 11–20 mins, (3) 21–30 mins, (4) 31–40 mins, (5)>40 mins	0.893
	MED 2	Days per week of meditation practice (1) 1 day, (2) 2 days, (3) 3 days, (4) 4 days, (5) > 4 days	0.851
	MED 3	Years of meditation practice (1) 1 year, (2) 2 years, (3) 3 years, (4) 4 years, (5) >4 years	0.801
	MED 4	Importance attached to meditation (1) Very little, (2) Little, (3) Moderate, (4) Important, (5) Very important	0.832

After the model had passed all the aforementioned measurement tests, path analysis was performed to ascertain the relationships among variables determined by the p and R-Square values. Overall, behavioral bias was found to increase the impulse purchase of cryptocurrency and lower trading performance. Conversely, the findings of this study reveal that mindfulness meditation reduces behavioral bias, thereby lessening impulse purchase and improving trading performance as a consequence. Figure 1 reports the results of PLS regression analysis.

Hypothesis 1 predicted that herding bias would increase impulse purchase. Results showed that their relationship was positive and statistically significant ($\beta = 0.411$; $p < .001$). Thus, hypothesis 1 was supported.

Hypothesis 2 predicted that overconfidence would increase impulse purchase. The results from PLS estimation showed that their relationship was positive and statistically significant ($\beta = 0.380$; $p < .001$). Thus, hypothesis 2 was supported.

Hypothesis 3 predicted that impulse purchase would escalate negative trading returns. The results of PLS estimation confirm that impulse purchase negatively influenced trading performance ($\beta = -0.563$; $p < .001$). Thus, hypothesis 3 was supported.

Hypothesis 4a predicted that mindfulness meditation would moderate the relationship between herding bias on the impulse purchase of cryptocurrency. Results confirmed that the moderating role of mindfulness in herding bias and impulse purchase was negative and significant ($\beta = -0.180$; $p = .002$). The graphical data presented in Figure 2A also illustrate the effect of moderate variables on the main variables. As the intensity of herding bias increased, the investor tended to exhibit a higher level of impulsivity. By contrast, investors with high mindfulness meditation tended to engage less in impulse buying regardless of their herding intensity.

Hypothesis 4b predicted that mindfulness meditation would moderate the relationship between overconfidence bias on impulse purchase of cryptocurrency. The moderating role of mindfulness meditation in overconfidence bias and impulse purchase was also negative and statistically significant ($\beta = -0.175$; $p = .002$). The results indicated that investors tended to have a higher level of impulsivity as the strength of their overconfidence bias increased. However, investors practicing high mindfulness meditation tended to engage less in impulse buying, regardless of their overconfidence level (Figure 2B).
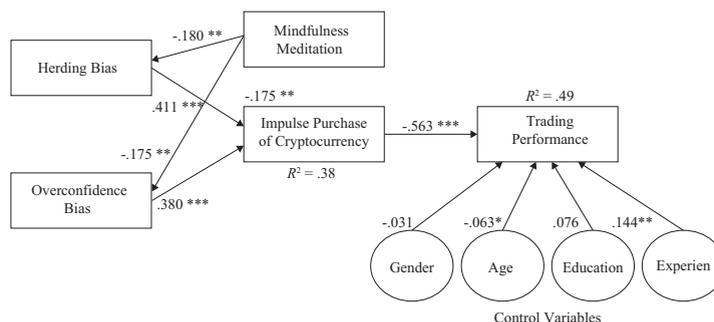
Figure 1 Results of PLS regression analysis
Note: Standardized coefficients are reported in the figure.
 *$p < .05$; **$p < .01$; ***$p < .001$.
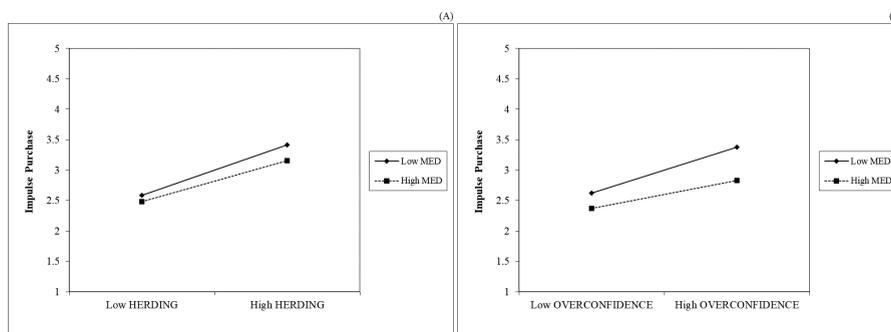
Figure 2 The regression lines between the group high and low in mindfulness meditation: (A) Data plots of herding bias, impulse purchase, and mindfulness meditation and (B) Data plots of overconfidence, impulse purchase, and mindfulness meditation

Additionally, the results revealed the existence of significant relationships between the control variables and trading performances. Firstly, age was significantly related to trading performance ($\beta = -0.063$; $p = .012$). Younger investors were more likely to invest in riskier financial products; thus, they tended to have higher average returns than older investors. Secondly, the results from PLS-SEM revealed that trading experience was significantly related to trading performance ($\beta = 0.144$; $p = .002$). Thus, investors with more trading experience tended to have better trading discipline and were thus more likely to gain higher returns than those with less trading experience. The results also indicated that negative consequences were not statistically related to gender ($\beta = -0.031$; $p = .265$) or education ($\beta = -0.076$; $p = .062$).

Discussion and Conclusions

Firstly, this research established relationships between behavioral bias, impulse purchase, and negative consequences. Herding behavior caused impulse purchase, leading to reduced efficiency in trading performance. The tendency of investors to take the risk of investing in cryptocurrency was driven by the influence of many others performing the same action. Most investors did not understand the cryptocurrency specifications due to the complexity of blockchain technology but still wished to capitalize on this wealth-creation opportunity. Therefore, they followed other investors as a herd without having a trading plan of their own and often faced severe consequences. These results concurred with Demirer and Kutan (2006) and Bouri et al. (2018), who suggested that herding behavior affected price volatility and, ultimately, investment returns. Herding behavior insinuated the feeling of greed among investors to accumulate more gains despite the potential risks, often leading to poor investment decisions.

Overconfidence bias caused the impulse purchase of cryptocurrency, leading to adverse trading consequences. The tendency of investors to take the risk of investing in cryptocurrency was driven by an overestimation of their abilities. They believed they could outsmart the market and, therefore, only sought higher returns without optimally limiting their financial exposure. They tended not to diversify their portfolio and instead traded in more risky assets, such as alternative coins and derivatives, to maximize their gains. This, in turn, decreased their propensity to gain profits. Generally, the findings of this study strengthened the evidence of Grinblatt and

Keloharju (2009), who reported that overconfident investors were more likely to engage in higher-risk activities, including trading high-risk financial vehicles. As the price of high-risk assets fluctuated unexpectedly, overconfident investors tended to trade more frequently (Bregu, 2020; Chen & Sabherwal, 2019). Liu and Du (2016) and Metawa et al. (2018) found that investors with overconfidence bias tended to trade more frequently, receiving significantly smaller returns than those who traded less often.

Secondly, this research investigated the role of mindfulness meditation on the relationship between behavioral bias, impulse purchase, and negative consequences. Investors who regularly engaged in mindfulness meditation were less susceptible to herding behavior. Before making the trading choice, they took time to consider its true impact rather than merely jumping on the bandwagon. Thus, they tended to purchase less cryptocurrency, lowering their likelihood of suffering unfavorable effects. Interestingly, this finding was consistent with many earlier studies. According to Bishop et al. (2004), the average investor's brain was associated with greed and the expectation and anticipation of rewards. However, greed was less active in the minds of those who regularly meditated. With less greed, investors were more likely to respond rather than react to it. Maymin and Langer (2021) also found that respondents who had received awareness training were less likely to exhibit behavioral bias. Mindful investors were better at correctly identifying positive and negative stimuli than participants with low mindfulness. This occurred because mindful investors tended to have a low financial discrepancy gap (Brown et al., 2009), with more flexible expectations while accepting that what they had was enough. Consequently, they tended to have less herding propensity.

Investors who practiced mindfulness meditation tended to have lower overconfidence bias. This suggested that traders who engaged in mindfulness meditation were often humbler about their abilities. No matter how confident they were, these investors believed that they could still be wrong. With this mindset, they strived to consider the worst-case scenarios and took appropriate steps to minimize the risk of losses. Thus, they had less tendency to overtrade cryptocurrency, reducing the likelihood of experiencing unfavorable effects. This outcome concurred with earlier research. Ungureanu (2020) discovered that traders with higher mindfulness had less overconfidence bias than those with lower mindfulness. Mindfulness reduced all aspects of overconfidence bias, including the better-than-average

impact and the miscalibration effect, while Dayton (2014) posited that Vipassana meditation improved observation skills and the ability to decipher patterns and trends. Instead of looking at only one trading timeframe, mindful investors deciphered the patterns of different time frames before making trading decisions. Charoensukmongkol and Aumeboonsuke (2018) posited that meditation helped to increase trading discipline while reducing overreaction and vulnerability to financial crises. In terms of trading results, they found that mindfulness allowed investors to invest less frequently and realize more of their stock profits, resulting in improved trading success.

Despite these findings, this research had some limitations. Firstly, measures of behavioral bias, impulse purchase, and mindfulness meditation were self-reported by the respondents. As a result, the respondents may have over-reported or under-reported the information due to social desirability bias (Malhotra, 2019). A self-reported questionnaire can result in the measurements being susceptible to potential bias and item miscomprehension. Future studies should objectively assess these constructs to provide stronger empirical results. Secondly, the analysis in this study was cross-sectional. Franses and Paap (2001) argued that cross-sectional data tended to make causality between phenomena difficult to imply. Thus, future studies should also collect longitudinal data to provide additional evidence to confirm the findings.

The findings of this research contribute to the existing knowledge on the role of mindfulness meditation in reducing behavioral biases, decreasing the tendency of investors to impulsively purchase cryptocurrency, leading them toward an undesirable trading performance. Traders who practice mindfulness meditation tend to show reduced impulsive buying behavior and subsequently earn higher investment returns. Therefore, investors should regularly exercise mindfulness to optimize their profits while achieving long-term financial stability. Although formal practices, such as mindfulness-based cognitive therapy (MBCT) and mindfulness-based stress reduction, are more effective than informal practices, an informal practice can be a good starting point for the beginner. Lastly, meditation is not an instant miracle; it requires discipline and becomes second nature after effective and persistent practice.

Conflict of Interest

The authors declare that there is no conflict of interest.

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