



## THE MEDIATOR ROLE OF COGNITIVE FLEXIBILITY AND MINDFULNESS IN RELATIONSHIP BETWEEN PERCEIVED STRESS AND DISTRESS TOLERANCE AMONG UNIVERSITY STUDENTS

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### **Abstract:**

The aim of this study is to examine the mediator role of the cognitive flexibility and mindfulness in the relationship between perceived stress and distress tolerance in university students. The sample of the study consisted of 417 students (306 females: 73,4%, 111 males: 26,6%) at Faculty of Healthy Sciences in Istanbul Medeniyet University in Turkey. Sample's mean of age came to 19,88 (Sd=1.93). The Perceived Stress Scale, Distress Tolerance Scale, Cognitive Flexibility Scale, and Mindfulness Scale have been used. As part of this study, the mediating role of cognitive flexibility and mindfulness in the relationship between perceived stress and distress tolerance has been tested using the Serial Mediator Model. The results have indicated that those with a higher level of perceived stress experience lower degrees of cognitive flexibility and that, given cognitively less flexible individuals experience less mindfulness, thus, lower levels of mindfulness are associated with a decrease in distress tolerance. Moreover, the model in its entirety proved statistically significant ( $F(3, 420)=33.87, p<.001$ ), accounting for 19,4% of the total variance. The findings have been discussed in line with relevant literature on the issue and recommendations on their possible application have been given.

**Keywords:** interview skills, assessment of students, business education

### **1. Introduction**

In many senses, stress has become an integral aspect of modern life, due to the rapid nature of technological and social change eroding the modern individuals' sense of personal control and security (Asberg, Bowers, Renk, & McKinney, 2008). Stress permeates the subtext of everyday life and can affect all aspects of human existence (Monroe, 2008; Pohlman & Becker, 2006). Stress is generally defined as the sequential operation between the organism (perception, coping resources) and environment

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(external challenges) over time (Cohen, Kessler, & Gordon 1995; Gunnar & Quevedo, 2007; Lazarus & Folkman, 1984). In parallel to this, stress is perceived as an individual's self-reported feelings of being unable to handle a variety of non-specific life stressors (Felton, Banducci, Shadur, Stadnik, & MacPherson, 2017). Furthermore, many studies (Galaif, Sussman, Chou, & Wills, 2003; Sellers, Caldwell, Schmeelk-Cone, & Zimmerman, 2003) have been shown that increasing perceived stress can lead to an increase in the symptoms of depression and anxiety over time, especially among adolescents. In addition to this, perceived stress has an evidently negative impact on the human physiological and mental health (Hammen 2005; Schneiderman, Ironson, & Siegel, 2005).

Stress, particularly that experienced between the ages of 18 and 25, are so pervasive (Seiffge-Krenke, Aunola, & Nurmi, 2009; Skinner & Zimmer-Gembeck, 2007) because at this particular age level, individuals are forced to achieve a myriad of developmental processes simultaneously (personal values, academic problem and decision-making skills, independence from the family) and must cope with the inevitable difficulties these involve (Arnett, 2007; Howard, Schiraldi, Pineda, & Campanella, 2006; Jekielek & Brown, 2005). Therefore, it is critical to identify the factors that work to both increase and reduce stress.

Many studies have indicated that university students perceived more stress than non-university students of the same age (Andrews & Wilding, 2004; Eisenberg, Gollust, Golberstein, & Hefner, 2007). In addition, over the past decade, many studies have stated that, compared to previous generations, there is a rising number of university students having mental health issues, especially those with psychological roots (Galatzer-Levy, Burton, & Bonanno, 2012; Tavolacci et al., 2013). Since the 1980s, Turkish university students have suffered from an increasing amount of stress compared (Doğan, 2018). All studies on this phenomenon indicate that among university, a tolerance for this perceived stress is a fact that, furthermore, must not be understated. In this respect, distress tolerance is seen as a vital concept for perceived stress.

## **2. The Relationship between Perceived Stress and Distress Tolerance**

Distress tolerance is brought into play to tackle several negative internal states, including negative emotion, ambiguity, uncertainty, frustration and physical discomfort (Simons & Gaher, 2005; Zvolensky, Vujanovic, Bernstein, & Leyro, 2010). Distress tolerance is the result of cognitive or physical processes but seen itself as an emotional state (Simons & Gaher, 2005). Therefore, distress tolerance essentially attests to the capacity of a person to handle with emotional states.

Many studies (Danielson et al., 2010; Hawkins, Macatee, Guthrie, & Cogle, 2013; MacPherson et al., 2010) have found that the relationship between low distress tolerance and perceived stress, and the relationship is explained by the can be illustrated by the individuals' reaction towards distress upon impact (Danielson et al., 2010; Daughters et al., 2009). Lynch & Mizon, (2011) has indicated that individuals with lower distress

tolerance may pay attention more stressful events in their environment, which, in turn, leads them to experience a higher degree of negative affect and causes difficulty in their ability to cope.

Interestingly, Cheng (2003, 2005) has noted that the using any coping strategies so much prevents the individual from coping with stress effectively. People need to be flexible in deploying their use of effective coping strategies and opt for the best in order to cope with a variety of stressful situations. However, individuals who possess a difficulty in tolerating unpleasant internal states may see stressful situations as a negative and can tend to attempt to overcome issues rather ineffectively.

Many studies indicate that those with lower levels of distress tolerance tend to show more behavioural problems (such as substance use) and emotional problems (such as avoidance) (Bliesner, 2010; Brown et al., 2009; Buckner, Keough, & Schmidt, 2007), and trauma problems (Marshall-Berenz, Vujanovic, Bonn-Miller, Bernstein, & Zvolensky, 2010; Potter, Vujanovic, Marshall-Berenz, Bernstein, & Bonn-Miller, 2011) when experienced a stressful events . Hence it has been stated that people having lower levels of distress tolerance have difficulty coping with stressful situations and in regulating their emotions (Simons & Gaher, 2005). A critical element in building up a tolerance for stress is a form of regulation by which the individual evaluates their coping options and choices according to what resources are available in which to deal with the stress (Lazarus & Folkman 1984; Lengua & Long, 2002). On order to regulate one's emotions, a person should be attentive and possess a certain degree of awareness as to what they are doing. In this regard, specifically, regulation consists of three components; attention, feelings, and cognition (Poskey, 2006). Attention is the first and foremost of these (Diehl, Semegon, & Schwarzer, 2006; Tanribuyurdu, 2012). It thus follows that those in possession of non-judgmental acceptance of aversive or challenging physical and emotional experiences have diminished levels of perceived stress (Gawrysiak, Leong, Grassetti, Shorey, & Baime, 2016). For this reason, this study finds the cognitive flexibility and mindfulness role in the relationship between perceived stress and distress tolerance to be worthy of further exploration.

### **3. The Mediator Role of Cognitive Flexibility and Mindfulness**

Cognitive flexibility is defined as the human capability to ponder flexibly and to adapt cognitive processing strategies during the new or unexpected conditions. Cognitive flexibility has been understood as the presence of two cognitive processes; differentiation and integration. Differentiation is the ability to recognize various dimensions and to take account of these when forming a perspective. Integration is the ability to comprehend the connections between these various dimensions (Cheng, 2003; 2005). Attention is an important element in both cognitive processes. Moreover, cognitive flexibility is so crucial for effective regulatory abilities (Murphy, Michael, Sahakian, 2012). Furthermore, these regulatory abilities are also intrinsically related to attentional processes (Canas, Fajardo & Salmeron, 2006; Payne, Bettman & Johnson, 1993).

In this regard, Bishop et al. (2004) emphasize that cognitive flexibility – the ability to switch between mental events – is related to the regulation of attention in mindfulness. Mindfulness is generally defined as a psychological state of being attentive to and non-judgmentally aware of the present moment (Bishop, et al., 2004; Brown & Ryan, 2003, Kabat-Zinn, 1994; Dane, 2011) and accepting inner subjective mental experiences, such as feelings, thoughts, sensations, perceptions, hopes, dreams, beliefs, and attitudes (Germer, 2005). Based on this understanding and numerous studies on mindfulness, researchers have proposed four components: 1) the ability to regulate attention, 2) an orientation to present or immediate experience, 3) awareness of experience, and 4) an acceptance or non-judgment approach towards experience.

The first component of the regulation of attention is to be crucial for one's ability to manage their attentional processes. It contains an ability to maintain focused attention over time and the ability to reveal awareness of the present moment. Many studies have stated that cognitive flexibility is heavily linked to mindfulness (Feldman et al., 2007; Frewen, 2008; Moore & Malinowski, 2009). Therefore, cognitive flexibility may be improved via a healthy regulation of attention.

Similarly, regulation of attention is also so vital for distress tolerance. Moreover, many researches (Martin & Anderson, 2001; Bonanno, et al., 2004) emphasize significant relationship between cognitive flexibility and distress tolerance. In this sense distress tolerance, which is seen as the power to control emotions, is associated with one's ability to be cognitively flexible and to regulate emotions. In this sense, people who exhibit a higher capacity of distress tolerance can manage their feelings and develop alternative methods to resolve situations.

In parallel to this, many studies have indicated the significant relationship between mindfulness and distress tolerance (Bishop, 2002; Coffey & Hartman, 2008; Eifert & Heffner, 2003; Siegel, Germer, & Olendzki, 2008). In other words, individuals with low distress tolerance mostly maintain an ability to develop a non-judgmental acceptance and views for aversive or challenging physical and emotional experiences via mindfulness training and their perception of stress may diminish.

As mentioned above, perceived stress has been seen more in university students, but there are few studies that deal with the relationship between cognitive flexibility and distress tolerance (Sheykholeslami, Kiani, Ahmadi, & Soleimani, 2016) and the relationship between mindfulness and distress tolerance (Kraemer, Luberto, O'Bryan, Mysinger, & Cotton, 2016) specifically among university students. Furthermore, there are no studies as of yet, which deal with these four concepts together. Therefore, this study makes a vital contribution to understanding which factors play an important role in distress tolerance among university students. Essentially, understanding which factors play an important role in distress tolerance ought to lead further studies in order to better adapt programs and training sessions accordingly. This study thus aims to examine the mediator role of cognitive flexibility and mindfulness in relationship between perceived stress and distress tolerance among university students.

## 4. Material and Methods

### 4.1 Research Goal

The aim of this study was to investigate the mediator role of cognitive flexibility and mindfulness affecting the relationship between distress tolerance and perceived stress among university students.

### 4.2 Sample and Data Collection

The undergraduate students from the Faculty of Health Sciences of Istanbul Medeniyet University in Turkey have been participated in the study. The participants ranged between the ages of 17-28 with a mean age of 19.90. 73.4% of the participants were female ( $N=306$ ) and 26.6% were male ( $N=111$ ).

In the present study, Distress Tolerance Scale, Cognitive Flexibility Scale, Difficulties in Emotion Regulation Scale, and Resilience Scale were all collected.

#### A. Perceived Stress Scale

This scale is used to measure as to what range situations in a person's life are perceived as stressful. It was developed by Cohen, Kamarck, and Mermelstein (1983) as a self-report scale. High scores represent high levels of perceived stress. There is a 7-reverse item in this scale. The Turkish version of the scale was adapted and validated by Eskin, Harlak, Demirkiran, and Dereboy. (2013). In the Turkish adaptation study of the scale, the factor analysis resulted in two factors: perceived insufficient self-efficacy and perceived stress/distress. The explanatory factor analysis explains 46.5% variance. Item factor loads for perceived insufficient self-efficacy factor items ranged from .44 to .76. Item factor loads for items perceived stress/distress ranged from .18 to .74. The Cronbach's alpha coefficient for the scale came to .84. The test-retest reliability coefficient was .87. In this study, the Cronbach's alpha coefficient for the entire scale came to .72.

#### B. Distress Tolerance Scale (DTS)

Simons and Gaher (2005) developed this self-report scale to measure the capacity to tolerate stress. 15 items have four factors (*tolerate* emotional distress, *appraisal* of distress, attention being *absorbed* by negative emotions, and *regulation* efforts to alleviate distress) with 5-point Likert-type. Sargin et al. (2012) were adapted the scale into Turkish. In the Turkish adaptation study of the scale, the factor analysis resulted in three factors: tolerance, regulation, and self-efficacy. The Cronbach's alpha coefficient for the entire scale came to .89. In this study, the Cronbach's alpha coefficient for the entire scale came to .85.

#### C. The Cognitive Flexibility Scale (CFS)

Martin and Rubin (1995) developed this self-report scale to measure cognitive flexibility. The scale consisted of 12 items with 6-point Likert-type. The total score is obtained by summing up the responses given to each item. Altunkol (2011) adapted this scale into Turkish. The Cronbach's alpha coefficient for the scale came to .81. The test-retest reliability coefficient for a two weeks interval came to .73. In this study, the Cronbach's alpha coefficient for the entire scale came to .76.

#### **D. Mindfulness Attention Awareness Scale**

Brown & Ryan (2003) developed this self-report scale to measure mindful attention awareness. The scale included 15 items with 6-point Likert-type. The total score is obtained by summing up the responses given to each item. The Turkish was adapted by Özyeşil, Arslan, Kesici & Deniz (2011). Item factor loads for each item ranged from .48 to .81. The Cronbach's alpha coefficient for the scale came to .80. The test-retest reliability coefficient is .86. In this study, the Cronbach's alpha coefficient for the entire scale came to .86.

#### **4.3 Data Analysis**

After the ethical permission from the university, data has been collected from undergraduate students at Medeniyet University in Turkey. Before collecting data, the informed consent has been taken from participants. All participants have been voluntary. The participants have been the scales in a paper pen format. All the scales have been filled out around 15 minutes.

Firstly, data entry was controlled to prevent any possible errors. A missing value analysis and outlier analysis were done to see that the data would be suitable with statistical methods. To find the missing values, participants who left more than 10% of the total number of items for each scale were removed from the analysis. In cases where there is a missing value of less than 10% for any scale, the mean score designated for the relevant items is assigned by using series mean method. To find the outliers, z scores were calculated for each continuous variable and the participants exceeding  $\pm 3.29$  were removed from the sample. After that, a correlation analysis was conducted in order to examine the relationships between variables by using the SPSS 20 package program. Finally, the Serial Multiple Mediation Analysis was carried out by PROCESS macro for the SPSS to test the mediation effect. The assumption of serial multiple mediator model is causal association between two or more mediators. The goal in serial multiple mediator model is to examine the direct and indirect effects of X on Y while modeling a process in which X causes  $M_1$ , which in turn causes  $M_2$ , and so forth, conclude Y as a final consequence (Hayes, 2013).

### **5. Results**

#### **5.1 Correlation Analysis**

The variables of this study have been significantly interlinked. Accordingly, the negative correlation between distress tolerance and perceived stress ( $r=-.53, p<.01$ ) has been found. A negative correlation has been also discovered between perceived stress and cognitive flexibility ( $r=-.34, p<.01$ ). Furthermore, a positive correlation between cognitive flexibility and distress tolerance has been found ( $r=.41, p<.01$ ). A positive correlation has also been found between mindfulness and distress tolerance ( $r=.47, p<.01$ ). The Pearson Correlation Coefficients between the variables are shown in Table 1.

**Table 1:** Pearson Correlation Coefficients between Variable

| Variables                | Correlation Coefficients |       |       |      |      |   |
|--------------------------|--------------------------|-------|-------|------|------|---|
|                          | M                        | SD    | 1     | 2    | 3    | 4 |
| 1. Perceived Stress      | 27.49                    | 7.63  | 1     |      |      |   |
| 2. Cognitive Flexibility | 46.03                    | 6.84  | -.34* | 1    |      |   |
| 3. Mindfulness           | 61.96                    | 12.24 | -.43* | .35* | 1    |   |
| 4. Distress Tolerance    | 47.25                    | 9.41  | -.53* | .41* | .47* | 1 |

\* $p < .01$

### 5.2 Serial Multiple Mediation Analysis

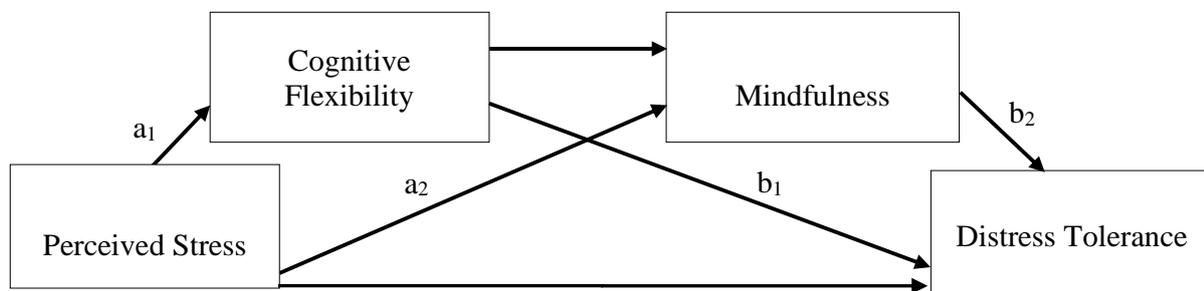
The Serial Multiple Mediator Model developed by Hayes (2013) has been used to determine the mediator role of cognitive flexibility and mindfulness in the relationship between distress tolerance and perceived stress.

There have three indirect effects and one direct effect in this model. As seen in Figure 1, these effects are as follows; the indirect effect of perceived stress on distress tolerance through cognitive flexibility ( $a_1b_1$ ), the indirect effect of perceived stress on distress tolerance through mindfulness difficulties ( $a_2b_2$ ), the indirect effect of perceived stress on distress tolerance through serial mediation of cognitive flexibility and mindfulness ( $a_1d_1b_2$ ). The sum of these three indirect effects indicates the total indirect effect of perceived stress ( $X: a_1b_1 + a_2b_2 + a_1d_1b_2$ ). When the direct effect of perceived stress on distress tolerance is added to total indirect effects, it shows the total effect of perceived stress ( $c$ ).

$$c = c' + a_1b_1 + a_2b_2 + a_1d_1b_2$$

In the serial multiple mediation model, the total indirect effect of perceived stress on distress tolerance is equal to the difference between the total effect of perceived stress on distress tolerance ( $c$ ) and the direct effect of perceived stress on distress tolerance ( $c'$ ).

$$c - c' = a_1b_1 + a_2b_2 + a_1d_1b_2$$



**Figure 1:** Serial Multiple Mediator Model

The direct effect of perceived stress on distress tolerance proved statistically significant ( $c$ 's path;  $\beta = -.41$ ,  $SH = .05$ ,  $t = -7.29$ ,  $p < .01$ ,  $CI [-.52, -.30]$ ). On the other hand, when all mediators (cognitive flexibility and mindfulness) are taken into serial analysis is been

statistically decreased; however, it does not lose its significance ( $c'$ 's path;  $\beta = -.24$ ,  $SH = .06$ ,  $t = -4.61$ ,  $p < .01$ ,  $CI [-.36, -.12]$ ). These findings suggest that some indirect effects mediated by cognitive flexibility and mindfulness are significant to the relationship between perceived stress level and distress tolerance. In this study, three indirect effects have been seen via the serial multiple meditation model. The PROCESS macro for the SPSS has been utilized to investigate these effects. According to the analysis, 10000 bootstrap sampling has been used, with the estimations evaluated in a 95% confidence interval that has been free from bias and has given corrected results.

The first indirect effect (ind1) has been found as that of perceived stress on distress tolerance through cognitive flexibility (perceived stress  $\rightarrow$  cognitive flexibility  $\rightarrow$  distress tolerance),  $a_1b_1 = (-0.13)(0.18) = -0.23$ . This indirect effect has been significantly positive because the bootstrap confidence interval was above zero ( $CI [-.05, -.004]$ ). These findings have suggested that cognitive flexibility decreases in parallel with increased perceived stress ( $a_1$  negative), and that decreasing cognitive flexibility has been associated with decreasing distress tolerance – irrespective of the mindfulness ( $b_1$  positive).

The second indirect effect (ind2) has been the series effect of perceived stress on distress tolerance through cognitive flexibility and mindfulness (perceived stress  $\rightarrow$  cognitive flexibility  $\rightarrow$  mindfulness  $\rightarrow$  distress tolerance),  $a_1d_1b_2 = (-0.13)(0.21)(0.20) = 0.05$ . This indirect effect has proved significantly positive because the bootstrap confidence interval was found to be above zero ( $CI [-0.13, -0.06]$ ). These findings have suggested that people with high perceived stress have lower cognitive flexibility ( $a_1$  negative), cognitively fewer flexible individuals experience less mindfulness ( $d_1$  positive), and thus less mindfulness has been associated with a decrease in distress tolerance ( $b_2$  positive).

The third indirect effect (ind3) is that of distress tolerance through difficulty in mindfulness (perceived stress  $\rightarrow$  mindfulness  $\rightarrow$  distress tolerance),  $a_2b_2 = (-0.67)(0.20) = -0.13$ . This indirect effect has proved significantly positive because the bootstrap confidence interval came to above zero ( $CI [.19, .08]$ ). These findings have suggested that as the perceived stress increases, mindfulness decreases ( $a_2$  negative), and the decrease in mindfulness is associated with a decrease in distress tolerance irrespective of cognitive flexibility ( $b_2$  positive).

Furthermore, it has been found that the model is significant ( $F(3,420) = 33.88$ ,  $p < .001$ ,  $R^2 = .19.4$ ) and explained 19.4% of the total variance. The results of the mediation analysis have been shown in Figure 2 and Table 2.

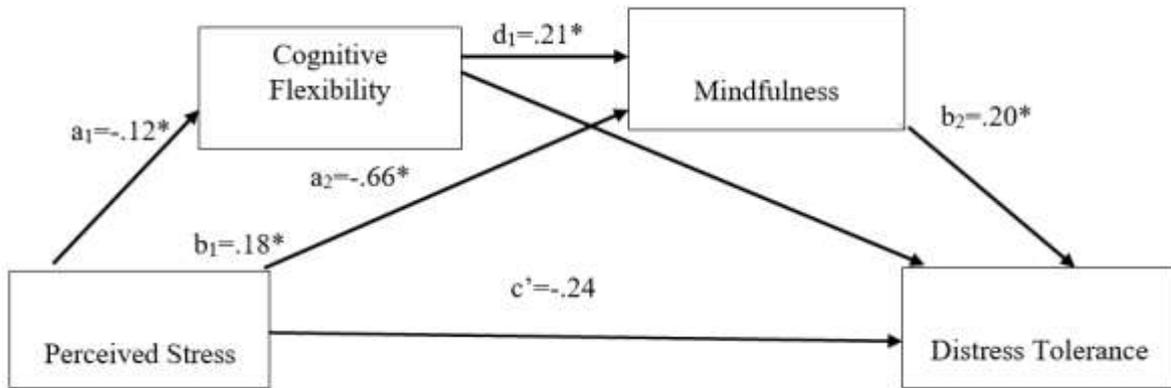


Figure 2: Serial Multiple Mediator Model

Table 2: Serial Multiple Mediation Analysis

| Antecedent           | Consequent                 |       |      |                            |                      |      |                              |                      |           |      |      |      |
|----------------------|----------------------------|-------|------|----------------------------|----------------------|------|------------------------------|----------------------|-----------|------|------|------|
|                      | M <sub>1</sub> (CFS)       |       |      | M <sub>2</sub> (MA)        |                      |      | Y(DST)                       |                      |           |      |      |      |
|                      | Coeff (β)                  | SE    | p    | Coeff (β)                  | SE                   | p    | Coeff (β)                    | SE                   | p         |      |      |      |
| X (PS)               | <b>a<sub>1</sub></b>       | -.13  | .04  | .003                       | <b>a<sub>2</sub></b> | -.67 | .07                          | .000                 | <b>c'</b> | -.25 | .06  | .000 |
| M <sub>1</sub> (CFS) | -----                      | ----- | ---  | <b>d<sub>1</sub></b>       | .21                  | .08  | .007                         | <b>b<sub>1</sub></b> | .18       | .06  | .003 |      |
| M <sub>2</sub> (M)   | -----                      | ----- | ---  | -----                      | -----                | ---  |                              | <b>b<sub>2</sub></b> | .20       | .04  | .000 |      |
| Constant             | 49.59                      | 1.23  | .000 | 70.50                      | 4.38                 | .000 | 32.97                        | 4.30                 | .000      |      |      |      |
|                      | <i>R</i> <sup>2</sup> =.02 |       |      | <i>R</i> <sup>2</sup> =.20 |                      |      | <i>R</i> <sup>2</sup> =.19.4 |                      |           |      |      |      |

$F(1, 422)=8.99, p=.003$        $F(2, 421)=52.94, p=.000$        $F(3, 420)=33.88, p=.000$

M=Mediator, PS=Perceived Stress, CFS=Cognitive Flexibility Scale, M=Mindfulness, DST=Distress Tolerance Scale.

## 6. Discussion and Conclusion

This study has examined the mediator role of cognitive flexibility and the mindfulness, which affects the relationship between perceived stress and distress tolerance among university students. The emerged model has proved to be statistically significant.

First, the study has found that the direct influence of perceived stress on distress tolerance to be statistically significant. On the other hand, when all mediators (cognitive flexibility and mindfulness) have been taken into serial analysis simultaneously, the direct relationship between perceived stress and distress tolerance has been statistically decreased; however, it has not lost its significance. These findings have suggested that some indirect effects mediated by cognitive flexibility and mindfulness may be significant in the relationship between perceived stress level and distress tolerance. Furthermore, in parallel to this, the study model has shown the significance and explained 19.4% of the total variance. The model has been described and discussed below.

In the available literature, many studies have emphasized that university students perceive stress to a far higher degree than non-university students of the same age (Andrews & Wilding, 2004; Eisenberg et al., 2007). Individuals who perceive stress are not necessarily experiencing more stress, however, but are apparently rather more reactive to stress, which is a matter of perception (Danielson et al., 2010; MacPherson et al., 2010). In line with this, many studies (Danielson et al., 2010; Daughters et al., 2009; Hawkins, Macatee, Guthrie, & Cogle, 2013; MacPherson et al., 2010) have stated that the relationship between low distress tolerance and perceived stress. Lynch & Mizon (2011) have stated that individuals with lower stress may notice more stressful events in their environment which lead them to experience more negative effects and have difficulty in coping. Cheng (2003, 2005) has emphasized that the dominant use of any coping strategy prevents individuals from coping with stress effectively. This chimes with the fact that many studies have stated in the sense that people with low distress tolerance have lower levels of cognitive flexibility (Martin & Anderson, 2001; Bonanno, et al., 2004). All these studies have supported the first indirect effect of perceived stress on distress tolerance through cognitive flexibility.

Furthermore, an increase of perceived stress on among university students backs up the significance of the role mindfulness plays in the current literature. Many studies have indicated a relationship between perceived stress and mindfulness (Howel, et al., 2008; Lynch, et al., 2011), and that mindfulness is not only related to perceived stress but also associated with distress tolerance (Bishop, 2002; Coffey & Hartman, 2008; Eifert & Heffner, 2003; Siegel et al., 2008). All of the relationships explained by regulation approaches in the literature. If people regulate their attention and to maintain an awareness of what they perceive, they might be in a better position with which to tolerate stress. All of these are parallel with the result of the indirect effect of distress tolerance through difficulty in mindfulness.

According to the current literature, attention regulation – which referred to as an important element in cognitive flexibility (Murphy et al. 2012) – and distress tolerance, is also the core component of mindfulness. In this sense, there are many studies regarding the relationship between cognitive flexibility and mindfulness (Feldman et al., 2007; Frewen, 2008; Moore & Malinowski, 2009) and the relationship between mindfulness and distress tolerance (Bishop, 2002; Coffey & Hartman, 2008; Eifert & Heffner, 2003; Siegel, Germer, & Olendzki, 2008). In line with such findings, many studies (Howell, Digdon, Buro, & Sheptycki, 2008; Lynch, et al., 2011) have pointed towards a negative relationship between perceived stress and mindfulness among university students. All the above relationships can be explained in terms of attention regulation. If people have difficulty in regulating their attention, they may perceive more stress than is reasonable according to the nature of a given situation. As they have perceived more stress, they may, cognitively speaking, possess a lesser degree of flexibility and be less mindful, which might lead them to preside over a significantly lower distress tolerance. Therefore, the results of these studies are parallel to this, in the sense that another indirect effect of

perceived stress on distress tolerance can be found when one refers to the benefits of cognitive flexibility and mindfulness.

This study undoubtedly has several limitations. Firstly, it is known that there are many different variables that may affect the model of the study. However, it is not possible to include all variables into any one such model. Secondly, social desirability may be seen due to the using self-report measures which may have negatively affected the reliability of the results. Thirdly, female participants participated much than male participants – which may mislead the results in terms of possible gender effect. Last not but least, although perceived stress and distress tolerance are mostly studied in clinical setting, our research has been tested in non-clinical population.

Despite all the aforementioned limitations, the present study also has several contributions. Firstly, the number of Turkish studies examining perceived stress and distress tolerance is so limited, therefore the current study may enlighten on the correlation between perceived stress and distress tolerance. Secondly, this study provides us with a greater understanding of the underlying mechanisms of the relationship between perceived stress and distress tolerance, particularly in terms of the mediator role of cognitive flexibility and of mindfulness in the relationship between perceived stress and distress tolerance. Moreover, the study shows that in the relationship between perceived stress and distress tolerance, cognitive flexibility is as vital as mindfulness. Thus, professionals who are in a position to develop mindfulness intervention programs for university students ought to keep cognitive flexibility in mind and should imbibe mindfulness programs with an acknowledgement of cognitive flexibility into mindfulness programs.

## **7. Recommendations**

For future studies, the number of female and male participants ought to be equated and two separate models ought to be tested for females and males in order to see whether different models could be harnessed to get more incisive results. Finally, there is a need to investigate distress tolerance by using clinical samples. Such results might be analyzed against the clinical population of various age groups to produce interesting results which may further knowledge in the field.

## **References**

- Andrews B., Wilding J. M. (2004). The relation of depression and anxiety to life-stress and achievement in students. *British Journal of Psychology* 95: 509–521.
- Arnett J. J. (2007). Emerging adulthood: What Is It, and What Is It Good For. *Society for Research Child Development* 1(2): 68-73.

- Altunkol F. (2011). Üniversite öğrencilerinin bilişsel esneklik ile algılanan stres düzeyleri arasındaki ilişkinin incelenmesi. Unpublished Master's Thesis, Çukurova University, Adana.
- Asberg K. K., Bowers C., Renk K., McKinney C. (2008). A structural equation modeling approach to the study of stress and psychological adjustment in emerging adults. *Child Psychiatry and Human Development* 39: 481-501.
- Bardeen J. R., Fergus T. A., Orcutt H. K. (2016). Examining the specific dimensions of distress tolerance that prospectively predict perceived stress. *Cognitive Behavior Therapy* 1–13.
- Bishop S. R. (2002). What do we really know about mindfulness-based stress reduction? *Psychosom Med.* 64: 71-83.
- Bishop S. R., Lau M., Shapiro S., Carlson L., Anderson N. D., Carmody J., Devins G. (2004). Mindfulness: A proposed operational definition. *Clinical Psychology: Science and Practice* 11: 230–241.
- Bliesner A. E. (2010). Mindfulness and distress tolerance: A review of the literature.
- Bonanno G. A., Papa A., Lalande K., Westphal M., Coifman K. (2004). The importance of being flexible: The ability to enhance and suppress emotional expression predicts long-term adjustment. *Psychological Science* 15(7): 482–487.
- Brown R. A., Lejuez C. W., Strong D. R., Kahler C. W., Zvolensky M. J., Carpenter L. L., ..., Price L. H. (2009). A prospective examination of distress tolerance and early smoking lapse in adult self-quitters. *Nicotine & Tobacco Research* 11(5): 493-502.
- 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: 822-848.
- Buckner J. D., Keough M. E., Schmidt N. B. (2007). Problematic alcohol and cannabis use among young adults: The roles of depression and discomfort and distress tolerance. *Addictive behaviors* 32(9): 1957-1963.
- Cañas J. J., Fajardo I., Salmerón L. (2006). Cognitive flexibility. Retrieved from <https://pdfs.semanticscholar.org/9a41/bdaf74a12dd6990580ca33ed50678628d1a5.pdf>
- Cheng C. (2003). Cognitive and motivational processes underlying coping flexibility: A dual-process model. *Journal of personality and social psychology* 84(2): 425.
- Cheng C. (2005). Processes underlying gender-role flexibility: Do androgynous individuals know more or know how to cope?. *Journal of Personality* 73(3): 645-674.
- Coffey K., Hartman M. (2008). Mechanisms of action in the inverse relationship between mindfulness and psychological distress. *Complement Health Pract Rev.* 13(2): 79–9.
- Cohen S., Kessler R. C., Gordon L. (1995). *Measuring Stress: A Guide for Health and Social Scientists*, New York, Oxford University Press Inc.
- Cohen S., Kamarck T., Mermelstein R. (1983). A global measure of perceived stress. *Journal of health and social behavior* 385-396.

- Dane E. (2011). Paying attention to mindfulness and its effects on task performance in the workplace. *Journal of Management* 37(4): 997–1018.
- Danielson K. C., McCart M. R., de Arellano M. A., Macdonald A., Doherty L. S., Resnick H. S. (2010). Risk reduction for substance use and trauma-related psychopathology in adolescent sexual assault victims: Findings from an open trial. *Child maltreatment* 15(3): 261-268.
- Daughters S. B., Reynolds E. K., MacPherson L., Kahler C. W., Danielson C. K., Zvolensky M, Lejuez C. W. (2009). Distress tolerance and early adolescent externalizing and internalizing symptoms: The moderating role of gender and ethnicity. *Behaviour research and therapy* 47(3): 198-205.
- Diehl M., Semegon A. B., Schwarzer R. (2006). Assessing attention control in goal pursuit: A component of dispositional self-regulation. *Journal of personality assessment* 86(3): 306-317.
- Dogan T. (2018). Problem areas of students at a university psychological counselling centre: a 16-year analysis. *British Journal of Guidance and Counselling* 46(3): 1-12.
- Eifert G. H., Heffner M. (2003). The effects of acceptance versus control contexts on avoidance of panic-related symptoms. *Journal of Behavior Therapy and Experimental Psychiatry* 34(3-4): 293-312.
- Eisenberg D., Gollust S. E., Golberstein E., Hefner J. L. (2007). Prevalence and correlates of depression, anxiety, and suicidality among university students. *American Journal of Orthopsychiatry* 77: 534–542.
- Eskin M., Harlak H., Demirkiran F., Dereboy C. (2013). The adaptation of the perceived stress scale into Turkish: a reliability and validity analysis. In *New Symp J* 51: 132-140.
- Feldman G., Hayes A., Kumar S., Greeson J., Laurenceau J. (2007). Mindfulness and emotion regulation: The development and initial validation of the Cognitive and Affective Mindfulness Scale-Revised (CMS-R). *Journal of Psychopathology and Behavioral Assessment* 29(3): 177–190. doi:10.1007/s10862-006-9035-8
- Felton J. W., Banducci A. N., Shadur J. M., Stadnik R., MacPherson L., Lejuez C. W. (2017). The developmental trajectory of perceived stress mediates the relations between distress tolerance and internalizing symptoms among youth. *Development and Psychopathology*.
- Frewen P. (2008). Letting go: Mindfulness and negative automatic thinking. *Cognitive Therapy & Research* 32(6): 758–774. Retrieved from EBSCOhost.
- Galaif E. R., Sussman S., Chou C., Wills T. A. (2003). 'Longitudinal Relations Among Depression, Stress, and Coping in High Risk Youth'. *Journal of Youth and Adolescence* 32(4): 243–58.
- Galatzer-Levy I. R., Burton C. L., Bonanno G. A. (2012). Coping flexibility, potentially traumatic life events, and resilience: A prospective study of college student adjustment. *Journal of Social & Clinical Psychology* 31: 542–567.

- Gawrysiak M. J., Leong S. H., Grasseti S. N., Wai M., Shorey R. C., Baime M. J. (2016). Dimensions of distress tolerance and the moderating effects on mindfulness-based stress reduction. *Anxiety, Stress, & Coping* 29(5): 552-560.
- Germer G. (2005). What is mindfulness? In G. Germer, R. Siegel, and P. Fulton (eds), *Mindfulness and Psychotherapy* (pp. 1-27). New York: Guilford.
- Gunnar M., Quevedo K. (2007). The neurobiology of stress and development. *Annual Review of Psychology* 58: 145–173.
- Hammen C. (2005). Stress and depression. *Annual Review Clinical Psychology* 1: 293–319.
- Hayes A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York NY: Guilford.
- Hawkins K. A., Macatee R. J., Guthrie W., Cogle J. R. (2013). Concurrent and prospective relations between distress tolerance, life stressors, and anger. *Cognitive therapy and research* 37(3): 434-445.
- Howard D. E., Schiraldi G., Pineda A., Campanella R., (2006). Stress and mental health among college students: overview and promising prevention interventions. In *Stress and Mental Health of College Students*, edited by M.V., Landow, New York, Nova.
- Howell A. J., Digdon N. L., Buro K., Sheptycki A. R. (2008). Relations among mindfulness, well-being and sleep. *Personality and Individual Differences* 45: 773–777.
- Jekielek S., Brown B. (2005). *The transition to adulthood: characteristics of young adults ages 18-24 in America*. Baltimore, MD: Kids Count/PRB/Child
- Kabat-Zinn J. (1994). *Mindfulness meditation for everyday life*. London: Piatkus Books
- 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. (2005). *Coming to our senses: Healing ourselves and the world through Mindfulness*, New York, Hyperion.
- Kim B. S. K., Omizo M. M. (2005). Asian and European American cultural values, collective self-esteem, acculturative stress, cognitive flexibility, and general self-efficacy among Asian American college students. *Journal of Counseling Psychology* 52: 412–419.
- Kraemer K. M., Luberto C. M., O'Bryan E. M., Mysinger E., Cotton S. (2016). Mind–body skills training to improve distress tolerance in medical students: a pilot study. *Teaching and learning in medicine* 28(2): 219-228.
- Lazarus R. S., Folkman S. (1984). Coping and adaptation. In W.D. Gentry (Ed.), *The handbook of behavioral medicine* (pp. 282-325), New York, Guilford.
- Lengua L. J., Long A. C. (2002). The role of emotionality and self-regulation in the appraisal–coping process: Tests of direct and moderating effects. *Journal of Applied Developmental Psychology* 23(4): 471-493.
- Leyro T. M., Zvolensky M. J., Bernstein A. (2010). Distress tolerance and psychopathological symptoms and disorders: a review of the empirical literature among adults. *Psychological Bulletin* 136(4): 576-600.

- Lynch T. R., Mizon G. A. (2011). Distress overtolerance and distress intolerance: A behavioral perspective.
- Lynch S., Gander M. L., Kohls N., Kudielka B., Walach H. (2011). Mindfulness-based coping with university life: a non-randomized wait-list-controlled pilot evaluation. *Stress and Health*, 40–41.
- MacPherson L., Reynolds E. K., Daughters S. B., Wang F., Cassidy J., Mayes L. C., Lejuez C. W. (2010). Positive and negative reinforcement underlying risk behavior in early adolescents. *Prevention Science* 11(3): 331-342.
- Marshall-Berenz E. C., Vujanovic A. A., Bonn-Miller M. O., Bernstein A., Zvolensky M. J. (2010). Multimethod study of distress tolerance and PTSD symptom severity in a trauma-exposed community sample. *Journal of traumatic stress* 23(5): 623-630.
- Martin M. M., Anderson C. M. (2001). The relationship between cognitive flexibility and affinity-seeking strategies. *Advances in Psychological Research* 4: 69-76.
- Martin M. M., Rubin R. B. (1995). A new measure of cognitive flexibility. *Psychological reports* 76(2): 623-626.
- Miller M. O. (2011). Posttraumatic stress and marijuana use coping motives: The mediating role of distress tolerance. *Journal of Anxiety Disorders* 25: 437–443.
- Monroe S. M. (2008). Modern approaches to conceptualizing and measuring human stress. *Annual Review of Clinical Psychology* 4: 33-52.
- Moore B. A. (2013). Propensity for experiencing flow: The roles of cognitive flexibility and mindfulness. *The Humanistic Psychologist* 41(4): 319–332.
- Moore A., Malinowski P. (2009). Meditation, mindfulness and cognitive flexibility. *Consciousness and cognition* 18(1): 176-186.
- Murphy F. C., Michael A., Sahakian B. J. (2012). Emotion modulates cognitive flexibility in patients with major depression. *Psychol. Med* 42: 1373–1382.
- Nila K., Holt D. V., Ditzen B., Aguilar-Raab C. (2016). Mindfulness based stress reduction (MBSR) enhances distress tolerance and resilience through changes in mindfulness. *Ment. Health Prevent* 4: 36–41. doi: 10.1016/j.mhp.2016.01.001
- Özyeşil Z., Arslan C., Kesici S., Deniz M. (2011). Adaptation of the mindful attention awareness scale into Turkish. *Education and Science* 36(160): 224-235.
- Payne J., Bettman J., Johnson E. (1993). *The adaptive decision maker*. Cambridge, New York.
- Pohlman B., Becker G (2006). Stress knocks hard on your immune system: Asthma and the discourse on stress. *Medical Anthropology* 25: 65-95.
- Potter C. M., Vujanovic A. A. Marshall-Berenz E. C. Bernstein A., Bonn-Miller M. O. (2011). Posttraumatic stress and marijuana use coping motives: The mediating role of distress tolerance. *Journal of Anxiety Disorders* 25(3): 437-443.
- Plessow F., Kiesel A., Kirschbaum C. (2012). The stressed prefrontal cortex and goal-directed behavior: acute psychosocial stress impairs the flexible implementation of task goals. *Exp. Brain Res.* 216(3): 397–408.
- Poskey M. (2006). The importance of emotional intelligence in the workplace, why it matters more than personality.

- Sargin A. E., Özdel K., Utku Ç., Kuru E., Yalçınkaya Alkar Ö., Türkçapar M. H. (2012). Sıkıntıya dayanma ölçeği: Geçerlik ve güvenilirlik çalışması. *Bilişsel Davranışçı Psikoterapi ve Araştırmalar Dergisi* 1: 152-161.
- Schneiderman N., Ironson G., Siegel S. D. (2005). Stress and health: Psychological, behavioral, and biological determinants. *Annual Review of Clinical Psychology* 1: 607-628.
- Seiffge-Krenke I., Aunola K., Nurmi J.-E. (2009). Changes in stress perception and coping during adolescence: The role of situational and personal factors. *Child Development* 80: 259-279.
- Sellers R. M., Caldwell C. H., Schmeelk-Cone K. H., Zimmerman M. A. (2003). Racial identity, racial discrimination, perceived stress, and psychological distress among African American young adults. *Journal of Health and Social Behavior* 44(3): 302-317.
- Sheykholeslami A., Kiani A. R., Ahmadi Sh., Soleimani E. (2016). On the prediction of tendency to drug use based on behavioral activation and inhibition systems, cognitive flexibility, and distress tolerance among students. *J Res Addict.* 10(39): 109-28.
- Siegel R., Germer C., Olendzki A. (2008). Mindfulness: What is it? Where did it come from? In F. Didonna (Ed.), *Clinical handbook of mindfulness* (pp. 17-36). New York, NY, Springer.
- Simons J. S., Gaher R. M. (2005). The distress tolerance scale: Development and validation of a self-report measure. *Motivation and Emotion* 29(2): 83-102.
- Skinner E. A., Zimmer-Gembeck M. J. (2007). The development of coping. *Annual Review of Psychology* 58: 119-144.
- Tanrıbuyurdu E. F. (2012). Okul öncesi öz-düzenleme ölçeği geçerlik ve güvenilirlik Çalışması. Unpublished Master's Thesis, Hacettepe University, Ankara.
- Tavolacci M. P., Ladner J., Grigioni S., Richard L., Villet H., Dechelotte P. (2013). Prevalence and association of perceived stress, substance use and behavioral addictions: a cross-sectional study among university students in France, 2009-2011. *BMC public health* 13(1): 724.
- Zvolensky M. J., Vujanovic A. A., Bernstein A., Leyro T. (2010). Distress tolerance: Theory, measurement, and relations to psychopathology. *Current Directions in Psychological Science* 19(6): 406-410.
- Zvolensky M. J., Leyro T. M., Bernstein A., Vujanovic A. A. (2011). Historical perspectives, theory, and measurement of distress tolerance. In M. J. Zvolensky, A. Bernstein & A. A. Vujanovic (Ed.), *Distress tolerance: Theory, research, and clinical applications* (pp. 3-27). New York, NY, The Guilford Press.

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