The Relationship between Resilience and Distress Tolerance in College Students: The Mediator Role of Cognitive Flexibility and Difficulties in Emotion Regulation

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Abstract: The purpose of this study is to examine the mediator role of cognitive flexibility and difficulties in emotion regulation in the relationship between resilience and distress tolerance amongst college students. The sample of the study involved 1114 students (771 females, 343 males) from various universities in Turkey. The mean age of the sample was 20.65 (Sd=2.77). The Resilience Scale, Distress Tolerance Scale, Cognitive Flexibility Scale, and Difficulties in Emotion Regulation Scale (DERS) had been used to collect data. In this study, a Serial Multiple Mediation Model was used, as proposed by Hayes. The findings showed that people with a higher level of distress tolerance possess higher degrees of cognitive flexibility and that cognitively more flexible individuals experience less difficulty in emotion regulation, and thus, lower levels of difficulty in emotion regulation were associated with an increase in resilience. Furthermore, the model in its entirety had proven to be statistically significant, accounting for 42% of the total variance.

Keywords: *Resilience, distress tolerance, cognitive flexibility, difficulties in emotion regulation.*

Introduction

Over the past decade, mental health professionals have indicated that there is a rising number of college students facing many mental health issues, especially psychological problems, compared to previous generations (Benton, Robertson, Tseng, Newton, & Benton, 2003; Eisenberg, Hunt, & Speer, 2013; Galatzer-Levy, Burton & Bonanno, 2012; Tavolacci et al., 2013). A study which has looked at Turkish college students from the 1980s to 2016 has shown that students suffer from progressively more stress compared to previous generations and have amassed a higher number of issues in general. According to this study, most students have attended individual counseling services, especially due to "relationship problems" (Dogan, 2018). Several studies have supported previous findings in the USA pointing a noticeable increase in the prevalence of psychological problems such as depression and anxiety disorders among university students (Hunt & Eisenberg, 2010). Similarly, in the United Kingdom, students who have applied for psychological help from university counseling services generally have a higher number of mental health problems. Of these students, nearly a third have serious mental health problems at a clinical level (Association of University College Counselling, 2011).

University students have experienced many issues, ranging from personal, financial, vocational, interpersonal to academic, social (Howard, Schiraldi, Pineda & Campanella, 2006). In terms of coping with these problems, college students have a range of similar strategies. Dao, Donghyuck and Chang (2007) have pointed out, however, that many of these ineffective or maladaptive coping strategies have led to vulnerability and depression, a serious mental health issue among students. Research on coping mechanisms has identified a number of paradigms underlying the coping process. Researchers have suggested that traits such as resilience, self-efficacy and secure attachment are related to cognitive appraisal based coping processes. Moreover, resilient individuals often possess a positive view of stressful situations and tend to manage their issues effectively (Garmezy, 1991; Ong, Bergeman, Bisconti & Wallace, 2006). It is

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for this reason that this study finds the factors influencing the relationship between resilience and distress tolerance to be worthy of further exploration.

The Relationships between Resilience and Capacity of Distress Tolerance

Resilience has been described as an individual's ability to return to a former state in spite of having gone through a stressful situation (Garmezy, 1993). Mangham, McGrath, Reid and Stewart (1999) have defined resilience as an effective coping strategy that individuals, families and communities can employ in stressful or risky situations.

Current literature points to resilience as being based on two dimensions; risk factors and protective factors. Risk factors refer to negative circumstances, whether actual or potential. Moreover, risk factors also cover a variety of situations that lead to maladaptive behaviors or psychopathological patterns (Baldwin et al., 1993; Hawkins, Catalona & Miller, 1992; Werner, 1984). On the other hand, protective factors help to reduce the negative effects of risky situations and individuals' developmental needs (Mangham et al., 1999). The presence of protective factors both prevent the risk factors and strengthen well-being.

Distress tolerance is taken as a protective factor within the scope of resilience. Distress tolerance refers to the experience and tolerance of a negative psychological state. Distress arises as a result of cognitive or physical processes but manifests itself as an emotional state (Simons & Gaher, 2005). As a result, the ability to distress tolerance is expressed as the capacity of a person to control all these emotional states. In the literature, the relationship between the difficulty in distress tolerance and emotion regulation has been discussed in numerous studies.

In some, it has been suggested that excessive impulsive behaviors and emotional fluctuations were seen in individuals with a borderline personality disorder can reduce the discomfort experienced and allow these individuals to endure lower levels of distress (Linehan, 1993). As a result, Linehan's dialectical behavioral therapy model is one of the main components of the treatment and aims to increase the capacity of distress tolerance.

Other studies related to distress intolerance suggest that people with lower levels of tolerance to inconvenience are more inclined to show maladaptive behavioral (such as substance use) and emotional responses (such as avoidance) (Brown et al., 2009; Buckner, Keough, & Schmidt, 2007), and risk-taking (MacPherson et al., 2010), trauma symptoms (Marshall-Berenz, Vujanovic, Bonn-Miller, Bernstein, & Zvolensky, 2011; Vujanovic, Bonn-Miller, Potter, Marshall-Berenz, & Zvolensky, 2011) when faced with a stressful circumstance or event. As a result, it is reported that people with lower levels of distress tolerance have difficulty in coping with stressful situations and have some difficulties in regulating their feelings (Simons & Gaher, 2005).

Consequently, it is understood that the capacity to muster distress tolerance plays an important role in the etiology of psychological problems; and this is also considered one of the factors that aim to increase the effects of psychotherapy (Linehan et al., 2006; McHugh, Reynolds, Leyro & Otto, 2013).

The Mediator Role of Cognitive Flexibility and Difficulties in Emotion Regulation

Cognitive flexibility is described as an ability to think flexibly and change perspectives and approaches easily. It is also explained as a kind of cognitive information processing and includes an adaptation process to new things (Canas, Fajardo & Salmeron, 2006; Payne, Bettman & Johnson, 1993).

In terms of the cognitive flexibility process, individuals who realize their options and alternatives and are eager to apply flexibility and adapt to a situation, often see themselves as competent in flexible thinking and behaving (Martin & Rubin, 1995). Therefore, cognitive flexibility is improved via learning.

Martin and Anderson (2001) claim that if an individual seeks to behave in a flexible way, they have to think flexibly in advance. Moreover, current literature reveals a significant relationship between cognitive flexibility and emotional regulation.

Similarly, a significant relationship has been found between distress tolerance, cognitive flexibility and emotional regulation. Accordingly, distress tolerance, which indicates the power to control emotions, is related to one's ability to be cognitively flexible and to regulate emotions. In this sense, people who exhibit a higher capacity of distress tolerance can arrange their feelings and develop alternative methods to resolve a situation.

Leyro, Zvolensky & Bernstein (2010), in his review of the relationship between difficulty to endure and psychological problems, suggests that recent studies have drawn attention to the relationship between the capacity to tolerate distress and psychological resilience, although the factors affecting this relationship need further investigation.

Methodology

Research Goal

This study aims to examine the mediator role of cognitive flexibility and the difficulties in emotion regulation which affects the relationships between resilience and distress tolerance, among college students.

Sample and Data Collection

1114 undergraduate students from different universities in Turkey have participated in the study. The participants were between the ages of 18-27 and the mean age was 20,65. 69,2% of the participants were female (*N*=771) and 30,8% were male (*N*=343).

In the present study, the following scales have been used**:** Distress Tolerance Scale, Cognitive Flexibility Scale, Difficulties in Emotion Regulation Scale, and Resilience Scale.

Distress Tolerance Scale (DTS): This scale was used to measure personal differences in the capacity to tolerate distress. It has been developed by Simons and Gaher (2005) as a self-report scale. It has 15 items involving four factors measuring the perceived ability to *tolerate* emotional distress, subjective *appraisal* of distress, attention being *absorbed* by negative emotions, and *regulation* efforts to alleviate distress. Its items were rated on a 5-point Likert-type scale: (5) Strongly disagree, (4) Mildly disagree (3) Agree and disagree equally, (2) Mildly agree, (1) Strongly agree. High scores represented high levels of distress tolerance. The Turkish version of the scale has been adapted and validated by Sargin et al. (2012). In the Turkish adaptation study of the scale, the factor analysis has resulted in three factors: tolerance, regulation and self-efficacy. The Cronbach's alpha coefficient for the entire scale has come to .89. In this study, the Cronbach's alpha coefficient for the entire scale has come to .84.

The Cognitive Flexibility Scale (CFS): This scale was used to determine an individual's level of cognitive flexibility. It has been developed by Martin and Rubin (1995) as a self-report scale. It has 12 items rated on a 6-point Likert-type scale. The total score was obtained by summing up the responses given to each item. High scores showed high levels of cognitive flexibility. In this study, the Turkish version of the scale has been used, as validated by Altunkol (2011). The Cronbach's alpha coefficient for the scale has come to .81. The test-retest reliability coefficient for a two weeks interval has come to .73. In this study, the Cronbach's alpha coefficient for the entire scale has come to .81.

Difficulties in Emotion Regulation Scale (DERS): This scale was used to determine the emotion regulation problems. It has 36 items rated on a 5-point Likert-type scale, with higher scores indicating difficulty in emotion regulation. The scale includes six subscales, which are (a) lack of awareness of emotional responses *(awareness)*; (b) lack of clarity of emotional responses *(clarity)*; (c) non-acceptance of emotional responses *(non-acceptance)*; (d) limited access to effective strategies *(strategies)*; (e) difficulties in controlling impulsive behavior when experiencing negative affect *(impulse)*; and (f) difficulties in engaging in goal-directed behavior when experiencing negative *goals*. The Cronbach's alpha coefficient has come to .93 for the total scale (Gratz & Roemer, 2004). The Turkish version of the scale has been adapted and validated by Ruganci and Gencoz (2010). The six-factor structure of the scale is confirmed in the Turkish version. The internal consistency coefficient of the total scale was .94 and the internal consistency coefficients of the subscales were valued at between .75 and .90. The test-retest reliability of the scale has been found to be .83 in the Turkish version. In this study, the Cronbach's alpha coefficient for the entire scale has been found to be .92.

Resilience Scale (RS): The Resilience Scale was a self-report measure assessing the degree of resilience in individuals (Wagnild & Young, 1993). It has 24 items rated on a 7-point Likert-type scale. Higher scores indicated high levels of resilience. The Turkish version of the scale has been adapted and validated by Terzi (2006). The Cronbach's alpha coefficient for the scale has been found to be .82. The test-retest reliability coefficient over a two-week interval has been found to be .84. Thus, the 24 item RS has satisfactory psychometric properties as a measure of resilience for college students. In this study, the Cronbach's alpha coefficient for the entire scale has been found to be .93.

Data Analysis

After acquiring the necessary ethical permission from the ethical committee of the university, data have been collected from undergraduate students across institutions in Turkey. Participation in the study has been voluntarily. Before starting to collect data, a written informed consent form, in which participants have been informed about the purpose of the study and have been assured of confidentiality, has been given. The participants who have confirmed their consent to participate in the study have been given the scales in a paper-pen format. It has taken around 15 minutes to fill out all of the scales.

First of all, data entry has been checked to avoid possible errors. After this, missing value analysis and outlier analysis have been performed to ensure that the data would be compatible with statistical methods. To determine the missing values, participants who have left more than 10% of the total number of items for each scale have been excluded from the analysis. In cases where there is a missing value of less than 10% for any scale, the mean score has been determined for the relevant items is assigned by using the series mean method. To determine the outliers, z scores have been

calculated for each continuous variable, and the participants exceeding ± 3.29 have been excluded from the sample. After that, the correlation analysis has been conducted to detect the relationships between variables by using SPSS 20 package program. Finally, the Serial Multiple Mediation Analysis has been carried out by the PROCESS macro for SPSS to test the mediation effect. The assumption of a serial multiple mediator model is a causal association between two or more mediators. The goal when an investigator estimates a serial multiple mediator model is to investigate 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).

Findings / Results

Correlation Analysis

The variables included in the study were significantly associated with each other. Accordingly, there was a positive correlation between resilience and distress tolerance (r= .34, p<.01). There has been a negative correlation between difficulty in emotion regulation and resilience (r= -.50, p<.01); a positive correlation has been found between cognitive flexibility and resilience (r= .62, p<.01). The Pearson Correlation Coefficients between the variables were shown in Table 1.

Table 1. Pearson Correlation Coefficients between variables

Variables	M	SD	1	2	3	4
1. Distress Tolerance	34.40	17.33	1			
2. Difficulties in Emotion Regulation	61.71	15.14	-.51*	1		
3. Cognitive Flexibility	91.09	19.34	.39*	-.59*	1	
4. Resilience	65.19	17.59	.34*	-.50*	.62*	1

*p<.01

Serial Multiple Mediation Analysis

The Serial Multiple Mediator Model proposed by Hayes (2013) has been used in determining the mediator role of emotion regulation difficulties and cognitive flexibility in the relationship between resilience and distress tolerance.

This model has three indirect effects and a direct effect. As shown in Figure 1, these effects are as follows; the indirect effect of distress tolerance on resilience through cognitive flexibility (a_1b_1), the indirect effect of distress tolerance on resilience through emotion regulation difficulties (a_2b_2), the indirect effect of distress tolerance on resilience through the serial mediation of cognitive flexibility and emotion regulation difficulties ($a_1d_1b_2$). The sum of these three indirect effects indicates the total indirect effect of distress tolerance (X: $a_1b_1 + a_2b_2 + a_1d_1b_2$). When the direct effect of distress tolerance on resilience is added to total indirect effects, this shows the total effect of distress tolerance (c).

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

In the serial multiple mediation model, the total indirect effect of distress tolerance on resilience is equal to the difference between the total effect of distress tolerance on resilience (c) and the direct effect of distress tolerance on resilience (c').
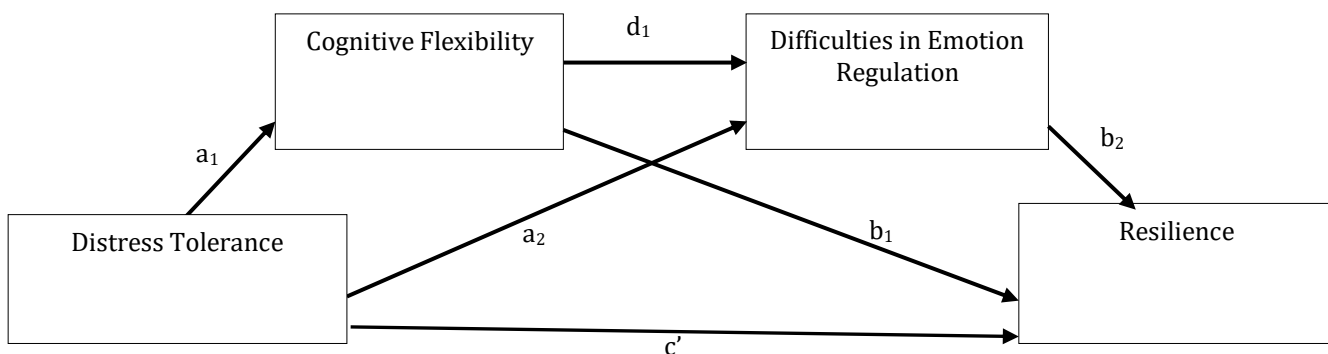
$$c - c' = a_1b_1 + a_2b_2 + a_1d_1b_2$$

Figure 1. Serial Multiple Mediator Model

The direct effect of distress tolerance on resilience has not proven to be statistically significant (c' = .12, t(1110) = 1.88, p = .060). In this study, the serial multiple mediation model showed three indirect effects. The PROCESS macro for SPSS

has been used to examine these. In the analysis, 10000 bootstrap sampling has been used, with the estimations evaluated in a 95% confidence interval that was free from bias and gave corrected results.

The first indirect effect (ind1) was the indirect effect of the distress tolerance on resilience through cognitive flexibility (distress tolerance → cognitive flexibility → resilience), $a_1b_1 = (0.39)(1.23)= 0.48$. This indirect effect was significantly positive because the bootstrap confidence interval was above zero (CI [.39, .58]). These findings suggested that cognitive flexibility increases in parallel with increased distress tolerance (a_1 positive), and that increasing cognitive flexibility was associated with increased resilience – irrespective of the emotion regulation difficulties (b_1 positive).

The second indirect effect (ind2) was the series effect of distress tolerance on resilience through cognitive flexibility and emotion regulation difficulties (distress tolerance → cognitive flexibility → difficulty in emotion regulation → resilience), $a_1d_1b_2= (0.39)(-1.00)(-0.21) = 0.08$. This indirect effect was significantly positive because the bootstrap confidence interval was above zero (CI [.05, .12]). These findings suggested that people with high distress tolerance have higher cognitive flexibility (a_1 positive), cognitively more flexible individuals experience less difficulty in emotion regulation (d_1 negative), so less difficulty in emotion regulation was associated with an increase in resilience (b_2 negative).

The third indirect effect (ind3) was the indirect effect of distress tolerance on resilience through difficulty in emotion regulation (distress tolerance → difficulty in emotion regulation → resilience), $a_2b_2= (-0.71)(-0.21) = 0.15$. This indirect effect was significantly positive because the bootstrap confidence interval was above zero (CI [.09, .21]). These findings suggested that as the distress tolerance increases, emotion regulation difficulties decrease (a_2 negative), and the decrease in emotion regulation difficulties was associated with an increase in resilience- irrespective of cognitive flexibility (b_2 negative).

In addition, it has been found that the model has been significant ($F(3,1110) = 266.13$, $p< .001$, $R^2= .42$) and has explained 42% of the total variance. The results of the mediation analysis were shown in Figure 2 and Table 2.
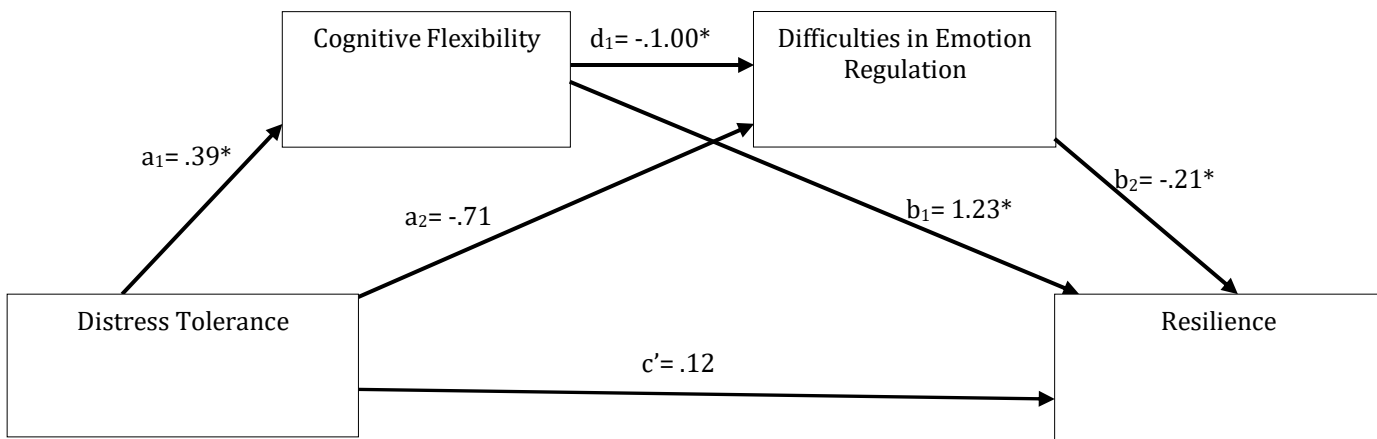

Figure 2. Serial Multiple Mediator Model

Table 2. Serial Multiple Mediation Analysis

	$M_1(CFS)$				$M_2(DERS)$				$Y(RS)$			
Antecedent	**Coeff**	**(β)**	**SE**	**p**	**Coeff**	**(β)**	**SE**	**p**	**Coeff**	**(β)**	**SE**	**p**
X (DTS)	a_1	0.39	.03	.000	a_2	-.71	.05	.000	c'	.12	.07	.06
M_1 (CFS)	-----	------	---		d_1	-1.00	.05	.000	b_1	1.23	.07	.000
M_2 (DERS)	-----	-----	----		-----	-----	----		b_2	-.21	.03	.000
Constant	31.80	1.38		.000	177.94	2.98	.000		69.50	7.01	.000	
		$R^2 = .15$				$R^2 = .43$				$R^2 = .42$			
	$F(1, 1112) = 197.43, p = .000$				$F(2, 1111) = 425.98, p = .000$				$F(3, 1110) = 266.13, p = .000$			

M= Mediator, DTS= Distress Tolerance Scale, CFS= Cognitive Flexibility Scale, DERS= Difficulties in Emotion Regulation Scale, RS= Resilience Scale

Discussion and Conclusion

This study has examined the mediator role of cognitive flexibility and the difficulties in emotion regulation, which affect the relationships between resilience and distress tolerance among college students. The emerged model fit has indicated that the model corresponds with the data excellently. Also, all paths, except those regarding the direct effect of distress tolerance on resilience, have shown coefficient values that have attested to significant relationships between the variables of the model.

First of all, the study has found that the direct influence of distress tolerance to resilience has not been statistically significant although there has been a significant correlation between distress tolerance and resilience. This result might be explained by the fact that two variables may be interwoven, which leads to showing no direct influence in distress tolerance regarding resilience. Hayes (2013) also claims that it does not matter in the serial model the direct influence between two variables. Furthermore, parallel to this, the study model has shown the significance and explained 42% of the total variance. The underlying mechanism of the model has been explained and discussed below.

The current literature on resilience (Galatzer-Levy, et al., 2012; LaLande & Bonanno, 2011, Sargent, Crocker, & Luhtanen, 2006) has emphasized college students' stress and vulnerability to the traumatic events. On the other hand, many college students have exhibited no signs of psychopathology as a result of their levels of emotional flexibility (Bonanno, Papa, Lalande, Westphal, & Coifman, 2004; Gupta & Bonanno, 2011; Galatzer-Levy, et al., 2012). Emotional flexibility, a key ingredient in distress tolerance, has also allowed for the ability to cope adaptively in an aversive situation (Simons & Gaher, 2005). In the related literature, there have been many studies (Leyro et al., 2010, Waugh, Thompson & Gotlib, 2011) that pointed to emotional flexibility is potentially related to resilience. All of these conclusions can be found in were parallel to our research result.

Zvolensky, Vujanovic, Bernstein and Leyro (2010) also underlined that distress tolerance may affect and be affected by cognitive, emotional and physical regulation. All of these regulations, emotional regulation (Karreman & Vingerhoets, 2012; Tugade & Fredrickson, 2006), cognitive regulation (Min, Yu, Lee & Chae, 2012), and physical regulations (Sullivan et al., 2018), are resilience. From this point of view, it can be considered that there are some factors that affect the relationship between distress tolerance and resilience.

One which our study found referred to cognitive flexibility. In this study, it has been shown that distress tolerance increases the in line with cognitive flexibility significantly, and that as cognitive flexibility increases so too does resilience. Thus, cognitive flexibility has a mediator role in the relationships between resilience and distress tolerance in college students. Many studies have revealed that the cognitive flexibility of a person changes their perspectives in a way crucial to distress tolerance (Martin & Anderson, 2001) and resilience (Bonanno et al., 2004). Previous studies may thus be supported by the present findings.

Furthermore, many studies indicated the correlation between cognitive flexibility and positive emotions (Fredrickson, 2003; Goschke & Bolte, 2014; Hirt, Devers & McCrea 2008; Lin, Tsai, Lin, & Chen, 2014; Yang, Yang, & Isen, 2013). Empirical evidence indicates that positive affect may assist individuals in using flexible strategies in many cognitive tasks such as exploration of new ideas and improving executive functions (Fredrickson, 2003). According to the broaden and build theory (Fredrickson, 2001), positive emotions may enhance an individuals' thoughts and provide flexible attention which may affect one's well-being positively. Plus, individuals may easily regulate emotions and many studies have indicated that emotional regulation strategies may directly influence distress tolerance (Bardeen, Tull, Dixon-Gordon, Stevens, & Gratz, 2015; Gratz & Roemer, 2004). Meanwhile, emotional regulation showed a strong related to resilience (Masten, 2001; Tugade & Fredrickson, 2006). In parallel with these studies, it is shown that as distress tolerance increases, so does cognitive flexibility, with the result of a significant increase in emotional regulation and thus resilience. Therefore, the present study emphasizes that both cognitive flexibility and difficulty in emotional regulation has a mediator role in the relationships between resilience and distress tolerance in college students.

This study has a number of limitations. First of all, it is known that there are many different variables affecting this study's model. However, as all of these variables cannot be included in the study's model, the research is limited in that it ignores the effects of these variables. Second, using self-report measures may allow for the manifestation of social desirability effects in participants' response, i.e. that participants may not give honest answers to the questions in the survey. Therefore, socially desirable responding may have affected the reliability of the results adversely. Third, the number of female participants has been higher than their male counterparts, which may mislead the results in terms of possible gender effect. Furthermore, this study has a problem in terms of generalizability due to the fact that participants have been undergraduate students at a private university in Istanbul. Last not but least, although distress tolerance and resilience are mostly studied in clinical setting, our researcher has been tested in non-clinical population.

Despite all the mentioned limitations above, the present study also has a number of strengths. One of them has been that the number of Turkish studies investigating distress tolerance and resilience is limited, so the current study may shed light on the correlation between distress tolerance and resilience. Secondly, this study provided us with a greater understanding of the underlying mechanisms of the relationship between distress tolerance and resilience, especially in terms of the mediator role of cognitive flexibility and of difficulties in emotional regulation in the relationship between distress tolerance and cognitive flexibility. Furthermore, the study showed that in an adverse situation, to

remain tolerant and resilient a person must be flexible in cognition and emotion. Thus, professionals may develop an intervention program according to these results.

Suggestions

In future studies, by equating the number of female and male participants, two separate models may be tested for females and males to see whether different models may be seen in future studies. Finally, there is a need to examine distress tolerance using clinical samples. Thus, these results may be tested against the clinical population of various age groups.

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