



The Role of Mindfulness Meditation on Stock Trading Performance

Peerayuth Charoensukmongkol * and Vesarach Aumeboonsuke

International College, National Institute of Development Administration, Thailand

Received 27 February 2018; Received in revised form 18 May 2018

Accepted 21 May 2018; Available online 25 June 2018

Abstract

Despite more interest in mindfulness meditation practice among stock investors, to date there is no empirical evidence to support the benefits of this meditation practice. This research aims to provide groundbreaking evidence. Data were collected from 145 individual stock traders and 81 professional stock traders in Thailand (total N=226). Results from partial least squares structural equation modeling indicates that respondents who practiced mindfulness meditation more intensively reported better trading performance than individuals who did not and those who meditated less intensively. In particular, meditation practice is found to be associated with higher trading discipline, which in turn associated negatively with the frequency of panic selling and overreaction to news; together, these factors strongly relate to trading performance.

Keywords

Mindfulness, Meditation, Stock trading, Emotion, Impulse

Introduction

Given the increasing interconnectedness of financial markets worldwide along with the higher risks and uncertainty associated with it, stock traders nowadays have to face tremendous challenges that might impact their success in trading (Kumar, 2009). In particular, volatility in stock price movement can be an issue that causes stock traders to experience stress (Mayall, 2010). In order to become successful in stock trading, just simply possessing good knowledge and skills in stock market analysis may not be sufficient, but the most important thing is that individuals need to have a strong trading discipline, adhere to it, and not let their own emotions influence their trading decisions (Chu et al., 2014). Unfortunately, even for experienced traders, uncontrolled emotions have been frequently regarded as a major obstacle that causes stock traders at all level to deviate from well-planned strategies, and finally causes them to commit unsuccessful trades (Mayall, 2010).

In the recent years, the media has reported that meditation has become a popular practice that many professional stock traders on Wall Street have begun to pay more attention to. Generally, a number of studies have found that mindfulness meditation can help enhance focus, discipline, and emotion control (Charoensukmongkol, 2014b; Tang et al., 2007), all of which are critical factors that determine success and failure in stock trading. However, although the benefits of mindfulness meditation have been frequently portrayed in the media, to the best knowledge of the authors, there is no empirical study that provides statistical evidence about its benefits on the performance of stock traders. Therefore, this research is considered a pioneer work that intends to unveil the evidence. In particular, the aim of this research is to link mindfulness meditation practice to the area of behavioral finance. Barberis and Thaler (2003) defined behavioral finance as the study of how irrational behavior may influence market prices, driving them from their fundamental values. Irrational behavior in stock trading emerges as investors deviate from rational thinking which causes traders to expose themselves to unnecessary risks. Given the benefits of mindfulness meditation in helping individuals to promote mental clarity and to maintain emotional stability (Charoensukmongkol, 2014a; Kabat-Zinn et al., 1992; Miller et al., 1995), this research aims to investigate whether this type of meditation practice can help individuals avoid irrational behaviors in trading. Specifically, the authors propose that mindfulness meditation practice will directly help traders enhance trading discipline, which in turn, lowers some impulsive behaviors in trading, and subsequently helps them improve trading performance. The two impulsive behaviors that are the focus of this research are panic selling and overreaction to news; both of which are common mistakes that lure many stock traders to commit unsuccessful trades. Results from this research will provide additional insight about interventions that can help stock traders effectively manage trading behaviors which might be essential for them to achieve successful trades.

Background and hypotheses

Mindfulness Meditation

The practice of mindfulness meditation originated from *vipassana* meditation in Buddhism, which emerged over two thousand years ago. Chavan (2007, p. 248) defined mindfulness meditation as the development of insight into the understanding of mind and body. This method of meditation practice emphasizes two things: (1) moment-to-moment awareness, and (2) non-judgmental reception (Goenka, 2006). As its name implies, mindfulness meditation is a practice that aims to enhance mindfulness (Kabat-Zinn, 2003, p.), which is a receptive attention to and awareness of external and internal present-moment states, events and experiences. According to Brown and Ryan (2003, p. 824) it is “inherently a state of consciousness.”

In mindfulness meditation practice, individuals are self-trained to focus their attention closely on physical and mental aspects of themselves (Kabat-Zinn et al., 1992). Physical aspects include a wide array of body movements (e.g. the rise and fall of the stomach). Mental aspects include thoughts, feelings, or other sensations. Mindfulness meditation practice can be performed in a sitting posture or when walking. In mindfulness meditation training, individuals have to cultivate a moment-to-moment awareness of any stimuli that they experience during the practice (Kabat-Zinn, 1990). Whether it is favorable (e.g., joy, calm) or unfavorable (e.g., pain, uncomfortable), they have to perceive it as it is, non-judgmentally. The goal of this training is to help individuals understand and experience any sensation for what it actually is, not the way they want it to be (Brown & Ryan, 2003). Individuals keep observing that specific sensation until it eventually disappears on its own. What individuals learn from mindfulness meditation training is the impermanent nature of things (Wallace, 2006). If any sensation (especially an unfavorable one) arises and they just observe it without clinging on or attaching to it, that sensation will eventually cease by itself. This phenomenon is based on Buddhist wisdom that attachment leads to suffering (Goenka, 2006). In practice, the understanding of this wisdom through prolonged meditation practice helps individuals to easily let go of negative thoughts and feelings that come to them in their daily life. When experienced meditation practitioners experience negative moods for example, they just observe them nonjudgmentally, so they do not get carried away or become overwhelmed by such moods.

Evidence on the benefits of mindfulness meditation has been documented in many areas of research. In particular, one widely documented unique benefit of mindfulness meditation is that it lowers stress and enhances psychological wellbeing (Jazaieri et al., 2014; Kabat-Zinn et al., 1992; Speca et al., 2000). Clinical studies have shown that mindfulness meditation training was used to help patients cope with chronic and psychical pain (Kabat-Zinn et al., 1985). Recently, scholars also found that employees who regularly practice

mindfulness meditation tended to have the ability to deal effectively with stress at work, which in turn led to more job satisfaction (Charoensukmongkol, 2014a, 2014b).

Mindfulness meditation as a practice to enhance trading discipline

This research proposes that mindfulness meditation practice can benefit stock trading performance in several ways. In particular, meditation can help promote trading discipline. Generally, investors who have high discipline not only have well-planned trading rules and strategies before each trade, but they also follow the rules and strategies precisely. Highly disciplined investors normally set their investment objectives prior to the investment and trades. In order to set investment objectives, apart from the desired returns, disciplined investors tend to know about the appropriate level of risk that they should take, and invest in their portfolio based at the appropriate risk level.

Importantly, one additional characteristic of highly disciplined investors is that they don't let emotions influence their trading decisions. The rationality of financial markets believes that the sources of irrational behavior observed in the financial markets, especially the stock markets, come from psychological emotions such as fear, greed, trust, confidence, and hope (Mayall, 2010). Emotions may have influence on trading activities and performance. For example, greed, which can be defined as the desire for profit, when present in the stock market, may lead investors to pay less attention to investment risk. Fear may lead investors to be excessively afraid of the downward movements in stock price and cause them to panic sell. With discipline, investors will strictly follow strategies that were planned and will not allow emotions to cloud their judgments (Maglio et al., 2014). For example, if the trader lets emotion overcome his/her trading plan and he/she is afraid to face the realized loss, then he/she is going to sell the good fundamental stock sooner, although the downward movement of the stock is simply due to short-term volatility. This circumstance shows how lack of discipline leads the trader to take more risk and to the possibility of more loss than he/she is willing to take in the first place.

In research, the benefit of discipline in helping investors improve trading performance is also documented. For example, Locke and Mann (2005) studied the trading behavior of professional futures traders by using high-frequency transactions data and found that trading discipline is positively related to subsequent success in trading performance. Locke and Mann (2005) argued that trading discipline is particularly essential for successful trading because it helps minimize irrational behaviors that can be dysfunctional for investors. One particular irrational behavior that the authors focus on in this research is the chance to commit panic selling. Panic selling is the propensity of traders to sell stocks in reaction to pure emotion and fear rather than evaluating fundamentals. For the investors who are holding the stock, the fall in a stock price serves as a reflection that some group of investors have been selling out the stock or a panic sell is happening on that stock. If they are afraid of

this price decrease and therefore decide to liquidate their position in the stock simply because other people do so, but not because of any rational supporting facts, then they are panic selling. On the contrary, if investors are rational, then they would be patient and continue to hold the stock with strong fundamentals without the fearing the ongoing short-term panic sell. Thus, having trading discipline can prevent traders from panic selling because it reminds investors to adhere to the trading strategies and not let emotions tamper with trading decisions. In particular, this aspect of trading discipline is supported by Feng and Seasholes (2005) who found that sophistication and trading experience, both of which are characteristics of high discipline traders, can reduce the magnitude of this effect.

The authors propose that another critical way that trading discipline can benefit stock traders is to help reduce the chance of overreaction to news. In particular, Daniel et al. (1998) developed a model to examine how investors assimilate new information. The model argues that informed investors are overconfident about the information they privately own, and as a result, overreact to this type of information. For example, assume that an investor originally has a positive outlook on the market and already invested at the appropriate price. Then when he/she comes across any economic news that supports his/her beliefs, he/she might take a larger position on the investment, even though the price has gone up beyond the fair level. Then as he/she invests in the overpriced securities, he/she would have lower trading performance. This activity shows how overconfidence may lure an investor to overreact and also implies that an investor who has lower discipline is more prone to let overconfidence take over his/her investment plan.

The authors propose that mindfulness meditation practice can help stock traders enhance trading discipline and other benefits associated with it. In fact, the practice of mindfulness meditation per se is to self-train individuals to develop self-discipline by closely and nonjudgmentally observing their thoughts and emotions (Shapiro et al., 2006). For example, Brown and Ryan (2003) found that mindfulness practice helped individuals enhance self-awareness and self-regulate behavior. Importantly, scholars including Lakey et al. (2008) and Leroy et al. (2013) proposed that mindful individuals tend to develop authenticity, which is defined as "the unobstructed operation of one's true, or core, self in one's daily enterprise." Authenticity can be a key characteristic of highly discipline traders because it allows individuals to be aware of their self and regulate themselves accordingly (Leroy et al., 2013). In particular, a receptive internal awareness of one's thoughts, emotions and behaviors that is developed through meditation practice can play an important role in reminding traders of what they are supposed to do in stock trading, that is, they have to follow trading rules and strategies without being compromised by impulse and emotions (Brown & Ryan, 2003). According to Baer and Lykins (2011), this benefit of mindfulness meditation is also consistent with self-determination theory (Deci & Ryan, 2002). In this

sense, internal awareness and authentic behavior derive from the meditation practice and can serve as intrinsic motivation that makes a trader adhere to trading discipline. Moreover, because individuals are trained to be highly aware of immediate internal and external stimuli in a non-judgmental and unbiased manner, they can avoid being affected by irrationality and other types of behavioral bias in trading.

The ability to maintain emotions is another major benefit that traders who regularly practice meditation can use to enhance their trading discipline and reduce overreactions in trading. Because uncontrolled emotions, both negative and positive ones, are major obstacles that sway traders from following trading plans and strategies, being able to deal with their own emotions is crucial. Moreover, the likelihood of traders to commit panic selling and overreact to news is also strongly driven by uncontrolled emotions. In particular, a number of studies have shown that meditation practice can help people deal effectively with emotional instability and a wide array of impulsive behaviors. Studies by Kabat-Zinn et al. (1992) and Miller et al. (1995) reported that participants who attended mindfulness meditation training showed significant reduction in anxiety levels. Clinical research by Speca et al. (2000) found that mindfulness meditation training helped people reduce mood disturbance and stress symptoms. Tang et al. (2007) found that even participants who attended short-term meditation training reported lower anxiety, depression, anger, and fatigue. In particular, Charoensukmongkol (2014a) found that people who regularly practiced mindfulness meditation not only possessed higher emotional intelligence, but also developed the belief that they could successfully complete any task.

Given all the supporting arguments regarding the benefits of mindfulness meditation practice in stock trading, the following hypotheses are presented:

Hypothesis 1: There is a positive relationship between intensity of mindfulness meditation and trading discipline.

Hypothesis 2: There is a negative relationship between intensity of mindfulness meditation and panic selling.

Hypothesis 3: There is a negative relationship between intensity of mindfulness meditation and overreaction to news.

Hypothesis 4: There is a positive relationship between intensity of mindfulness meditation and trading performance.

Lastly, given the influence of trading discipline on panic selling, overreaction to news, and trading performance, the following hypotheses are presented.

Hypothesis 5: There is a positive relationship between trading discipline and trading performance.

Hypothesis 6: There is a negative relationship between panic selling and trading performance.

Hypothesis 7: There is a negative relationship between trading discipline and panic selling.

Hypothesis 8: There is a negative relationship between overreaction to news and trading performance.

Hypothesis 9: There is a negative relationship between trading discipline and overreaction to news.

Methods

Samples and data collection

Participants in this research were independent investors and professional investors whose work was related to investment such as brokers, traders, and analysts. The data were collected through a self-administered survey. For the samples who were independent traders, data were collected using convenient sampling from individual investors who attended the Stock Exchange of Thailand–Thailand Future Exchange (SET–TFEX) Online Investor fair. Questionnaires were distributed at the fair by two research assistants. After the fair ended, a total of 145 useable surveys were obtained. For professional investors, questionnaires were distributed to brokers, traders, and analysts at two leading financial institutions in Thailand. A total of 81 usable surveys were received from this sample group. In total, 226 questionnaires were obtained. Descriptive statistics of demographic information of the sample are reported in Table 1.

Measures

Trading performance was measured by asking respondents to identify the level of gain/loss that they made. Both long-term and short-term performance was measured. Long term performance covered a one year period, while short-term performance covered a three month and six month period. They were measured using an ordinal scale ranging from 1 (more than 30 percent loss), 2 (26-30 percent loss), 3 (21-25 percent loss) ... 8 (breakeven) ... 13 (21-25 percent gain), 14 (26-30 percent gain), 15 (more than 30 percent gain). The majority of the respondents reported that they profited no more than 5 percent, which is consistent with the average annual return of the Thai Stock Exchange during the time of data collection, which was 5.4 percent. These three measures were then used as indicators to construct a single reflective latent variable.

Table 1 Demographic and Trading Characteristics of Samples

Gender	Male: 124 (54.87%) Female: 102 (45.13%)
Finance-related educational background	Yes: 87 (38.50%) No: 139 (61.50%)
Educational level	Below bachelor's degree: 27 (11.95%) Bachelor's degree: 149 (65.93%) Master's degree: 50 (22.12%)
Trading experience (in year)	Less than 1 year: 53 (23.45%) 1 year: 47 (20.80%) 2 years: 39 (17.26%) 3 years: 32 (14.16%) 4 years: 6 (2.65%) 5 years: 8 (3.54%) 6 years: 6 (2.65%) 7 years: 5 (2.21%) 8 years: 5 (2.21%) 9 years: 2 (0.88%) 10 years: 9 (3.98%) More than 10 years: 14 (6.19%)
Professional trader	Yes: 81 (35.84%) No: 145 (64.16%)
Information expertise	Mean= 3.173; S.D.=.697
Investment horizon	Short term: 68 (30.22%) Middle term: 118 (52.44%) Long term: 39 (17.33%)
Meditation practice	No: 159 (70.35%) Yes: 67 (29.65%)
Trading performance	Mean= 9.41; S.D.= 3.1
Trading discipline	Mean= 3.23; S.D.= .92
Panic selling	Mean= 3.14; S.D.= .96
Overreaction to news	Mean= 3.02; S.D.= .84

Mindfulness meditation was operationalized based on the instrument previously used by scholar (Brown & Ryan, 2003; Charoensukmongkol, 2014a, 2014b). It was measured by four indicators: (1) minutes per day of meditation practice, (2) days per week of meditation practice, (3) years of meditation practice, and (4) the degree to which respondents think that meditation is important for them. All study participants were measured using ordinal scales. Minutes of meditation practice ranged from 1 (less than 10 minutes), 2 (11-20 minutes), 3 (21-30 minutes), 4 (31-40 minutes), 5 (41-50 minutes), 6 (51-60 minutes), and 7 (more than 60 minutes). Days per week of meditation practice ranged from 1 to 7. Years of meditation practice ranged from 1 (less than 1 year), 2 (1 year), 3 (2 years) ... 11 (10 years), and 12 (more than 10 years). The degree to which meditation is important was measured using a 5-point Likert scale ranging from 1 (very little) to 5 (very much). For individuals who did not meditate, all indicators were set to zero. These four measures were then used as indicators to construct a single reflective latent variable.

Trading discipline was measured using three questions. Respondents were asked to indicate the degree to which they (1) have well-planned rules strategies before each trade, (2) follow trading rules and strategies precisely, and (3) do not let emotions influence trading decisions. The item was measured using a 5-point Likert scale ranging from 1 (never) to 5 (always). These three measures were then used as indicators to construct a single reflective latent variable.

Panic selling was measured by asking respondents to think of a time when the price of the high-quality stock they were holding dropped significantly; and this price drop had nothing to do with the fundamental issues of the firm. Then, they were asked the frequency with which they decided to hold the stock until its price recovered, instead of selling the stock quickly. The item was measured using a 5-point Likert scale ranging from 1 (never) to 5 (always).

The measure of *overreaction to news* was adapted from the scale developed by Menkhoff et al. (2006). Respondents were asked to evaluate the degree to which they normally overreacted to good and bad economic news, thereby leading to wrong trading decisions. The item was measured using a 5-point Likert scale ranging from 1 (never) to 5 (always).

In addition to the role of mindfulness meditation on the dependent variables (including trading discipline, panic selling, overreaction to news, and trading performance) other factors that might affect study participants were included as control variables. First, the study takes into account the role of information expertise, trading experience, educational background related to finance, and whether a respondent is a professional trader. Information expertise was adapted from a scale developed by Chu et al. (2014). It was measured using four questions: (1) level of interest in keeping up with financial reports, (2) the extent to which

a respondent searches for information related to a stock investment, (3) the extent to which a respondent is involved in attending lectures on stock investment, and (4) level of understanding of financial articles in newspapers. Respondents were measured using a 5-point Likert scale ranging from 1 (very low) to 5 (very high). These four measures were then used as indicators to construct a single reflective latent variable. Trading experience was measured by the number of years that a respondent had traded stock. Professional trader was coded as a dummy variable (1=yes; 0=no). Educational background related to finance was coded as a dummy variables (1=yes; 0=no). This research also controlled for the extent to which a respondent relied on fundamental analysis and technical analysis in their trading decisions. These two variables were measured using a 5-point Likert scale ranging from 1 (never) to 5 (always). Lastly, investment timeframe was considered as another control variable. This variable was coded as ordinal scale (1=short-term; 2=middle-term; 3=long-term), whereby a higher score means a longer investment timeframe.

Data analysis

This research uses Partial Least Squares - Structural Equation Modeling (PLS-SEM) to analyze the data. PLS-SEM is a statistical method that is similar to principal components regression (Fornell and Bookstein, 1982). However, instead of estimating hyperplanes of maximum variance between the response and independent variables, PLS-SEM estimates a linear regression model by projecting the predicted variables and the observable variables to a new space (Chin & Newsted, 1999). PLS-SEM allows multiple hypotheses to be tested simultaneously while also enabling the use of reflective scales. It also permits the simultaneous assessment of both measurement and structural models. PLS-SEM is appropriate for the data used in this research because it does not require a large sample size as compared to other SEM techniques (Chin, 1998). Furthermore, it does not require the data to be normally distributed (Kline, 2005). PLS is suitable for this study because the results from the Jarque-Bera test of normality indicated that all main constructs in the hypotheses are not normally distributed. PLS-SEM analysis is performed using WarpPLS version 5.0.

Results

Validity and reliability of the multi-item measures were estimated before performing PLS-SEM estimation for hypotheses testing. First, convergence validity test was conducted to prove whether the degree to which the measures that theoretically should be related, were in fact related (Hair et al., 2009). Convergence validity was assessed using factor loadings. Hair et al. (2009) suggested that factor loadings should be greater than .5. The results indicate that all factor loadings are above the minimum requirement. Next, a discriminant validity test was conducted to prove whether the concepts that were not supposed to be

related were actually unrelated (Fornell & Larcker, 1981). Discriminant validity was assessed by comparing the average variance extracted (AVE) to the squared correlation coefficient. Fornell and Larcker (1981) suggested that the square root of the AVE must be greater than the correlations between the constructs in order for discriminant validity to exist. The results, as shown in Table 2, satisfy this requirement. Second, construct reliability was assessed using Cronbach's alphas coefficient and composite reliability coefficient. The minimum requirement for these two indicators is .7. Results showed that the reliability indicators of all latent variables exceed the minimum requirement according to Nunnally (1978).

Next, the test of multicollinearity, which is a phenomenon in which two or more predictor variables in a model are highly correlated, was conducted. The test was performed using the full variance inflation factor (VIF) statistics. In particular, a full VIF test is more robust than a traditional VIF test because it allows lateral and horizontal collinearity to be evaluated simultaneously. Petter et al. (2007) recommended that a full VIF should be lower than 3.3. The analysis indicates that the maximum full VIF is 2.239, which is lower than the maximum threshold.

Results from the PLS-SEM analysis are shown in Figure 1. Standardized path coefficients and p-values are reported. The findings are presented as the following:

Hypothesis 1 predicted that mindfulness meditation will increase trading discipline. The result shows that their relationship is positive and statistically significant ($\beta=.116$; $p=.038$). Thus, hypothesis 1 is supported.

Hypothesis 2 predicted that mindfulness meditation will reduce panic selling. The result shows that their relationship is negative; however, it is not statistically significant ($\beta=-.059$; $p=.184$). Thus, hypothesis 2 is not supported.

Hypothesis 3 predicted that mindfulness meditation will reduce overreaction to news. The result shows that their relationship is negative and statistically significant ($\beta=-.128$; $p=.025$). Thus, hypothesis 3 is strongly supported.

Hypothesis 4 predicted that mindfulness meditation will increase trading performance. The result shows that their relationship is positive and statistically significant ($\beta=.116$; $p=.038$). Thus, hypothesis 4 is supported.

Hypothesis 5 predicted a positive association between trading discipline and trading performance. The result shows that their relationship is positive and highly significant ($\beta=.25$; $p<.001$). Thus, hypothesis 5 is strongly supported.

Hypothesis 6 predicted that panic selling will lower trading performance. The result shows that their relationship is negative and statistically significant ($\beta=-.16$; $p=.007$). Thus, hypothesis 6 is strongly supported.

Hypothesis 7 predicted that trading discipline will lower panic selling. The result shows that their relationship is negative and statistically significant ($\beta=-.108$; $p=.049$). Thus, hypothesis 7 is supported.

Hypothesis 8 predicted that overreaction to news will lower trading performance. The result shows that their relationship is negative and statistically significant ($\beta=-.132$; $p=.022$). Thus, hypothesis 8 is supported.

Hypothesis 9 predicted that trading discipline will lower overreaction to news. The result shows that their relationship is negative and statistically significant ($\beta=-.162$; $p=.006$). Thus, hypothesis 9 is strongly supported.

Finally, the significant relationships between control variables and key dependent variables are found as follows. Trading performance positively associates with trading experience ($\beta=.195$; $p=.001$), use of fundamental analysis ($\beta=.111$; $p=.044$); but it negatively associates with information expertise ($\beta=-.124$; $p=.029$) and a longer investment timeframe ($\beta=-.115$; $p=.04$). Trading discipline positively associates with information expertise ($\beta=.525$; $p<.001$) and use of fundamental analysis ($\beta=.168$; $p=.005$). Overreaction to news positively associates with use of fundamental analysis ($\beta=-.115$; $p=.039$), trading experience ($\beta=.131$; $p=.022$), longer investment timeframe ($\beta=.119$; $p=.034$); it negatively associates with information expertise ($\beta=.185$; $p=.002$). Panic selling negatively associates with use of fundamental analysis ($\beta=.16$; $p=.007$).

Table 2 Correlations among Variables, Internal Consistency, and Convergent Validity

	Cronbach's alpha coefficient	Composite Reliability coefficient	TP	MED	DCP	ON	PS	IE	XP	PRO	FN	TF	FDM	TCH
TP	.847	.908	(.876)	.168*	.367**	-.251**	-.221**	.251**	.287**	.167*	.164*	-.05	.267**	.268**
MED	.923	.946		(.903)	.217**	-.2*	-.055	.172*	.037	.123	.022	-.019	-.075	.077
DCP	.861	.915			(.885)	-.313**	-.153*	.666**	.213**	.194**	.171*	.111	.468**	.383**
ON	-	-				(1)	.071	-.31**	-.193**	-.093	-.114	-.143*	-.085	-.129
PS	-	-					(1)	-.104	-.099	-.025	.044	-.088	-.194**	-.048
IE	.825	.884						(.811)	.242**	.244**	.325**	.041	.485**	.389**
XP	-	-							(1)	.413**	.152*	.091	.223**	.263**
PRO	-	-								(1)	.395**	-.108	.124	.306**
FN	-	-									(1)	-.15*	.117	.27**
TF	-	-										(1)	.054	-.128
FDM	-	-											(1)	.46**
TCH	-	-												(1)

Notes: $p \leq .05$; ** $p \leq .01$;

Average variance extracted of latent variables are shown in the parentheses;

TP=trading performance, MED=mindfulness meditation, DCP=trading discipline, ON=overreaction to news, PS=panic selling,

IE=information expertise, XP=trading experience, PRO=professional trader, FN=educational background related to finance, TF=trading timeframe,

FDM=use of fundamental analysis in trading, TCH=use of technical analysis in trading.

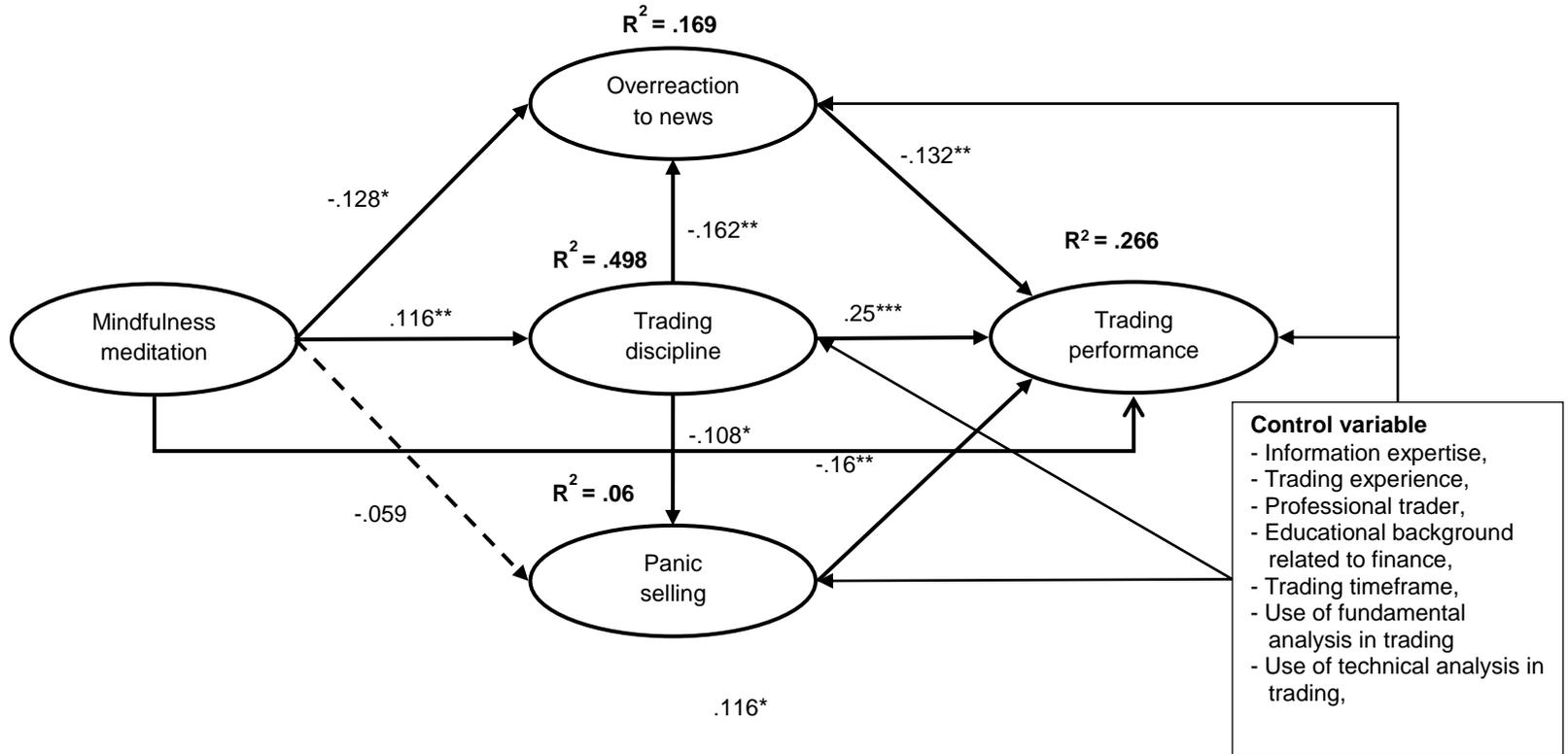


Figure 1 PLS Results

Notes: 1. * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$;
 2. Standardized coefficients are reported;
 3. Solid lines represent statistically significant paths;

Discussion and conclusion

General discussion

In this research paper, the authors developed a framework to test the relationship between mindfulness meditation practice and trading performance of individual traders and professional traders in Thailand. In addition to the direct role of mindfulness meditation, the study also explored the roles of trading discipline, panic selling and overreaction to news that might explain why the intensity of mindfulness meditation practice correlates with trading performance. The overall results support the hypotheses about the positive roles of mindfulness meditation. In particular, the analysis confirms that the intensity of mindfulness meditation practice, as measured through several indicators, directly and indirectly correlates with high trading performance of the sample traders. First, traders who reported that they practiced mindfulness meditation more intensively tend to demonstrate higher trading discipline. Trading discipline, in turn, was found to associate positively and strongly with trading performance. In addition, high trading discipline was found to relate significantly to a lower chance of traders engaging in panic selling and overreaction to news; these two aspects of behaviors were found to associate negatively and strongly to trading performance. Moreover, a key mechanism by which trading discipline positively correlated with trading performance was explained by the degree of overreaction to news that tended to be lower for high disciplined traders. In this regard, it can be summarized that traders who reported that they extensively practiced mindfulness meditation also adhered strongly to their trade discipline and demonstrated a lower tendency to overreact to news, in sequence. The linkages between mindfulness meditation, trading discipline, and overreaction to news, eventually explained why the traders who intensively practice mindfulness meditation tended to demonstrate higher trading performance.

Overall, the empirical evidence revealed in the statistically analysis supports the prior argument that mindfulness meditation practice correlates with the ability of individuals to enhance focus, to promote mental clarity, and to effectively regulate and stabilize emotions (Kabat-Zinn et al., 1992; Speca et al., 2000). All of these factors are important for investors to maintain strong discipline in trading (Feng & Seasholes, 2005). Broadly, the findings from the present study are consistent with prior research which also found benefits of mindfulness meditation in various aspects of performance outcomes (Jazaieri et al., 2014; Kabat-Zinn et al., 1992; Speca et al., 2000). In particular, the positive association between mindfulness meditation and trading discipline gave extra support to prior research which reported the benefits of mindfulness meditation in helping individuals effectively regulate their own behaviors (Kabat-Zinn et al., 1985; Tang et al., 2007). Moreover, the results regarding the negative relationship between mindfulness meditation and overreaction to news and panic selling during stock trading are consistent with prior research which showed that practicing

mindfulness meditation can improve the cognitive process and promote rational decision making (Charoensukmongkol, 2014a; Zeidan et al., 2010). Specifically, these findings are consistent with the study of Hafenbrack et al. (2013) which showed that practicing mindfulness meditation helped lower the chance of individuals to commit sunk cost bias. They are in line with the study of Ortner et al. (2007) which found that mindfulness meditation practice tended to lower emotional interference on a cognitive task.

Limitations

There are some limitations that have to be taken into consideration. First, the authors used convenient sampling to collect the data. One major concern about using convenient sampling is that the sample obtained may not be a valid representation of the population of interest (Babbie, 1990). Moreover, the authors selected samples of professional traders from only two leading financial institutions. Overall, these issues can limit the generalizability of the findings to a population of stock traders. Thus, future research should include more samples in the analysis. Second, using self-report measures particular for stock trading performance can be susceptible to subjective bias from the respondents. Future research will need to test the model using actual stock trading performance from the brokerage records of the respondents, if the data are accessible. Third, results obtained from this research are based on cross-sectional data. Using cross-sectional data makes causality between variables difficult to infer. Moreover, results from hypothesis testing are inferred based on associations between variables. Therefore, the authors recommend that future research should address this issue by using longitudinal data collection or performing an experiment to confirm the causality between mindfulness meditation and trading performance. In addition, mindfulness meditation practice was assessed as the quantity of meditation, but not the mindfulness quality of the respondents. Moreover, the conceptual model does not include the role of emotion regulation that might explain why mindfulness meditation can improve stock trading performance. Thus, there is a need for experimental research to investigate whether mindfulness meditation practice can improve mindfulness quality, emotion regulation, and trading performance. Lastly, other factors that might affect trading behaviors are not incorporated in this research. For example, the model did not control for trading frequency which can be a sign of trading behaviors such as panic selling or an overreaction to news.

Future research directions

Because research on the benefits of mindfulness meditation, especially in the area related to behavioral finance, is still scant, there are suggestions for future studies to extend the findings from the present research. First, researchers may investigate the contribution that mindfulness meditation can have on other aspects of irrational behaviors in trading.

Moreover, one issue that is left unanswered in the present research is the role of mindfulness that stock traders obtain from mindfulness meditation. Whether mindfulness can strengthen or lessen some specific behaviors in stock trading that influence trading performance is an issue that future studies may need to investigate. Finally, this research only focuses on stock traders in Thailand. It is still unclear whether the benefits of mindfulness meditation are valid across national cultural domains. For example, it is evident that trading behaviors of investors can be influenced by national cultures. Therefore, future research may try to replicate the present study in other countries to determine whether the results regarding the benefits of mindfulness meditation are valid for stock traders in other cultures or not.

Research contributions and practical implications

Despite the research limitations discussed above, this study offers a significant contribution to literature regarding the roles of mindfulness meditation in stock trading. Although prior studies on the benefits of mindfulness meditation are documented in several fields of research (Charoensukmongkol, 2014a, 2014b; Miller et al., 1995; Speca et al., 2000; Tang et al., 2007), no study links mindfulness meditation to stock trading. Importantly, this research provides groundbreaking evidence that mindfulness mediation can strongly explain the performance of stock traders in Thailand. The statistical evidence from this research provides scientific support to the benefits that stock traders and investors will gain from meditation. In particular, the authors recommend that mindfulness meditation is a practice that can significantly help stock traders improve trading performance. Essentially, it was confirmed that the practice strengthens the ability of individuals to effectively plan and follow trading strategies without being swayed by emotions. When discipline is in place, individuals can avoid impulsive behaviors in trading. This benefit of mindfulness meditation is particularly crucial because it is evident that a common mistake that unsuccessful traders normally experience is allowing uncontrolled emotions to lead to overreaction.

Therefore, the authors suggest that mindfulness meditation should be taught to stock investors and traders in order to lower irrational behaviors that could unnecessarily lure them to commit unsuccessful trades. However, it is important to understand that the full benefits that individuals can obtain from mindfulness meditation may take time to achieve. Hindman et al. (2014) recommend that formal meditation and informal practice may be more effective than training with brief mindfulness exercises and informal practice. Thus, although mindfulness meditation is a simple practice, it is important to keep in mind that successful practitioners are those who have trained themselves properly and regularly.

References

- Babbie, E. R. (1990). *Survey Research Methods*. Belmont, CA: Wadsworth.
- Baer, R. A., & Lykins, E. L. M. (2011). Mindfulness and positive psychological functioning. In K. M. Sheldon, T. B. Kashdan, & M. F. Steger (Eds.), *Designing Positive Psychology: Taking Stock and Moving Forward* (pp. 335-348). New York, NY: Oxford University Press.
- Barberis, N., & Thaler, R. (2003). A survey of behavioral finance. In M. H. G.M. Constantinides & R. M. Stulz (Eds.), *Handbook of the Economics of Finance* (Vol. 1, Part B, pp. 1053-1128): Elsevier.
- Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology*, 84(4), 822–848.
- Charoensukmongkol, P. (2014a). Benefits of Mindfulness Meditation on Emotional Intelligence, General Self-Efficacy, and Perceived Stress: Evidence from Thailand. *Journal of Spirituality in Mental Health*, 16(3), 171–192.
- Charoensukmongkol, P. (2014b). The contributions of mindfulness meditation on burnout, coping strategy, and job satisfaction: Evidence from Thailand. *Journal of Management & Organization*. doi:10.1017/jmo.2014.8
- Chavan, D. V. (2007). Vipassana: the Buddha's tool to probe mind and body. In R. Banerjee & B. K. Chakrabarti (Eds.), *Progress in Brain Research* (Vol. 168, pp. 247-253): Elsevier.
- Chin, W. W. (1998). Issues and opinion on structural equation modeling. *MIS Quarterly*, 22(1), vii-xvi.
- Chin, W. W., & Newsted, P. R. (1999). Structural equation modeling analysis with small samples using partial least squares. In R. Hoyle (Ed.), *Statistical strategies for small sample research* (pp. 307–341). Sage: Thousand Oaks, CA.
- Chu, W., Im, M., & Lee, E.-J. (2014). Investor Expertise as Mastery over Mind: Regulating Loss Affect for Superior Investment Performance. *Psychology and Marketing*, 31(5), 321–334.
- Daniel, K., Hirshleifer, D., & Subrahmanyam, A. (1998). Investor psychology and security market under-and overreactions. *Journal of Finance*, 53(6), 1839-1885.
- Deci, E., & Ryan, R. (2002). *Handbook of self-determination research*. Rochester, NY: University of Rochester Press.
- Feng, L., & Seasholes, M. S. (2005). Do investor sophistication and trading experience eliminate behavioral biases in financial markets? *Review of Finance*, 9(3), 305-351.
- Fornell, C., & Larcker, D. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39-50.

- Goenka, S. N. (2006). *Peace within oneself for peace in the world*. Dhammagiri, Igatpuri: Vipassana Research Institute.
- Hafenbrack, A. C., Kinias, Z., & Barsade, S. G. (2013). Debiasing the Mind Through Meditation: Mindfulness and the Sunk-Cost Bias. *Psychological Science*. doi:10.1177/0956797613503853
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2009). *Multivariate data analysis* (7th ed.). Upper Saddle River, NJ: Prentice Hall.
- Hindman, R., Glass, C., Arnkoff, D., & Maron, D. (2014). A Comparison of Formal and Informal Mindfulness Programs for Stress Reduction in University Students. *Mindfulness*, 1-12. doi:10.1007/s12671-014-0331-1
- Jazaieri, H., McGonigal, K., Jinpa, T., Doty, J., Gross, J., & Goldin, P. (2014). A randomized controlled trial of compassion cultivation training: Effects on mindfulness, affect, and emotion regulation. *Motivation and Emotion*, 38(1), 23-35. doi:10.1007/s11031-013-9368-z
- Kabat-Zinn, J. (1990). *Full catastrophe living: Using the wisdom of your body and mind to face stress, pain, and illness*. New York, NY: Delacorte Press.
- Kabat-Zinn, J. (2003). Mindfulness-based interventions in context: Past, present, and future. *Clinical Psychology: Science and Practice*, 10 (2), 144–156.
- Kabat-Zinn, J., Lipworth, L., & Burney, R. (1985). The clinical use of mindfulness meditation for the self-regulation of chronic pain. *Journal of Behavioral Medicine*, 8(2), 163-190.
- Kabat-Zinn, J., Massion, A. O., Kristeller, J., Peterson, L. G., Fletcher, K. E., Pbert, L., & Lenderking, W. R. (1992). Effectiveness of a meditation-based stress reduction program in the treatment of anxiety disorders. *The American Journal of Psychiatry*, 149(7), 936-943.
- Kline, R. B. (2005). *Principle and Practice of Structural Equation Modeling* (2nd Ed.). New York, NY: The Guilford Press.
- Kumar, A. (2009). Hard-to-value stocks, behavioral biases, and informed trading. *Journal of Financial and Quantitative Analysis*, 44(6), 1375-1401.
- Lahey, C. E., Kernis, M. H., Heppner, W. L., & Lance, C. E. (2008). Individual differences in authenticity and mindfulness as predictors of verbal defensiveness. *Journal of Research in Personality*, 42(1), 230-238. doi:http://dx.doi.org/10.1016/j.jrp.2007.05.002
- Leroy, H., Anseel, F., Dimitrova, N. G., & Sels, L. (2013). Mindfulness, authentic functioning, and work engagement: A growth modeling approach. *Journal of Vocational Behavior*, 82(3), 238-247. doi:http://dx.doi.org/10.1016/j.jvb.2013.01.012
- Locke, P. R., & Mann, S. C. (2005). Professional trader discipline and trade disposition. *Journal of Financial Economics*, 76(2), 401-444.

- Maglio, S., Gollwitzer, P., & Oettingen, G. (2014). Emotion and control in the planning of goals. *Motivation and Emotion*, 38(5), 620-634. doi:10.1007/s11031-014-9407-4
- Mayall, M. (2010). A feeling for finance: Motivations for trading on the stock exchange. *Emotion, Space and Society*, 3(2), 103-110.
- Menkhoff, L., Schmidt, U., & Brozynski, T. (2006). The impact of experience on risk taking, overconfidence, and herding of fund managers: Complementary survey evidence. *European Economic Review*, 50(7), 1753-1766. doi:http://dx.doi.org/10.1016/j.euroecorev.2005.08.001
- Miller, J. J., Fletcher, K., & Kabat-Zinn, J. (1995). Three-year follow-up and clinical implications of a mindfulness meditation-based stress reduction intervention in the treatment of anxiety disorders. *General Hospital Psychiatry*, 17(3), 192-200. doi:http://dx.doi.org/10.1016/0163-8343(95)00025-M
- Nunnally, J. C. (1978). *Psychometric Theory* (2nd ed.). New York, NY: McGraw-Hill.
- Ortner, C. N. M., Kilner, S. J., & Zelazo, P. D. (2007). Mindfulness meditation and reduced emotional interference on a cognitive task. *Motivation and Emotion*, 31(4), 271-283. doi:10.1007/s11031-007-9076-7
- Petter, S., Straub, D., & Rai, A. (2007). Specifying Formative Constructs in Information Systems Research. *MIS Quarterly*, 31(4), 623-656.
- Shapiro, S. L., Carlson, L. E., Astin, J. A., & Freedman, B. (2006). Mechanisms of mindfulness. *Journal of Clinical Psychology*, 62(3), 1-14.
- Specia, M., Carlson, L. E., Goodey, E., & Angen, M. (2000). A Randomized, Wait-List Controlled Clinical Trial: The Effect of a Mindfulness Meditation-Based Stress Reduction Program on Mood and Symptoms of Stress in Cancer Outpatients. *Psychosomatic Medicine*, 62(5), 613-622.
- Tang, Y.-Y., Ma, Y., Wang, J., Fan, Y., Feng, S., Lu, Q., . . . Posner, M. I. (2007). Short-term meditation training improves attention and self-regulation. *Proceedings of the National Academy of Sciences of the United States of America*, 104(43), 17152-17156. doi:10.1073/pnas.0707678104
- Wallace, B. A. (2006). *The attention revolution: Unlocking the power of the focused mind*. Boston, MA: Wisdom Publications.
- Zeidan, F., Johnson, S. K., Diamond, B. J., David, Z., & Goolkasian, P. (2010). Mindfulness meditation improves cognition: Evidence of brief mental training. *Consciousness and Cognition*, 19(2), 597-605. doi:https://doi.org/10.1016/j.concog.2010.03.014