

DISPOSITIONAL MINDFULNESS AND FOOD CRAVINGS AMONG EXERCISERS AND NON-EXERCISERS: A COMPARATIVE STUDY

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Abstract

Dispositional mindfulness is a construct used to describe the extent to which an individual is conscious of one's feelings and actions of daily life while craving is intense desire to consume a particular food. In the present study it was hypothesized that there will be negative correlation between dispositional mindfulness and food cravings and there will be significant gender difference in the level of dispositional mindfulness and food cravings. It was also hypothesized that there will be group differences among exercisers and non-exercisers in the level of dispositional mindfulness and food cravings. The sample consisted of 138 students studying in university of Peshawar. Two self-report measures were administered for data collection i.e. Mindful attention awareness scale (Brown & Ryan, 2003) and Food Cravings Questionnaire-Trait- reduced (Meule et al. 2014). Results were analyzed through SPSS 22. The Results indicated that dispositional mindfulness significantly negatively correlated with food cravings. Regression analysis revealed that dispositional explained 5% variation in food

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cravings. Furthermore, no significant difference found in dispositional mindfulness and food cravings among exercisers and non-exercisers. Whereas statistically significant difference was reported in food craving among males and females with females scoring high on food cravings as compared to males while there exist no significant difference in dispositional mindfulness among males and females. Therefore, this research can help in introducing effective mindfulness techniques which could help in managing food cravings and pathological eating.

Key Words: *Dispositional mindfulness, Food cravings, Exercise*

Introduction

The concept of mindfulness is deeply rooted in Buddhism. Later on Western Europe and America studied and worked on this concept. Mindfulness is defined as “non-judgmental present-oriented focused attention” (Kabat-zin, 2004). While Brown and Ryan (2003) state it as “A receptive attention to and awareness of present events and experience”. Mindfulness concerns not only about the awareness of the outer world but also awareness of the inner world i.e. individuals thoughts, feelings and emotions. (Mishra, 2004). It help us to get a vivid view of the surrounding world. Different theoretical approaches of mindfulness are presented by different researchers. Brown and Ryan (2003) explained mindfulness through one factor while Baer et al. (2006) attempted to explain mindfulness with the help of five factors namely, 1- non-reactivity to inner experience; 2- observation of experience; 3-awareness of actions; 4-describing/labelling experience with words; and 5- nonjudging of experience”.

In another attempt to have a comprehensive understanding of the concept, Creswell et al. (2007) proposed that Mindfulness can be better explained in terms of two broad dimensions i.e.1- *State mindfulness* and 2- *trait/dispositional mindfulness*. The *State mindfulness* is the type of mindfulness an individual

obtains at a specific time with the help of mindfulness techniques while the Dispositional mindfulness is the type of mindfulness an individual usually has in daily life activities (Cahn & Polich, 2006). The concept of mindfulness has also been studied in clinical settings and has been incorporated in different therapeutic techniques to enhance the quality of consciousness. In an attempt to experimentally study the concept of mindfulness, Kiken et al. (2014) conducted a study to explore the effect of state mindfulness on trait mindfulness during 8-month mindfulness based interventions. The results indicated that participants with greater rates of increase in state mindfulness increase more in trait mindfulness and decrease more in psychological distress. Several studies have attempted to explore the relationship between mindfulness and health related outcomes. In an attempt to identify the outcomes of mindfulness, Mindful2Workoutcomes training has been proven effective in workability, anxiety, depression, stress, sleep, and affect in employees suffering from work related stress (Bruin et al. 2017). Similarly, Bruin et al. (2017) also found significant relationship between Mindfulness and many health related conditions like stress and sleep. In addition, it has been studied in relation to unhealthy eating (Keesman et al. 2017). In attempt to identify the outcomes of mindfulness it has been studied in relation to food cravings and exercise.

“Craving is strong urge to eat a particular type of food” (Finlayson & Dalton, 2012) and refers to an intense desire or longing for a particular substance (Weingarten & Elston, 1990.) We can infer from these definitions that craving is *stronger* than ordinary food choices and it is *specific* that can only be satisfied by a particular kind of food (e.g. chocolate, drugs etc.) differentiating it from hunger which can be satisfied by any kind of food. Different researchers have attempted to study the correlation between mindfulness and food cravings. In a review of some studies it was found that the decentering perspective of mindfulness

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decreases cravings, physiological reactivity and unhealthy eating (Keesman et al. 2017). Similarly, Lacaille et al. (2014) reported that disidentification aspect of mindfulness is most efficacious mindfulness skill in reducing trait and state chocolate cravings. In an attempt to measure the effect of decentering strategy of mindfulness on chocolate craving the participants go through chocolate craving induction and then through a 4-minute audio they were guided to either use decentering strategy, visualization, or mind wandering. All three conditions caused reductions in cravings, but no significant differences were found between all the conditions indicating that the other two techniques are as effective as decentering in reducing chocolate cravings (Tapper & Turner, 2018). Mindfulness has also been studied in relation to physical activity and exercise.

Exercise is widely acknowledged as a highly important health behavior. Murphy et al. (2012) studied the association between dispositional mindfulness, health behaviors (like exercise) and physical health concluding that the higher the mindful disposition the more health practices are followed and better physical health is reported. In an experimental study it was found that the regular exercisers score higher on measures of mindfulness and acceptance (Ulmer et al., 2010). Similarly, by adopting an experimental approach, Fuller et al. (2015) examined the effect of baseline level of mindfulness on weight loss in older, obese people with pre-diabetes or type-2 diabetes mellitus during a 12-month diet and exercise program. The result indicated that baseline mindfulness scores were not the predictor of weight loss in the participants after exercise and diet interventions. In an attempt to identify the effect of regular aerobic exercise on dispositional mindfulness Lacaille et al. (2004) conducted a study indicating that the aerobic exercise was associated with increase in dispositional mindfulness.

Like mindfulness, cravings are also studied in relation to exercise. In a study it was proposed that moderate intensity exercise (Brisk walk) reduce chocolate

craving and attentional bias among normal and obese regular chocolate eaters who had refrained from chocolate eating for different period of time (Oh & Taylor, 2013). Likewise, Kurti and Dallery (2014) and Fong et al. (2014) emphasized that moderate intensity exercise results in significant reduction in cigarette craving. In another study treadmill exercise revealed non-significant reduction in cocaine craving and subsequent use but not in tobacco use among individuals with concurrent cocaine and tobacco use disorder (Garza II et al. 2016). Similarly, Brown et al. (2016) also found that exercise enhance mood ratings, decrease anxiety and cravings in alcohol dependent adults over the 12 weeks duration. Later on, Meule and Kubler. (2017) investigated the effect of slow paced breathing on current food craving suggesting that slow paced breathing merely have a delayed influence on state hunger.

While studying the relationship between mindfulness and gender difference, Ahmadi et al. (2014) found that mindfulness was correlated with health condition but not with demographic characteristics like gender, age, religion, and educational background etc. There is limited number of researches identifying the gender difference in the proposed variables. Therefore, this research attempts to study this aspect as well.

Although the relationship between mindfulness, food cravings and exercise is being studied but the field is still in the growing face. This research will focus on the dispositional aspect of mindfulness because the state mindfulness can be varied by following mindfulness technique at the moment. Therefore, to have a better understanding of the trait level mindfulness i.e. dispositional mindfulness is studied in the present study. Most of the researches are conducted in the western countries and there is dearth of research measuring these variables in Pakistani culture. Therefore, more researches are required in our culture to have a better understanding of the concept.

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Objectives

The objectives of the present study are:

- 1- To identify the relationship among dispositional mindfulness and food cravings.
- 2- To identify gender difference in dispositional mindfulness and food cravings.
- 3- To find out group difference among exercisers and non-exercisers in the level of dispositional mindfulness and food cravings.

Hypotheses

1. There will be negative correlation between dispositional mindfulness and food cravings.
2. Exercisers will score high on dispositional mindfulness as compared to non-exercisers.
3. Exercisers will score low on food cravings as compared to non-exercisers,
4. There will be significant gender difference in the level of dispositional mindfulness.
5. There will be significant gender difference in the level of food cravings.

Methodology

Research design and Sample

The sample comprised of the students enrolled in graduates and undergraduates programs of the University of Peshawar. A total of 138 research participants were included in the sample. Age of the research participants ranged from 17-34 years ($M = 22.22$, $SD = 3.282$). The sample comprised of 37 males and 101 females, among them 56 (40.6%) were graduate and 82(59.4%) were undergraduates. While 53(38.5%) were non-exercisers and 85(61.5%) were exercisers. Among the exercisers the different types of exercises were reported.

These types of exercise were Gym (5.1%), yoga (4.3%), walk (37%), jogging (5.1%), other (10.1 %). Total duration of exercise varied from 0 to 21 hours per week. It is a comparative study. Convenient sampling strategy was used to collect the data.

Inclusion and exclusion criteriaA minimum of three hours per week exercise was required for inclusion in the sample. Those exercising less than three hours per week were excluded from inclusion in the sample.

Instruments:

The Following instruments were used in the study:

1. Demographic information:

The demographic sheet comprise of the following information:

Name, age, gender, educational level, exercise, its duration and type of exercise.

2. Food Cravings Questionnaire—Trait—reduced (FCQ-T-r)

FCQ-T-r is constructed by Meule et al. (2014). It is a short version of Food Cravings Questionnaire FCQ-T constructed by Cepeda-Benito et al., (2000). FCQ was designed to measure two aspects of cravings i.e. State craving and Trait craving. *Trait craving* comprise of 39 items while *State craving* comprise of 15 items. It measure behavioral, cognitive and physiological aspect of food cravings. Instead of assessing specific type of food cravings (chocolate, alcohol, ice-cream etc.) it assess variety of food cravings. FCQ-T-r used in this study comprise of 15 items covering five sub-scales. The five subscales of the questionnaire include, 1- *thoughts or preoccupation with food* comprise of five items. 2- *Lack of control over eating* comprise of 5 items. 3- *Emotions before or during food craving* comprise of two items, 4- *Intentions and plans to consume food* comprise of two items. 5- *Cues that may trigger food cravings* comprise of single item. Total score of FCQ-T-r range from 15-75. High or low score indicate higher or lower level of craving intensity.

Meule et al. (2014) validated FCQ-T-r in German reporting one factor structure of the questionnaire and high internal consistency (Cronbach's $\alpha = 0.94$). Similarly, English food craving questionnaire-Trait-reduced FCQ-T-r (Hormes&Meule 2015) also demonstrated excellent internal consistency (Cronbach's $\alpha = 0.94$). In another study by Meule et al., (2014) FCQ-T-r demonstrated High reliability ($r_{tt} = .74$) than the FCQ-S ($r_{tt} = .39$). In the present study English version of the questionnaire was used and it showed excellent internal consistency (Cronbach's $\alpha = 0.90$).

3. Mindful Attention Awareness Scale (MASS)

Mindful attention awareness scale (MASS) was constructed by Brown and Ryan (2003). It consists of items. It is a likert scale and response category ranges from 0 to 5. It is designed to measure the extent to which individuals are aware of their actions and feelings in the present moment or, in contrast they are inattentive and run on an autopilot mode. It does not require any degree of familiarity with the mindfulness constructs and mindfulness practices. It is one dimension self-report measures and by far the most widely used instrument to measure mindfulness. Examples of the items are "I break or spill things because of carelessness, not paying attention, or thinking of something else", "I do jobs or tasks automatically, without being aware of what I'm doing." etc.

Soler et al. (2012) developed a Spanish version of MASS and reported a one-factorial structure of the scale and internal consistency of 0.89. Similarly, Columbian version of MASS (Ruiz et al 2016) also reported one factorial structure of the scale and excellent internal consistency ($\alpha = .92$). In the present research English version of the scale was used and it demonstrated very good internal consistency (Cronbach's $\alpha = 0.84$).

Procedure

For collection of data the self-report measures comprising of demographic sheet, Food Cravings Questionnaire Trait-reduced (FCQ-T-r) and Mindful attention awareness scale (MASS) were utilized. Students of the University of Peshawar were approached conveniently. The objective of the study was explained to the participants. They were assured that the responses will be kept confidential and the data collected would only be used for academic purpose. A verbal consent was taken and they were informed that the participation was voluntary and will be allowed to quit the research if they do not want to continue. Instructions were given on how to respond to the questionnaire. Moreover, they were told that there were no wrong answers. They were to choose the answer that they thought best describe them. After the participants responded, the forms were collected and they were thanked for their participation. The forms that were complete were fed in the SPSS for the analysis.

Data analysis

To find the relationship between Dispositional mindfulness and Food cravings Pearson Product moment correlation was run. To identify the dispositional mindfulness as a predictor of food cravings, regression analysis was carried out. While independent sample T-test was performed in order to find the group difference among exercisers and non-exercisers and the gender difference in the level of dispositional mindfulness and food cravings.

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Results

Table 1

Scale	<i>M</i>	<i>SD</i>	Cronbach's α
MAAS	57.03	12.74	.84
FCQ-t-r	40.88	13.91	.90

Note. MAAS= Mindful Attention Awareness Scale; FCQ-T-r = Food Cravings Questionnaire-Trait- reduced

Table 1 represents the alpha reliability of Mindful attention awareness scale (MASS) and Food Cravings Questionnaire-Trait- reduced (FCQ-T-r) administered in this study. The 15 items MASS reported High reliability of .84. Similarly, FCQ-t-r reported excellent reliability of .90 indicating that both the scale are suitable for the present study.

Table 2

Correlation between Dispositional mindfulness and Food cravings (N=138)

Variable	Dispositional mindfulness	Food cravings
Dispositional Mindfulness	-	-.24
Food cravings		-

** $P=0.01$, * $P=0.05$ (two tailed)

Table 2 represents the relationship between dispositional mindfulness and food cravings. As predicted, the result indicates that dispositional mindfulness is significantly negatively related with food cravings ($r= -.24^{**}$, $p<0.01$).

Table 3

Linear regression predicting Food cravings from Dispositional mindfulness (N=136)

Variable	B	β	SE	t	p	95%CI
Constant	55.90		5.36		.00	[45.29,66.51]
DM	-3.95	-.240	1.37	-2.87	.00	[-6.67,-1.23]
R ²	.05					
ΔR^2	.05					

Note. DM= Dispositional Mindfulness

Table 3 shows the result of linear regression. Dispositional mindfulness was regressed on food cravings and it revealed that dispositional mindfulness appeared as significant predictor of food cravings among the participants ($R^2=.05$, $F(8.27)$, $p<0.00$) and explained 5% variation in food cravings. Beta value revealed that 1 unit increased in dispositional mindfulness resulted in .240 unit decreased in food cravings.

Table 4

Independent sample t test showing difference in dispositional mindfulness and food cravings among exercisers, non-exercisers and among males, females.

	Exercisers		Non-exercisers		$t(135)$	p	Males		Females		$t(136)$	p
	(n= 79)		(n =58)				(n =37)		(n =101)			
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
DM	3.74	.89	3.92	.76	-1.27	.21	3.61	.83	3.89	.83	-1.74	.085
FC	40.61	14.41	41.07	13.27	-.189	.85	35.9	10.41	42.61	14.53	-2.98	.004

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Table 4 indicate that no significant difference exist in dispositional mindfulness and food cravings among exercisers and non-exercisers. It also indicated that statistically significant difference exist in food craving among males and females with females scoring high ($M=42.61$, $SD=14.53$) on food cravings as compared to males ($M=35.94$, $SD=10.41$) while there exist no significant difference in dispositional mindfulness among males and females.

Discussion

The objectives of the present study were to examine relationship between dispositional mindfulness and food cravings, gender difference among these variables and to find out difference between dispositional mindfulness and food cravings among exercisers and non-exercisers. Results indicated that dispositional mindfulness significantly negatively correlated with food cravings accepting the first hypothesis. This result is consistent with the past researches conducted by (Lacaille et al., 2014; Tapper & Turner 2018; Keesman et al., 2017).Lacaille et al. (2014) also found the same results that the mindfulness is effective in reducing food cravings. Similarly, Tapper and Turner (2018) reported significant reduction in cravings subsequent to decentering based mindfulness strategies. In review of studies Keesman et al. (2017) also reported that decentering perspective of mindfulness reduces subjective cravings. It can be because of the reason that Mindfulness i.e. being in the present moment allow us to be aware of our feelings and behavior therefore it help us to limit ourselves from various types of food craving which in turn helps to restrain ourselves from engaging in pathological eating like drug addiction, binge eating,etc. As suggested by Chao et al. (2016) Food cravings can predict binge eating and eating disorder psychopathology.

Warren et al. (2017) also proposed that mindfulness appears to be effective in addressing problematic eating behavior and helps in managing weight. Similarly,

Higher disposition mindfulness has been related to the consumption of higher diet quality (Donofry et al. 2020). Therefore, in light of these findings we can conclude that mindfulness can help us in managing our healthy eating behavior.

In current research exercise was not correlated to dispositional mindfulness and food cravings i.e. no significant difference exist in dispositional mindfulness and food cravings among exercisers and non-exercisers rejecting the second and third hypotheses. This result is consistent with Fuller et al. (2015) that baseline mindfulness scores were not the predictor of weight loss in the participants after exercise and diet interventions. Similarly, Meule, and Kubler. (2017) also proposed that the specific food cravings were not affected by breathing rate. The obtained result can be because of the reason that individuals were self-motivated to reduce their food cravings irrespective of their involvement in any type of exercise. While in contrast, some contradicting findings are also reported by many researchers. Ulmer et al. (2010) and Murphy et al. (2012) reported that participants score higher on measures of mindfulness who were successful at maintaining exercise. In another study it was proposed that moderate intensity exercise (Brisk walk) reduce chocolate craving (Oh & Taylor 2013). Likewise, Lacaille et al. (2004) reported that aerobic exercise was associated with increase in dispositional mindfulness. Thus, Physical activity interventions can be introduced for reduction in food cravings (Myers et al., 2018). Therefore, more researches are needed to study the relationship between food craving and exercise in order to have a better understanding of the concept. An experimental design will be more effective in this regard.

In current research gender was significantly positively correlated with food cravings with females scoring high ($M=42.61$, $SD=14.53$) on food cravings as compared to males ($M=35.94$, $SD=10.41$) proving the fifth hypothesis. The result is consistent with the findings reported by (Chao et al. (2016) proposing that

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Females experience high cravings as compared to males. This can be analysed in the light of findings reported by Imperatori et al. (2013) that obese females experience more cravings than males. As obesity was not measured in the present study therefore future researches can take this variable into account as well. Likewise no significant difference found in dispositional mindfulness among males and females rejecting the fourth hypothesis. This result is consistent with Ahmadi et al. (2014) suggesting that the mindfulness is not correlated with demographic characteristics like gender, age, religion, and educational background etc. It could be explained with the help of individuals' internal motivation irrespective of gender. If individuals are curious of their surroundings and more motivated to be aware of their surroundings, they will score more on the level of mindfulness as compared to others.

Limitations

- One limitation of this research was that both questionnaires were entirely self-report measure. By using objective measures we can get a clearer picture of the relationship between variables.
- The convenient sampling technique was used and the number of males was less as compared to females in the sample which limit the generalizability of the research.
- Only students were selected in the sample, in the future a diverse sample can be studied to explore the proposed relationship between variables. Age range of the participants should also be increased to study the difference between difference age groups.
- It was a correlational cross sectional research design; experimental study can be attempted in the future.

- Additionally, there was lack of significant information regarding the total period from which participants started exercising, future researches can discover the relationship of this aspect with dispositional mindfulness and food cravings as well. This research only studied dispositional mindfulness and trait food craving, the state component of food cravings and mindfulness could also be studied in future researches.

Conclusion

This study was designed to identify the relationship among dispositional mindfulness and food cravings, gender difference and group difference among exercisers and non-exercisers in the level of dispositional mindfulness and food cravings. It was proposed that there will be negative association between dispositional mindfulness and food cravings. Exercisers will score high on dispositional mindfulness and low on food cravings as compared to non-exercisers and there will be significant gender difference and group difference in the level of dispositional mindfulness and food cravings. Regression analysis revealed that dispositional explained 5% variation in food cravings. Furthermore, no significant difference exist in dispositional mindfulness and food cravings among exercisers and non-exercisers while statistically significant difference exist in food craving among males and females with females scoring high on food cravings as compared to males while there exist no significant difference in dispositional mindfulness among males and females. Thus accepting the first and fifth hypotheses and rejecting second, third and fourth hypotheses. Furthermore, limitations of research were also discussed.

Future suggestions

These researches suggest that mindfulness practices can be incorporated into different aspect of our daily life in order to improve our mental and physical

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health. Researchers could attempt to explore the cultural difference among the mindfulness and its effects on behavioral and psychological aspects of individual. These construct can be studied with a number of different other variables to draw a clear picture of its effectiveness. In several studies mindfulness has been proved to be effective in improving mental health and to alleviate psychological sufferings like depression, emotional distractors, and stress. (Winkens et al., 2019, Makowski et al., 2019, Nezlek et al., 2015). A number of different mindfulness based interventions has been developed over the past few decades. In a longitudinal study conducted by Winkens et al. (2019) the effect of mindful eating on depressive symptoms indicated that the more indulgence in mindful eating resulted in reduction in depressive symptoms in a 3-year follow-up. A study was conducted by Makowski et al. (2019) to identify whether mindfulness is associated with a diminished emotional response, or with faster recovery from emotional distractors. The findings indicated that the Non-reacting facet of dispositional mindfulness aids in the faster disengagement from emotional distractors. Nezlek et al. (2015) in a two week study find out that trait mindfulness is positively related to event-level mindfulness i.e. state mindfulness and negatively related to event-level stress suggesting that more mindful an individual may experience less stress.

The effectiveness of mindfulness training has been studied for behavioral problems and attentional functioning in adolescents and adults with ADHD indicating that the behavioral and attentional problems in adolescents reduced after mindfulness training (Weijer Bergsma et al., 2012). In review of 9 studies it was found that mindfulness based strategies is effective in improving attention among ADHD adults. Moore and Brown. (2019) in their study found that the level of mindfulness of an individual has an influence on texting behavior while driving. The individuals with higher level of trait mindfulness are significantly

less likely to habitually text while driving than individuals who are having low to moderate level of trait mindfulness. Therefore, these findings can be explored in our Pakistani culture which could help in the introduction of effective mindfulness and exercise interventions for various health related practices and dealing with psychopathological behaviors.

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