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# The Effects of Mindfulness on Overconfidence*

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**Abstract**
*This study aims to investigate the relationship between mindfulness and overconfidence defined as a decision making error. Data were gathered from department of business administration students. Mindfulness was divided into acceptance and attention dimensions and their effects on overplacement and overestimation as the dimensions of overconfidence were explored. Results indicate that acceptance has significant relations with overplacement which means participants who accept the events and situations predict more accurately about their performance and others' than participants who don't accept. This study contributes to literature as few studies exist about the association between mindfulness and decision making process. Based on a belief that organizations benefit from better decisions, acceptance based training programs were suggested for employees who work for strategic decision making positions.*
***Keywords:*** *Mindfulness, overconfidence, decision making, overplacement, overestimation.*

## Bilinçli Farkındalığın Kendine Aşırı Güvenme Üzerine Etkisi

**Özet**
*Bu çalışma bilinçli farkındalık ve bir karar verme hatası olarak tanımlanan kendine aşırı güvenme arasındaki ilişkiyi ortaya koymak amacıyla yapılmıştır. İşletme bölümü öğrencilerinden oluşan örneklemden elde edilen verilere uygulanan faktör analizinde bilinçli farkındalık, kabullenme ve dikkat boyutlarına ayrılmış ve kendine aşırı güvenmenin boyutları olan kendini üstün değerlendirme ve abartılı öngörü üzerindeki katkıları analiz edilmiştir. Araştırma bulguları kabullenmenin kendini üstün değerlendirme üzerinde olumsuz bir katkısının olduğunu yani olayları ve durumları kabul eden katılımcıların kendilerinin ve başkalarının performanslarına ilişkin daha doğru tahminde bulunduklarını göstermektedir. Çalışmanın kuramsal açıdan önemi bilinçli farkındalığın karar verme üzerindeki etkisini inceleyen az sayıda çalışmadan biri olmasıdır. Doğru karar vermenin kurumlara kazanç getireceği düşüncesinden hareketle, insan kaynakları tarafından özellikle stratejik öneme sahip karar vericilere kendi duygu ve düşüncelerini fark etmelerini sağlayacak kabullenme odaklı eğitimler verilmesi önerilmektedir.*
***Anahtar kelimeler:*** *Bilinçli farkındalık, kendine aşırı güvenme, karar verme, abartılı öngörü, kendini üstün değerlendirme.*

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## 1. INTRODUCTION

In the beginning of the 20th century, treating psychological disorders is so popular in psychology discipline, that it was ignored to develop healthy individual's life. According to Froh[1], William James was the first person who was aware about this ignorance. James asked that why some people can use their all resources but the others not. Starting from 1950's, Humanist perspective becomes a response to James's question with its effort to find the ways to reveal human potential, positive sides and demands. Following the similar tradition, positive psychology advances this effort with increasing numbers of research related to well-being. For the last two decades, lots of new concepts emerged in the literature related to well-being, and mindfulness which refers to being aware of each moment, is one of them.

Although the history of mindfulness concept is as old as Buddhism, the first researcher who made the concept popular in psychology literature is Kabat Zinn. Based on mindfulness, he developed a technique to treat stress related problems. According to his definition, mindfulness refers to "a particular way of paying attention. It is a way of looking deeply into oneself in the spirit of self-inquiry and self-understanding".[2] He defines life as a process which includes rise and falls, but in a temporary order. In other words, the events and situations that we consider as permanent are in fact temporary. That's why moment-to-moment awareness or mindfulness becomes important to own each moment of our experiences either good or bad.

Mindfulness is an important concept for organizational behavior for two reasons. First of all, mindfulness is related to well-being at work. Lots of studies examined its beneficial effects on stress.[3] Secondly, mindfulness has positive effects on decision making process.[4]

Lots of studies examined the effects of mindfulness on well-being. However, fewer studies were found about the relationship between mindfulness and decision making process. People are prone to do errors when making a decision and its costs may threaten individual's success and the future of any organization. To develop the quality of decisions, organizations need to prevent errors in a decision-making process. Overconfidence is one of the most common errors in decision making. Overconfidence[5] is defined as the disposition for one to see him/her better than the others.

Overconfidence is a popular topic in finance. For instance, the costs of overconfident decision making in financial markets[6] and the negative effects of overconfi-

1 Froh Jeffrey J., 'The history of positive psychology: truth be told', The Psychologist, 16(3), 2004, p. 18-20.

2 Kabat Zinn Jon, 'Full Catastrophe Living', (New York, Bantam Dell, 2005), p.11,12.

3 Asuero Andres Martin et al., 'Effectiveness of a mindfulness education program in primary healthcare professionals: A pragmatic controlled trial', Journal of Continuing Education in the Health Professions, 34(1), 2014, p. 4–12.

4 Karelaia Natalie and Reb Jochen, 'Improving decision making through mindfulness', Mindfulness in Organizations, 2014, Reb J. & Atkins, P. (Eds). Cambridge University Press.

5 Emich Kyle J. 'But consider the alternative: The influence of positive affect on overconfidence', Cognitive and Emotion, 28:8, 2014, p. 1382-1397

6 Odean Terrance, 'Volume, volatility, price, and profit when all traders are above average', The Journal of Finance, 53, 1998, p. 1887–1934.

dence in bargaining behaviors[7] were examined. Overconfidence is also an important issue for organizational behavior. It may threaten an individual and the whole organization as it makes individuals to have misleading conception about them. For instance, if employees don't see their weaknesses then they don't have any interest to training programs. Also they may not give any importance to performance feedbacks as they see themselves excellent workers. Teamwork may become harder with these kinds of employees as ego involvement is probable. In a similar way, organizations may not see their weaknesses, and they may take more risks than they should have. This research fulfills the gap with its examination on the relationship between a psychological concept "mindfulness" and overconfidence.

## 2. LITERATURE REVIEW

### 2.1. The Concept of Mindfulness

As stated in the beginning, the concept of mindfulness is one of the major topics in Buddhism. According to Buddhism, every cause has an effect and this is known as "Law of Cause and Effect". The relationship between cause and effect is described with 12 linkages: ignorance, karmic formation, consciousness, name and form, six sense organs, contact, feelings, craving, grasping, becoming, rebirth, decay-suffering and death. The process starts with ignorance and followed by karmic formation. When we become ignorant, then karmic formation starts and we would become responsible for our own karma[8]. Being ignorant may cause misconception in which one believes that he/she is a separate subject who lives in an objective world that is not dependent from all other beings. Karmic process prevents people from being free and mindfulness is suggested to be the only way to prevent karmic process.[9]

Basically, two approaches were suggested for mindfulness: the clinical psychology approach and self-determination theory approach[10]. Kabat Zinn[11] brought the concept of mindfulness into the clinical psychology literature and used mindfulness based stress reduction program (MBSR) to treat stress related problems. Brown and Ryan[12] define mindfulness based on self-determination theory: "open or receptive awareness and attention which may be reflected in a more regular of sustained consciousness on ongoing events and experiences". This approach defines mindfulness as a naturally occurring phenomenon. Awareness is required for selecting the choice of behaviors

7 Neale Margaret A. and Bazerman Max H., 'The effects of framing and negotiator overconfidence on bargaining behaviors and outcomes', Academy of Management Journal, 28 (1), 1985, p. 34-49.

8 Vallabh Priyanka and Singhal Manish, 'Buddhism and decision-making at individual, group and organizational levels', Journal of Management Development, 33, 2014, p. 8-9.

9 Werner Karel, 'The law of karma and mindfulness', 2009, e-book, available at http://www.bps.lk/olib/bl/bl061.pdf (accessed April 29, 2015).

10 Jankowski Tomasz and Holas Pawel, 'Metacognitive model of mindfulness', Consciousness and Cognition, 28, 2014, p. 64-80.

11 Kabat-Zinn Jon, 'Wherever you go, there you are: Mindfulness meditation in everyday life', (New York: Hyperion, 1994).

12 Brown Kirk Warren, Ryan Richard M., "The benefits of being present:mindfulness and its role in psychological well-being", Journal of Personality and Social Psychology, 84(4), 2003, 822-848.

which fit best with one's needs, values and interest. Mindfulness was suggested to develop well-being by fulfillment of the needs for autonomy, competence and relatedness. Although both of the approaches make similar definitions, clinical psychology approach assumes that mindfulness is not a neutral state and it should be practiced to learn. Meditation is used for being mindful. On the other hand, self-determination theory approach claims that mindfulness may occur without intention; curiosity or intrinsic motivation may make people to have mindfulness[13].

The concept of mindfulness was explained with three axioms[14] based on Kabat-Zinn[15] definition "paying attention in a particular way: on purpose, in the present moment, and non-judgmentally". The first axiom is intention. Intention explains the reason why mindfulness practice (e.g. mindfulness meditation) is done. For example, people may have health problems related to stress so they may need to relax with mindfulness. Attention refers to observing the current experiences with full concentration. It requires the avoidance of rumination. Attitude refers to having kindness, curiosity and openness about the experience itself. These three axioms should happen at the same time. Then re-perceiving occurs which means a significant change about the point of view.

Another study defined mindfulness with two components: self-regulation of attention and orientation of experience[16]. The first component, self-regulation of attention refers to sustained attention, switching attention and inhibiting the elaborative processing. Mindfulness requires having awareness about what is going on now and focus on breathing to feel the moment which must result with sustained attention. Switching attention refers to the individual has the ability to change his/her focus from one event to the other. Inhibiting the elaborative processing refers to focusing on momently experience of events without making rumination. The second component, orientation to experience, means that rather than prevention of feeling or thinking in one way, it permits to experience each thought, feeling and sensation that are created by consciousness. With these two components, mindfulness is described as an attention regulation process for having non elaborative awareness to ongoing experiences and connecting to one's experiences with curiosity, openness and acceptance (p. 234).

The relationship between mindfulness and lots of variables were investigated such as personality traits, well-being, cognition and decision making. In terms of well-being, it was found that there is a negative relationship between neuroticism and mindfulness such that individuals who scored higher in neuroticism have lower

13 Jankowski Tomasz and Holas Pawel, 'Metacognitive model of mindfulness', Consciousness and Cognition, 28, 2014, p. 64-80.

14 Shapiro Shauna L., Carlson, Linda E., Astin, John A. and Freedman Benedict, 'Mechanisms of mindfulness', Journal of Clinical Psychology, 62 (3), 2006, p. 373-386.

15 Kabat Zinn, Jon, 'Wherever you go, there you are: Mindfulness meditation in everyday life', (New York: Hyperion, 1994), p.4.

16 Bishop, Scott R. et al., 'Mindfulness: A proposed operational definition'. Clinical Psychology: Science and Practice, 11 (3), 2004,p. 230-241.

attention to the current moment of their lives[17]. Mindfulness was also negatively related with trait anger when the effect of neuroticism was controlled. Additionally, neuroticism predicted depressive symptoms among individuals who are low in dispositional mindfulness; but not on individuals who have high mindfulness levels.

The impact of brief mindfulness meditation on cognition was examined[18]. 24 students were put in the experimental group and 25 of them were assigned to the control group. Four sessions of mindfulness meditation were given to the first group by an experienced facilitator. In these sessions, the aim was to focus on to breathing and if any thought or feeling arise, the participants were told to just be aware of them and let them go, give attention to breathing again. The control group watched *The Hobbit* audio book. After the manipulation, mood, depression, anxiety, mindfulness, immediate memory and working memory were measured. Results indicated that participants who were given mindfulness meditation had lower anxiety and depression level and higher mindfulness level than control group but no difference was found in terms of mood levels. Experimental group showed significantly higher scores in visio-spatial processing, working memory and executive functioning but no differences were found in memory recall. This study showed that brief mindfulness meditation training is effective on cognition. The authors conclude that mindfulness meditation increase attention and teach controlling thoughts which were the important requirements for succeeding the cognitive tasks.

Mindfulness is also influential on decision making process. It is explained with Law of Dependent Origination (LDO) in terms of individual level of decision making. According to LDO everything in the universe is related with the other so self-interest and egoism would result with bad lessons. LDO can be understood in relation to cause and effect in individual level; when people become ignorant they start the karmic process which prevents liberation. This means when people are involved with ego centered judgments then they ignore the others and they ignore the reality that everything is connected to each other. Because of their ignorance they suffer and this is one of the rules of karma. Being mindful increases awareness and attention and prevents karmic process. Also as mindfulness prevents stress, it may influence decision making in a positive way[19].

Although mindfulness is originally based on a religion, lots of studies examined it as a purified concept from religion, excluding the Karmic process. In the next section, decision making process and specifically overconfidence will be examined in a more rational way and the relationship between mindfulness and overconfidence will be set.

17 Feltman Roger, Robinson Michael D. and Ode Scott, 'Mindfulness as a moderator of neuroticism-outcome relations: A self-regulation perspective', Journal of Research in Personality, 43, 2009, p. 953-961.

18 Zeidan Fadel, Johnson Susan K., Diamond Bruce J., David Zhanna and Goolkasian Paula, 'Mindfulness meditation improved cognition: Evidence of brief mental training', Consciousness and Cognition, 19, 2010, p.597-605.

19 Vallabh Priyanka and Singhal Manish, 'Buddhism and decision-making at individual, group and organizational levels', Journal of Management Development, 33, 2014, p. 8-9.

### 2.2. Decision Making Process and Overconfidence

Four decision making approaches were suggested[20]. Each of them stands in the different places in a decision pyramid. From bottom of the pyramid to the top, more effort is required. At the bottom of the pyramid, intuition exists. People rely on their intuitive judgments when they don't want to spend much time to think. Intuitive judgment is appropriate in emergency times or for artistic judgments yet it is unreliable. However, experts may make valid decisions by using their intuition. In the second floor of the pyramid, there are rules and shortcuts. Rules are similar in one way with intuition as they drive the decision process fast but different in other way as they can be implemented consciously. Rules may be more beneficial as being objective makes them to defend. In the third floor of the pyramid, there is importance weighting. When individuals give some consideration more importance and use these considerations for their future decisions, importance weighting is said to be used. In the top of the pyramid, value analysis exists and it is the most advanced decision making approach. Although making a decision with values gives the highest quality decisions, it is not applicable for all the time as it requires maximum amount of energy. The authors conclude that people should decide according to the importance and complexity of the decision. Finally, as using intuition becomes an automated process with expertise and training, the lowest floor of the pyramid –intuition- may result with valid decisions. Therefore, selecting one approach as best fit for everyone may not sound accurate.

Kahneman[21] used the concepts of System 1 and System 2 to explain the process how the mind works. System 1 and System 2 were originally defined by Stanovich and West[22], and Kahneman used the same terminology. System 1 works automatically and quickly, without voluntary control and less or no effort. For example, people can detect hostility or friendship from a voice or drive with less attention in an empty road and these are the signs that System 1 is occupied. On the other hand, System 2 gives attention to the complex mental activities that are required like solving a complicated mathematical problem. For example, if we want to buy a car we should compare the gas consumption, tax and performance of cars to select the best one and it requires spending some time to decide which means System 2 is working. System 1 maintains the impressions which result with beliefs, choices and actions. Also it is the consequence of intuitive judgments and many of the systematic errors in our intuition such as heuristics, bias and overconfidence. As stated in the preceding part, it is assumed that experts may have valid intuitions about some of their decisions[23]. Kahneman[24] claims that expert's intuition differs from the others'

20 Schoemaker, Paul J. H. and Russo, J. Edward, 'A pyramid of decision approaches', California Management Review, 1993, p. 9-31

21 Kahneman Daniel, 'Thinking Fast and Slow', (London, Penguin Books, 2011), p.20-21

22 Stanovich Keith E. and West Richard F. 'Individual difference in reasoning: implications for the rationality debate?', Behavioral and Brain Sciences, 23, 2000, p.645–726.

23 Schoemaker, Paul J. H. and Russo, J. Edward, 'A pyramid of decision approaches', California Management Review, 1993, p. 9-31

24 Kahneman Daniel, 'Thinking Fast and Slow', (London, Penguin Books, 2011), p.20-21.

and he agrees with Simon's[25] argument about it. According to Simon, the situation has maintained with a cue; experts can see the cue so they can access to the relevant information existing in the memory. So intuition is not a magical concept rather it is one way of recognition.

One of the most common errors in decision making process is overconfidence[26]. System 1, the terminology that Kahneman used, was lazy and it jumps to conclusions with little evidence. When people estimate the quantity, they trust the information that comes to their mind and create a consistent story in which the estimate sounds good and overconfident judgments occur. Overconfidence is a common issue for both individuals and organizations. It was found that CFOs who were most confident and optimistic about S&P Index were also overconfident and optimistic for the risks that they took on their company. It is no surprise that optimism in business or governments may result with economic failures.

Overconfidence is described as "on nearly any dimension that is both subjective and socially desirable, most will see themselves as better than average"[27]. For instance, most of the drivers see themselves better drivers than the others. But if they all are good drivers, how can these accidents happen? Similarly, most of the people think that they have better sense of humor than the others (in reality not). It is obvious that some people make wrong judgments about their abilities and performance.

Overconfidence is operationally defined with overestimation, overplacement and overprecision[28]. Overestimation occurs when people estimate better performance (e.g. higher scores in an exam) than they actually did. Overplacement is the tendency to see oneself better compared to others. Overprecision refers to the disposition that one is excessively certain about his/her belief is true. These three types of overconfidence are claimed to be conceptually and empirically distinct.

Although some studies used a comprehensive model which involved three types of overconfidence[29], some studies examined overconfidence with one or two concepts. For example, in a research about the relationship between positive affect and overconfidence[30], it was measured with overplacement and overestimation. In their experimental manipulation focalism is used as a mediator for positive affect study. Focalism refers to giving attention to only one side of a problem with ignoring others[31]. Results indicated that positive affect leads people to spend more time to think

25 Simon Herbert, "What is an explanation of behavior?" In Myers, D. G. Intuition: Its Powers and Perils (New Haven: Yale University Press, 2002), 1992, p. 56.

26 Kahneman Daniel, 'Thinking Fast and Slow', (London, Penguin Books, 2011), p.20-21

27 Myers David G. 'Social Psychology', 6th edition, (New York: McGraw-Hill, 1999), p.57.

28 Moore Don A. and Healy, Paul J. 'The trouble with overconfidence', Psychological Review, 115 (2), 2008, p. 502-517.

29 Moore Don A. and Healy, Paul J. 'The trouble with overconfidence', Psychological Review, 115 (2), 2008, p. 502-517.

30 Emich Kyle J. 'But consider the alternative: The influence of positive affect on overconfidence', Cognitive and Emotion, 28:8, 2014, p. 1382-1397.

31 Krizan, X. and Suls, J.' Losing sight of oneself in the above-average effect: When egocentrism, focalism, and group diffuseness collide', Journal of Experimental Social Psychology, 44, 2008, p. 929-942.

other sides of a problem which results with less overplacement. In contrast, negative affect was found to be related with more overplacement. The authors concluded that self-enhancement motivation may be the underlying cause of the results. People in positive mood may feel safe when they confront with their weaknesses. Negative mood may motivate people to enhance their abilities.

As being mindful requires attention and awareness to the moment, it may result with less intuitive errors and better judgments. Also mindful individuals may have expert intuitions which may end up with automated and valid decisions. The relationship between mindfulness and overconfidence in decision making process will be explored in the next section.

### 2.3. The Relationship Between Mindfulness and Overconfidence

Although some studies exist about the relationship between mindfulness and decision making[32]-[33], only two studies exist in the literature about the relationship between overconfidence and mindfulness. One study examined overconfidence in individual level[34]. In their experimental study among gamblers, it was found that mindfulness was negatively associated with gambling problems after controlling gender and self-control. Also, mindful gamblers were more accurate, less overconfident and make safer choices. Another study proposed a relationship between these two variables as well[35]. The effects of mindfulness on decision making were analyzed with four stages which were suggested before[36]. The first stage is framing the decision and it refers to noticing that a decision should be made, generating options, prioritizing decisions and recognizing the ethical challenges. Mindfulness benefits this stage in terms of goal awareness, goal clarity and prevention of past decision regret. The next stage is information gathering and processing. Mindfulness may decrease overconfidence and may develop the quality of information considered. In coming to conclusion stage, mindfulness maintains individuals the ability to use both intuition and analysis to reach a decision. Also individuals who are mindful were found to be better to appreciate uncertainty. The last stage in decision making process is coming to conclusion. Mindful individuals were found to have less ego concerns therefore they are better to learn from feedback and learn the right lessons.

32 Ruedy Nicole E. and Schweitzer Maurice E., 'In the moment: The effect of mindfulness on ethical decision making', Journal of Business Ethics, 95, 2011, p. 73-87

33 Wittman Marc, Peter Joachim, Gutina Oksana, Otten Simone, Kohls Niko and Meissner Karin, 'Individual differences in self attributed mindfulness levels are related to the experience of time and cognitive self control', Personality and Individual Differences, 64, 2014, p. 41-45.

34 Lakey, Chad E., Campbell, W. Keith, Brown Kirk Warren and Goodie Adam S. 'Dispositional mindfulness as a predictor of the severity of gambling outcomes', Personality and Individual Differences, 43, 2007, p. 1698-1710.

35 Karelaia Natalie and Reb Jochen, 'Improving decision making through mindfulness', Mindfulness in Organizations, 2014, Reb J. & Atkins, P. (Eds). Cambridge University Press.

36 Schoemaker, Paul J. H. and Russo, J. Edward, 'A pyramid of decision approaches', California Management Review, 1993, p. 9-31.

Overconfidence was defined as the result of the inability to discriminate weak from strong performance[37]. This weakness is seen among poor performers and it was argued that the lack of insight is the reason for it. Mindful individuals may not be successful in a selected task but as they are expected to evaluate their performance better they may have better judgments. As stated in the above mindful individuals have less ego concerns[38] and mindfulness may help people to give attention to the information existing in every moment so it makes people to reach data easier[39]. Also, as suggested, mindfulness may generate appropriate interpretations depending on the context and simplify decision behavior for that context. So as mindful individuals have less ego concerns, and have more attention they may be less biased about their performance. Mindfulness may also decrease overconfidence with the mediating role of emotions. For example, it was found that individuals who score higher in mindfulness are better in emotional handling of the past, have more accurate timing, have a more pronounced future perspective and they are less impulsive which may result with better temporal self-control[40]. Thus mindful individuals may control their emotions better and it may result with less overconfident judgments.

As suggested above, overconfidence may diminish decision making process and mindfulness may have a negative effect on overconfidence. In this study, the effects of mindfulness on overconfidence will be measured. It is expected that people who scored higher on mindfulness scale will be less overconfident.

***Hypothesis 1: Mindfulness has negative impact on overconfidence.***

***Hypothesis 1a. Mindfulness has negative impact on overestimation***

***Hypothesis 1b. Mindfulness has negative impact on overplacement.***

## 3. METHOD

### 3.1. **Participants and Procedure**

By using convenience sampling method, 146 undergraduate and graduate students were recruited from faculty of business administration. Third and fourth year students and graduate students were selected as most of them have part time or full time work experience. The participants are composed of students aged between 19 and 43 (57% was female, 42% was male and 1% was unknown). 27.4% students are

37 Ehrlinger Joyce, Johnson Kerri, Banner Matthew, Dunning David & Kruger Justin, 'Why the unskilled are unaware: Further explorations of (absent) self-insight among the incompetent', Organizational Behavior and Human Decision Processes, 105, 2008, p. 98-121.

38 Karelaia Natalie and Reb Jochen, 'Improving decision making through mindfulness', Mindfulness in Organizations, 2014, Reb J. & Atkins, P. (Eds). Cambridge University Press.

39 Vallabh Priyanka and Singhal Manish, 'Buddhism and decision-making at individual, group and organizational levels', Journal of Management Development, 33, 2014, p. 8-9.

40 Wittman Marc, Peter Joachim, Gutina Oksana, Otten Simone, Kohls Niko and Meissner Karin, 'Individual differences in self attributed mindfulness levels are related to the experience of time and cognitive self control', Personality and Individual Differences, 64, 2014, p. 41-45.

third year, 45.2% students are fourth year and 27.4% students were graduate students.

Structured surveys were distributed to students in class which - prevented them to copy from each other during the test. After they finished, they were thanked, debriefed and the surveys were collected.

### 3.2. Instruments

#### 3.2.1. Measurement of Mindfulness

Cognitive and Affective Mindfulness Scale (Revised) was designed[41] including 12 items but because of validity concerns of two items, the scale was also suggested to be used with 10-item format. In this study, 10-item format was used with 6-point Likert type scale ranging from 1 (*never*) to 6 (*always*). Its psychometric properties in Turkish population was assessed[42] and found out that the scale is a valid instrument to measure mindfulness. The Cronbach's Alpha value was found .73. For this study, the translation of the scale was controlled by a group of academicians and some minor changes were done. Some items of the scale are "It is easy for me to concentrate on what I'm doing", "I'm able to focus on to the present moment". Cronbach Alpha of the scale was found .77 in the original study[43]

#### 3.2.2. Measurement of overconfidence

Overconfidence has been measured with pop quiz tests in the literature[44]-[45]. Test difficulty was found to be influential in placement and estimation[46]. Therefore, test difficulty was manipulated. Tests with easy, medium and hard difficulty levels were designed. Then a group of researchers discuss about the items and based on their suggestions the final format was prepared by the author. Each test consists of ten questions (total 30 questions). Questions are related to popular culture such as music, arts, TV shows, movie and politics.

41 Feldman Greg, Hayes Adele, Kumar Sameet, Greeson Jeff, and Laurenceau, Jean Philippe, 'Mindfulness and emotion regulation: The development and initial validation of the Cognitive and Affective Mindfulness Scale-Revised (CAMS-R)', Journal of Psychopathology and Behavioral Assessment, 29, 2007, p. 177-190. doi:10.1007/s10862-006-9035-8

42 Çatak Pelin, 'The Turkish version of the cognitive and affective mindfulness scale-revised', Europe's Journal of Psychology, 8 (4), 2012, p. 603-619.

43 Feldman Greg, Hayes Adele, Kumar Sameet, Greeson Jeff, and Laurenceau, Jean Philippe, 'Mindfulness and emotion regulation: The development and initial validation of the Cognitive and Affective Mindfulness Scale-Revised (CAMS-R)', Journal of Psychopathology and Behavioral Assessment, 29, 2007 177-190. doi:10.1007/s10862-006-9035-8

44 Ehrlinger Joyce, Johnson Kerri, Banner Matthew, Dunning David and Kruger Justin, 'Why the unskilled are unaware: Further explorations of (absent) self-insight among the incompetent', Organizational Behavior and Human Decision Processes, 105, 2008, p. 98-121

45 Emich Kyle J. 'But consider the alternative: The influence of positive affect on overconfidence', Cognitive and Emotion, 28:8, 2014, p. 1382-1397

46 Moore Don A. and Healy, Paul J. 'The trouble with overconfidence', Psychological Review, 115 (2), 2008, p. 502-517.

### 3.2.3. Calculation of overconfidence

Overconfidence was measured in different ways in the literature as mentioned in the introduction part. A more fulfilled way to calculate the formulas were decided to be used. Based on a study, overestimation, overplacement and overprecision of the participants were found[47]. According to their definition,

***Overplacement = (E[Xi] - E[Xj]) – (xi – xj).***

In this Formula *E[Xi]* refers to expected performance of the participant, *E[Xj] is the* participant's expected performance of the others on that quiz, *xi* is actual score of the individual and *xj* is actual score of the others.

*Overestimation* is found by subtracting a participant's actual score from his/her expected score. Lastly, *overprecision* refers to a subjective probability distribution that is narrower (lower variance) than the actual score. Moore and Healy (2008) calculated overprecision for their whole sample but not individually. As individual differences are examined in this study and the effects of mindfulness on overprecision are questionable, no hypothesis was stated for overprecision.

## 4.1. RESULTS

### 4.1.1 Manipulation Checks

For assessing the difficulty manipulation, the mean scores of three types of quiz were computed. The mean scores in easy, medium and hard tests are ($M$=9.6, $SD$=.63; $M$=7.05, $SD$=1.63; $M$=4.78, $SD$=1.86) respectively which indicates that manipulation was performed successfully and the participants respond in the expected way.

### 4.2.2. Factor structure and reliability levels of tests

Exploratory Factor Analysis was applied by using Principal Component Method with varimax rotation. Kaiser-Meyer-Olkin (KMO) sample adequacy test value is higher than .50 and Bartlett sphericity test is significant at .05 level which were the indicators of a good fit of the data to the model.

In the original scale, four factors were found (acceptance, attention, present focus and awareness)[48]. In this study two factors were inferred. As item 4 decreased Cronbach $\alpha$ of the second factor, this item was deleted and the analysis was done again. Two factors explained 58.05 % (KMO = .75; Bartlett Sphericity Test = 410.94, p <.001). The first factor, named as acceptance, consists of five items. The second factor is composed of four items and it represents attention. Cronbach $\alpha$ of the scale is .76. The factor analyses results can be seen in Table 1.

47 Ibid

48 Feldman Greg, Hayes Adele, Kumar Sameet, Greeson Jeff, and Laurenceau, Jean Philippe, "Mindfulness and emotion regulation: The development and initial validation of the Cognitive and Affective Mindfulness Scale-Revised (CAMS-R)", Journal of Psychopathology and Behavioral Assessment, 29, 2007 177-190. doi:10.1007/s10862-006-9035-8

***Table 1:*** *Factor Analysis Results and Reliability of Cognitive Affective Mindfulness Scale*

| Item no | Mindfulness | Factor Loading |
|---|---|---|
| | Factor name: Acceptance (Explained variance = 30.64; α = 0.77) | |
| I7 | I try to notice my thoughts without judging them. | .79 |
| I8 | I am able to accept the thoughts and feelings I have. | .75 |
| I2 | I can tolerate emotional pain. | .68 |
| I3 | I can accept things I cannot change. | .66 |
| I6 | It's easy for me to keep track of my thoughts and feelings. | .67 |
| | Factor name: Attention (Explained variance = 27.41; α = 0.76) | |
| I1 | It is easy for me to concentrate on what I am doing.. | .87 |
| I10 | I am able to pay close attention to one thing for a long period of time. | .75 |
| I5 | I am easily distracted. | .76 |
| I9 | I am able to focus on the present moment. | .63 |
| | **KMO=.75; Bartlett Test Chi Square= 410.94 sd = 36 p < .001** | |

### 4.3. Calculation of Overconfidence

Three formulas were suggested[49] to infer overconfidence. In each pop quiz, expected score of the participant and the expected score of the others were gathered. Actual score was calculated according to their responses and observed score of the others was calculated based on the participants Mean scores. With these four scores formulas (stated in the method part) for overestimation and overplacement were found (See Table 2 for overconfidence scores).

***Table 2:*** *Descriptive Statistics of Overconfidence Scores*

| **Overestimation** | | **Mean** | **SD** |
|---|---|---|---|
| | Easy | -.35 | .78 |
| | Medium | .05 | 1.76 |
| | Hard | .42 | 2.04 |
| **Overplacement** | | | |
| | Easy | 1.06 | 1.21 |
| | Medium | .62 | 2.12 |
| | Hard | .02 | 2.17 |

49 Moore Don A. and Healy, Paul J. 'The trouble with overconfidence', Psychological Review, 115 (2), 2008, p. 502-517.

### 4.4. Hypothesis Testing

For testing the hypothesis, first of all, the effect of mindfulness on overplacement and overestimation was analyzed for each manipulation (easy, medium and hard) with simple regression analysis. No significant result was found.

Then multiple regression analysis was carried out with entering the subdimensions of mindfulness as independent variable. Results indicate that acceptance and attention have significant effects on overplacement for easy (Adjusted $R^2$ = .05, F = 3.59, p < .05) and medium tests (Adjusted $R^2$ = .13, F =8.32, p < .001). In medium test, acceptance has negative relationship with overplacement (β = -.33, p < .01). That means when acceptance increases, overplacement decreases which is an expected finding. On the other hand, attention has positive relationship with overplacement for easy (β = .24, p < .05) and medium tests (β = .31, p < .01) (See Table 3). These results partially support Hypothesis 1b. No significant relation was found between attention and acceptance dimensions and overestimation. Thus Hypothesis 1a was rejected.

***Table 3:*** *Regression analysis of overplacement on the sub-dimensions of mindfulness*

| | **Overplacement** | | |
|---|---|---|---|
| | **Easy** | **Medium** | **Hard** |
| **Attention** | β = .24* | β = .31** | β = .09 |
| **Acceptance** | β = -.18 | β = -.33** | β = -.04 |
| **R** | .26 | .38 | .09 |
| **$R^2$** | .07 | .15 | .01 |
| **Adjusted R** | .05 | .13 | .03 |
| **F** | 3.59* | 8.32*** | .22 |

*$p$ < .05; ** $p$< .01 ;*** $p$ < .001

## DISCUSSION

The purpose of this study is to examine the effects of mindfulness on overconfidence. Mindfulness refers to focusing on the present moment, with acceptance and awareness. Since mindfulness may provide individuals to gain information easier and prevent ego concerns, the more mindful the individuals the less they are expected to make overconfidence which is one of the decision making errors. The results indicate that acceptance dimension has a significant negative effect on overplacement in medium difficulty test. When individual's acceptance level become higher, they make less overconfident judgments as they make better guesses about their performance and the others'.

As mindfulness decreases ego concerns and increases the quality of information considered[50], its negative relationship with overplacement was an expected finding of this research. On the other hand the positive relationship between attention and overplacement is an unexpected finding. People who scored higher in attention dimension did also higher overplacement. This may be due to the fact that people, who focus on themselves more, also do overplacement more[51]. Also rather than cognitive functions like attention, biases or ego concerns may influence overplacement more. Therefore, more studies should be done to answer the issue.

One research[52] analyzed the difference between overplacement and overestimation among hard and easy tests. They develop differential information theory. According to the theory, people assume that they are better than others in easy tasks and worse than others in hard tasks. In easy tasks a person knows his/her performance and makes estimates about the others performance based on the predictions about the group. As they have a better knowledge about their performance but less information about the others performance, overplacement is probable. On the other hand, for difficult tasks, the reverse is true- underplacement is probable as they don't know their performance and make an average estimation about the others. Their theory also suggests that for hard tasks, overestimation is more probable. Therefore, a reverse relationship exists between overplacement and overestimation. In this study, participants did more overplacement when the tests become easier and they did more overestimation when the tests become harder. These results are compatible with differential information theory [53].

Social comparison theory states that people want to evaluate their opinions and abilities but they cannot find an objective standard. To reduce the uncertainty, they compare them with the others which results with an evaluation[54]. Therefore, a response to a question such as "How clever am I?" usually comes with the comparison of ourselves with our friends, colleagues or family members. Obviously these kinds of evaluations are subjective and various motivations may affect them like self-enhancement. Overconfidence, a result of self-enhancement[55] is one of the most common errors in decision making process. In this study two dimensions of overconfidence, overplacement and overestimation were analyzed. As mindfulness is a concept which refers to accepting all positive and negative events and situations that one faces, it is predicted that the same acceptance should involve for a performance

50 Karelaia Natalie and Reb Jochen, 'Improving decision making through mindfulness', Mindfulness in Organizations, 2014, Reb J. & Atkins, P. (Eds). Cambridge University Press.

51 Emich Kyle J. 'But consider the alternative: The influence of positive affect on overconfidence', Cognitive and Emotion, 28:8, 2014, p. 1382-1397.

52 Moore Don A. and Small Deborah A. 'Error and Bias in Comparative Judgment: On being both better and worse than we think we are', Journal of Personality and Social Psychology, 92 (6), 2007, p. 972-989.

53 Ibid

54 Festinger Leon, 'A theory of social comparison processes'. Human Relations, 7, 1954, p. 117–140

55 Emich Kyle J. 'But consider the alternative: The influence of positive affect on overconfidence', Cognitive and Emotion, 28:8, 2014, p. 1382-1397.

in a pop quiz test. The results showed that acceptance is negatively related to overplacement which is consistent with the prediction.

The original 10-item CAMS-R is the revised form of 12-item CAMS. Four factors were inferred from CAMS with second order confirmatory factor analysis. These factors are; attention, present focus, awareness and acceptance[56]. Because of validity issues, two items were excluded from "present focus" factor and it was named as CAMS-R. One research[57] measured the scales validity and reliability in Turkish sample found out that the scale has four factors as well. However, in that research, present focus factor has one indicator (item 9). As a factor should have at least two indicators, that model is questionable. In this study, two factors were extracted and named as acceptance and attention. To our knowledge, no study has been done about the confirmatory factor analysis results of CAMS-R, therefore, more studies should be done about the factor structure of this scale.

**Implications**

As far as we know, this study is the first study which examines the relationship between mindfulness and overconfidence in student sample. Compared to a study with gambler sample[58] student sample may make the results more generalizable. In spite of a small sample size, the results are consistent with the findings in the literature. Yet more studies are needed among the samples inferred from diverse cultures.

**Practical Suggestions**

The findings of this research indicate that acceptance, a dimension of mindfulness, is a valuable concept for organizations as it decreases overplacement which is a decision making flaw. Therefore, organizations may give acceptance-based mindfulness training to their employees. As training is a cost for them especially more important people in decision making channels like managers or key employees in finance departments may be primarily selected.

56 Feldman Greg, Hayes Adele, Kumar Sameet, Greeson Jeff, and Laurenceau, Jean Philippe, 'Mindfulness and emotion regulation: The development and initial validation of the Cognitive and Affective Mindfulness Scale-Revised (CAMS-R)', Journal of Psychopathology and Behavioral Assessment, 29, 2007 177-190. doi:10.1007/s10862-006-9035-8

57 Çatak Pelin, 'The Turkish version of the cognitive and affective mindfulness scale-revised', Europe's Journal of Psychology, 8 (4), 2012, p. 603-619.

58 Lakey, Chad E., Campbell, W. Keith, Brown Kirk Warren and Goodie Adam S. 'Dispositional mindfulness as a predictor of the severity of gambling outcomes', Personality and Individual Differences, 43, 2007, p. 1698-1710.

## REFERENCES

Asuero Andres Martin et al., 'Effectiveness of a mindfulness education program in primary healthcare professionals: A pragmatic controlled trial', Journal of Continuing Education in the Health Professions, 34(1), 2014, p. 4–12.

Barber, Brad M. & Odean, Terrance, 'Boys will be Boys: Gender, Overconfidence and Common Stock Investment',The Quarterly Journal of Economics, 2001, p. 261-291.

Bishop, Scott R. et al., 'Mindfulness: A proposed operational definition', Clinical Psychology: Science and Practice, 11 (3), 2004, 230-241.

Botta Ariel A., Cadet Tamara. J. and Maramaldi, Peter, 'Reflections on a Quantitative, Group-Based Mindfulness Study with Social Work Students' Social Work with Groups, 38:2, 2015 , p. 93-105, DOI: 10.1080/01609513.2014.975885.

Brown Kirk Warren and Ryan Richard M., 'The benefits of being present: mindfulness and its role in psychological well-being', Journal of Personality and Social Psychology, 84(4), 2003, p. 822-848.

Çatak Pelin, 'The Turkish version of the cognitive and affective mindfulness scale-revised', Europe's Journal of Psychology, 8 (4), 2012, p. 603-619.

Ehrlinger Joyce, Johnson Kerri, Banner Matthew, Dunning David and Kruger Justin, 'Why the unskilled are unaware: Further explorations of (absent) self-insight among the incompetent', Organizational Behavior and Human Decision Processes, 105, 2008, p. 98-121.

Emich Kyle J., 'But consider the alternative: The influence of positive affect on overconfidence', Cognitive and Emotion, 28:8, 2014, p. 1382-1397.

Feldman Greg, Hayes Adele, Kumar Sameet, Greeson Jeff, and Laurenceau, Jean Philippe, 'Mindfulness and emotion regulation: The development and initial validation of the Cognitive and Affective Mindfulness Scale-Revised (CAMS-R)', Journal of Psychopathology and Behavioral Assessment, 29, 2007, p. 177-190. doi:10.1007/s10862-006-9035-8

Feltman Roger, Robinson Michael D. and Ode Scott, 'Mindfulness as a moderator of neuroticism-outcome relations: A self-regulation perspective', Journal of Research in Personality, 43, 2009, p. 953-961.

Festinger Leon, 'A theory of social comparison processes', Human Relations, 7, 1954, p. 117–140

Froh Jeffrey J., 'The history of positive psychology: truth be told', The Psychologist, 16(3), 2004, p. 18-20.

Jankowski Tomasz and Holas Pawel, 'Metacognitive model of mindfulness', Consciousness and Cognition, 28, 2014, p. 64-80.

Kabat-Zinn Jon, 'Wherever you go, there you are: Mindfulness meditation in everyday life', (New York: Hyperion, 1994).

Kabat Zinn Jon, 'Full Catastrophe Living', (New York, Bantam Dell, 2005).

Kahneman Daniel, 'Thinking Fast and Slow', (London, Penguin Books, 2011).

Karelaia Natalie and Reb Jochen, 'Improving decision making through mindfulness', Mindfulness in Organizations, 2014, Reb J. & Atkins, P. (Eds). Cambridge University Press.

Lakey, Chad E., Campbell, W. Keith, Brown Kirk Warren and Goodie Adam S., 'Dispositional mindfulness as a predictor of the severity of gambling outcomes', Personality and Individual Differences, 43, 2007, p. 1698-1710.

Moore Don A. and Healy, Paul J. 'The trouble with overconfidence', Psychological Review, 115 (2), 2008, p. 502-517.

Moore Don A. and Small Deborah A. 'Error and Bias in Comparative Judgment: On being both better and worse than we think we are', Journal of Personality and Social Psychology, 92 (6), 2007, p. 972-989.

Myers David G., 'Social Psychology', 6th edition. (New York: McGraw-Hill, 1999).
Neale Margaret A. and Bazerman Max H., 'The effects of framing and negotiator overconfidence on bargaining behaviors and outcomes', Academy of Management Journal, 28 (1), 1985, p. 34-49.
Odean Terrance, 'Volume, volatility, price, and profit when all traders are above average', The Journal of Finance, 53, 1998, p. 1887–1934.
Ruedy Nicole E. and Schweitzer Maurice E., 'In the moment: The effect of mindfulness on ethical decision making', Journal of Business Ethics, 95, 2011, p. 73-87.
Shapiro Shauna L., Carlson, Linda E., Astin, John A. and Freedman Benedict, 'Mechanisms of mindfulness', Journal of Clinical Psychology, 62 (3), 2006, p. 373-386.
Schoemaker, Paul J. H. and Russo, J. Edward, "A pyramid of decision approaches", California Management Review, 1993, p. 9-31.
Simon Herbert, 'What is an explanation of behavior?' In Myers, D. G. Intuition: Its Powers and Perils (New Haven: Yale University Press, 2002), 1992, p. 56.
Stanovich Keith E. and West Richard F., 'Individual difference in reasoning: implications for the rationality debate?', Behavioural and Brain Sciences, 23, 2000, p.645–726.
Vallabh Priyanka and Singhal Manish, 'Buddhism and decision-making at individual, group and organizational levels', Journal of Management Development, 33, 2014, p.8-9.
Werner Karel, 'The law of karma and mindfulness', e-book, 2009, available at http://www.bps.lk/olib/bl/bl061.pdf (accessed April 29, 2015).
Wittman Marc, Peter Joachim, Gutina Oksana, Otten Simone, Kohls Niko and Meissner Karin, 'Individual differences in self attributed mindfulness levels are related to the experience of time and cognitive self control', Personality and Individual Differences, 64, 2014, p. 41-45.
Zeidan Fadel, Johnson Susan K., Diamond Bruce J., David Zhanna and Goolkasian Paula, 'Mindfulness meditation improved cognition: Evidence of brief mental training', Consciousness and Cognition, 19, 2010, p.597-605.