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Original Article

Effects of adverse childhood events over metacognitions, rumination, depression and worry in healthy university students

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Abstract

Aim: Adverse childhood experiences observed the various physical and mental problems that emerged in the later periods of life were found to be significantly associated. The aim of this study is to compare anxiety and depression, rumination and metacognitions of individuals who experienced adverse childhood events and individuals with no adverse childhood events, even though they do not develop any psychopathology.

Material and Methods: The sample of the study consisted of 275 university students who were applied SCID-I and SCID-II and no psychopathology. Adverse Childhood Experiences Scale Turkish Form (ACE-TR), Metacognition Questionnaire-30 (MCQ-30), Ruminative Thought Style Questionnaire (RTSQ), Positive-Negative Beliefs about Rumination Scale, Penn State Worry Scale, Generalized Anxiety Disorder-7, Beck Depression Inventory were applied to volunteers who met the criteria of inclusion in the study.

Results: Participant with ACE-TR score greater than 0, 'Negative Beliefs about Uncontrollability and Danger', 'Lack of Cognitive Confidence', 'Need to Control Thoughts', 'Cognitive Self Consciousness' and total scores were statistically higher than those with ACE-TR score 0. The participant with ACE-TR scores greater than 0 had RTSQ, PBRS, NBRS, NBRS -1, PSWQ, GAD-7 and BDI scores were statistically higher than those with ACE-TR score 0.

Discussion: Even though negative childhood experiences do not lead to psychopathology, they may trigger the emergence of dysfunctional metacognitions which leads to more anxiety and rumination and make the individual vulnerable for further stressful life events and might decrease resilience.

Keywords: Metacogniton; adverse childhood events; rumination; worry; depression; anixety.

INTRODUCTION

Human life consists of many different events, positive and negative experiences. The impact of the negative experiences differs through trajectory. Physical, sexual, psychological abuse, neglect and adverse conditions observed in the home environment before the age of 18 and the various physical and mental problems that emerged in the later periods of life were found to be significantly associated (1). In addition, it is suggested that the presence of a history of least one of these adverse childhood experiences, may be a predictor for psychopathologies such as PTSD, depressive disorder, and attempted suicide (2). When the number of adverse childhood experiences increases, the long term risks of mental health issues such as substance abuse, depression, suicide attempts, risky sexual behaviors and physical health risks such as cardiovascular diseases, cancer, lung diseases, bone fractures, liver diseases increase as well (3). Although many factors determine the diversity of thoughts and behaviors, there are different sources, theories, and models that explain the etiology of psychopathology. One of these is the Self-Regulatory Executive Function Model (4), proposes Cognitive Attentional Syndrome (CAS) leads to psychopathology which consists of worry/ rumination, threat monitoring, self- focused attention

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and unhelpful coping strategies such as avoidance, reassurance seeking, self-medication, alcohol/substance use and thought suppression as a means of controlling or avoiding worry, rumination, depression, anxiety and stress in response to undesirable internal events (5). It has been stated that CAS is formed and continued due to positive and negative metacognitions. Positive metacognitive beliefs are about the effectiveness of coping with CAS to deal with the perceived threat and negative internal trigger, and negative metacognitive beliefs are uncontrollability of worrying, rumination and the dangerous consequences for the physical, psychological, and social functioning which lead to continuous dysfunctional coping towards internal triggers as CAS (6).

In a recent survey that was conducted in 500 adults showed that higher ACEs are associated with decreased efficient emotion regulation strategies, such as lower levels of cognitive reevaluation and mindfulness as well as higher levels of thought suppression and rumination (7,8).

Martin and Tesser define the term "rumination" in several ways, as conscious thoughts about the same issue in perseverative style without an environmental necessity (9). Furthermore, past focused individuals used to ruminate on their past unfavorable life events, thus reported more psychological disturbances compared to present focused as well as future-focused ones (10).

Individuals who experience traumatic events could develop trauma-related depression due to traumatic ruminations even in the absence of TSSB (11-13). Besides, post-traumatic sequelae of unfavorable childhood events were found to be associated with negative affection and retrospective interpretation of these events, rather than the intensity of this negative affection (12). Individuals with strong dysfunctional metacognitive beliefs are more likely to experience distressing intrusions about traumatic events which lead to negative perceptions about themselves and the world, leading to the continuity of dysphoric moods and ruminations in the long term (7).

Experiencing trauma can interpret the memory spaces that would be encountered when the traumatic experience is tried to be remembered. Clear and complete memory would be perceived as a necessity in order to prevent the recurrence of the traumatic experience and recovery due to positive metacognitive beliefs about the exactness of human memory (14) which may result rumination and memory filling and can keep the focal point in the incident and hinder the adaptation process (15).

This study hypothesizes that individuals who experienced adverse childhood events might have higher levels of anxiety and depression, rumination and worry, and have stronger believe that rumination and worrying as useful, dangerous and uncontrollable even though they do not develop any psychopathology when compared to individuals with no adverse childhood events.

MATERIAL and METHODS

Participants

The sample of the study consisted of healthy volunteer university students (health board, trainee) who applied to the Validebağ Service Building of Haydarpaşa Numune Hospital between September 2018 and March 2018. The sample size was planned by power analysis in accordance with the literature (2). The sociodemographic data form was applied to 420 volunteer university students who accepted to participate in the study. According to the sociodemographic data form, participants with present regular substance use, history of suicide attempt, present psychotropic drug use and who have had present psychopathology were excluded from the study. After the exclusion criteria applied, 345 participants were performed Structured Clinical Interview for DSM-IV (SCID)-1 and SCID-2. Additionally, those who were found to have psychopathology according to SCID-1 and 2 were excluded. After 145 volunteers who did not meet the inclusion criteria were excluded from the study, finally, 275 volunteers were included in the study.

As the inclusion criteria; a) volunteering to participate in the study, b) not having psychopathology according to SCID 1 and SCID 2, c) not abusing a substance, d) not having a history of attempted suicide, e) not having any psychiatric diagnose, f) not using psychiatric medication, were determined.

Study Design

After completing the socio-demographic data form, researchers applied SCID-1 and SCID-2 to volunteers. Adverse Childhood Experiences Scale Turkish Form (ACE-TR), Metacognition Questionnaire-30 (MCQ-30), Ruminative Thought Style Questionnaire (RTSQ), Positive-Negative Beliefs about Rumination Scale, Penn State Worry Scale, Generalized Anxiety Disorder-7, Beck Depression Inventory were applied to volunteers who met the criteria of inclusion in the study. The scale scores, which were evaluated along with the data and instructions collected from the volunteers, were recorded in data sets and analyzed. In order to determine the effect of Childhood Adverse Experiences, we divided the participants into two groups as ACE-TR scores 0 and 1 or above and compared. The local ethics committee approved the study. All stages of the study and the rights of the participants were protected following the Declaration of Helsinki.

Data Collection Tools

Socio-demographic data form; was developed by researchers, to gather information about socio-demographic data as well as age, gender, faculty, marital status, economic status, psychiatric drug use, psychiatric diagnosis, suicide attempt, substance abuse.

Turkish Form of Adverse Childhood Experiences Scale (ACE-TR); developed in order to question the adverse experiences in childhood during the first 18 years of life by Permanente, such as domestic emotional violence, physical violence, sexual violence, abuse, emotional and

physical neglect, and questioning of divorce. The self-report type is a 10-item scale. Each item specified as "Yes" is considered a score, and is summed to obtain the total score. Even the one point score from the scale indicates adverse childhood experiences. Turkish validity and reliability study was performed by Gündüz et al. in 2018. The Cronbach's alpha value of the scale was 0.742 (16).

Metacognition Scale-30; was developed by Cartwright-Hatton and Wells in 2004 (17) to evaluate various metacognitive beliefs and processes. The 4-point Likert type is a self-report type consisting of 30 items. Total score range is 30-120. Five dimensions are evaluated: 'Positive Beliefs about Worry', 'Lack of Cognitive Confidence', 'Negative Beliefs about Uncontrollability and Danger', 'Cognitive Self Consciousness' and 'Need to Control Thoughts'. Turkish validity and reliability were performed by Tosun et al. The Cronbach's alpha value of the scale was between 0.72 and 0.89 (18).

Ruminative Thought Style Questionnaire (RTSQ); was developed by Brinker and Dozois (19) to evaluate the general thought tendency of rumination. 7-point Likert-type scale is a self-report type scale with 20 cut-off points. Turkish validity and reliability were performed by Karatepe et al (20). Cronbach's Alpha for the was 0.94.

The Positive Beliefs about Rumination Scale (PBRS); was developed by Papageorgiou and Wells in 2001 (21) to examine positive metacognitions related to rumination with 0.80 Cronbach's alpha. It is a self-report type consisting of 9 items. Turkish validity and reliability were performed by Yılmaz et al (22).

The Negative Beliefs about Rumination Scale (NBRS); was developed by Papageorgiou and Wells in 2001 (21) to investigate negative metacognition related to rumination. It is a self-report type scale consisting of two dimensions consisting of 13 items. The sub-scales are the uncontrollability and danger of rumination and the interpersonal and social consequences of rumination. Turkish validity and reliability were performed by Yılmaz et al (Cronbach α = 0.85) (22).

The Penn State Worry Questionnaire (PSWQ); was developed by Meyer et al. In 1990 (23) to assess the prevalence, severity, and controllability of generalized and sustained anxiety that is not specific to any subject. It is a 5-point Likert-type scale and consists of 16 items. The increase in the score indicates an increase in pathological anxiety. Turkish validity and reliability were performed by Yılmaz et al. and the Cronbach's alpha coefficient of the scale was 0.93 for the total scores (24).

Generalized Anxiety Disorder-7 (GAD-7); was developed by Spitzer et al. (25) To evaluate common anxiety disorder. It consists of 7 items with 4-point Likert type. Turkish validity and reliability study were performed by Konkan et al. (Cronbach's alpha= 0.852) (26)

Beck Depression Inventory (BDI); was developed by Beck et al. In 1961 (27) to evaluate the symptoms of physical, emotional, cognitive and motivational depressive symptoms. The 4-point Likert-type scale consists of 21 items, and the total score is 0-63. The Turkish validity and reliability study was performed by Hisli et al. with 0.854 Cronbach's alpha (28).

Statistical Analysis

SPSS for Windows version 20.0 was used for statistical analysis. Pearson's chi-square test was used to compare categorical data between the two groups. After the normal distribution suitability was tested for continuous variables, Student's T-test was used for normal distribution, and the Mann-Whitney U test was used for those with the abnormal distribution. Pearson Correlation test was used to examine the relationship between two continuous variables. P values less than 0.05 were considered statistically significant.

RESULTS

The sociodemographic data of the participants and the comparison between the two groups are presented in Table 1. The mean age of the participants was 20.42±1.64, and 164 (59.6%) were female. In a comparison of those with an ACE-TR score of 0 and greater than 0, there was a statistical significance only between maternal ages. The mean maternal age of the patients with ACE-TR score was found to be higher. (47.80±6.47 & 45.07±5.84, p =0.006)

A comparison of MCQ-30 subgroup and total scores between two groups with ACE-TR score 0 and greater than 0 is presented in Table 2. For those with an ACE-TR score greater than 0, 'Negative Beliefs about Uncontrollability and Danger' (11.64±3.40 & 13.17±3.10), 'Lack of Cognitive Confidence' (9.69±.26 & 11.55±4.37), 'Need to Control Thoughts' (14.66±3.61 & 16.36±3.54), 'Cognitive Self Consciousness' (10.10±.61 & 12.32±3.54) and total (56.32±11.93 & 63.42±11.97) scores were statistically higher than those with ACE-TR score 0. (p values are 0.001, 0.001, 0.001, 0.000.001 and 0.000.001 respectively) There was no statistically significant difference between the two groups 'Positive Beliefs about Worry' score.

Table 3 shows the comparison of the scores of RTSQ, PBRS, NBRS, PSWQ, GAD-7, and BDI between the ACE-TR score 0 and the two groups greater than 0.

Patients with ACE-TR score greater than 0 had RTSQ (53.18±23.40 & 54.33±19.05), PBRS (17.43±5.18 & 20.35±5.16), NBRS (17.70±4.89 & 19.56±5.62), NBRS-1 (8.81±3.12 & 10.17±3.62), PSWQ (32.68±7.20 & 36.56±8.80), GAD-7 (8.43±1.76 & 9.82±2.35) and BDI (2.45±3.19 & 6.84±4.75) scores were statistically higher than those with ACE-TR score 0. (p values are respectively 10.001, ≤0.001, 0.011, 0.002, 0.003, ≤0.001 and ≤0.001) There was no statistically significant difference between the two groups NBRS -2 scores. In addition, the relationships between all scale scores are presented in Table 4.

Tablo 1. Comparison of sociodemographic variables according to ACE scores

	Total	ACEs=0	ACEs≥1	X^2/Z/T	p value
Age (Year)	20.42±1.64	20.51±1.76	20.23±1.32	1.461	[a]0.146
Gender					
Female	164 (59.6%)	109 (66.5%)	55 (33.5%)	1.713	[b]0.191
Male	111 (40.4%)	82 (73.9%)	29 (26.1%)		
Marital Status					
Single	256 (93.1%)	177 (69.1%)	79 (30.9%)	0.172	[b]0.678
Married	19 (6.9%)	14 (73.7%)	5 (26.3%)		
Mother's Age	46.98±6.40	47.80±6.47	45.07±5.84	2.764	[a]0.006**
Father's Age	51.01±7.00	51.37±7.47	50.18±5.75	1.065	[a]0.288
Smoking					
Yes	60 (22.2%)	44 (73.3%)	16 (26.7%)	0.325	[b]0.569
No	210 (77.8%)	146 (69.5%)	64 (30.5%)		
Alcohol					
Yes	46 (16.9%)	28 (60.9%)	18 (39.1%)	2.122	[b]0.145
No	226 (83.1%)	162 (71.7%)	64 (28.3%)		

[a]: Student T Testi, [b]: Ki-quare Test, *p≤0.05, **p<0.01

Table 2. Total and subscale scores of the MCQ-30 according to ACE scores

		ACEs= 0 (n=143)	ACEs≥1 (n=76)	Z/T	P value
MCQ-30	Positive Beliefs	10.40±3.72	10.70±3.75	-0.612	[a]0.541
	Negative Beliefs	11.64±3.40	13.17±3.10	-3.430	[a]0.001**
	Cognitive Confidence	9.69±3.26	11.55±4.37	-3.392	[a]0.001**
	Self Consciousness	14.66±3.61	16.36±3.54	0.871	[a]0.001**
	Need to Control Thoughts	10.10±3.61	12.32±3.54	-4.309	[a]≤0.001**
	Total	56.32±11.93	63.42±11.97	-4.042	[a]≤0.001**

[a]:Student T Testi. *p≤0.05, **p<0.01

Table 3. Comparison of metacognition questionnaire-30 (MCQ-30), ruminative thought style questionnaire (RTSQ), positive-negative beliefs about rumination scale, penn state worry scale, generalized anxiety disorder-7, and beck depression inventory according to ACEs

	ACEs=0	ACE≥1	Z/T	p value
Ruminative Thought Style Questionnaire	53.18±23.40	54.33±19.05	-4.148	[a]≤0.001**
Positive Beliefs about Rumination Scale	17.43±5.18	20.35±5.16	-4.306	[a]≤0.001**
Negative Beliefs about Rumination Scale	17.70±4.89	19.56±5.62	-2.588	[a]0.011*
Negative Beliefs about Rumination Scale-1	8.81±3.12	10.17±3.62	-3.118	[a]0.002**
Negative Beliefs about Rumination Scale-2	8.94±2.40	9.33±2.56	1.198	[a]0.232
Penn State Worry Scale	32.68±7.20	36.56±8.80	-2.981	[b]≤0.001**
Generalized Anxiety Disorder-7	8.43±1.76	9.82±2.35	-5.213	[b]≤0.001**
Beck Depression Inventory	2.45±3.19	6.84±4.75	-7.826	[b]≤0.001**

[a]: Student T Testi, [b]: Mann-Withney U Testi *p≤0.05, **p<0.01

Table 4. Correlations between adverse childhood experiences scale Turkish form (ACE-TR), Metacognition Questionnaire-30 (MCQ-30), Ruminative Thought Style Questionnaire (RTSQ), Positive Beliefs about Rumination Scale, Negative Beliefs about Rumination Scale, Penn State Worry Scale, Generalized Anxiety Disorder-7, and Beck Depression Inventory

		MCQ-30												
	ACE total scores	Positive Beliefs	Negative Beliefs	Cognitive Confidence	Need to Control Thoughts	Self Consciousness	Total	RTSQ	PBRS	NBRS	NBRS 1	NBRS 2	PSWQ	GAD-7
ACE total scores	1													
MCQ-30 Positive Beliefs	0.099	1												
MCQ-30 Negative Beliefs	0.218**	0.198**	1											
MCQ-30 Cognitive Confidence	0.150*	-0.019	0.323**	1										
MCQ-30 Need to Control Thoughts	0.242**	0.244**	0.474**	0.322**	1									
MCQ-30 Self Consciousness	0.211**	0.355**	0.608**	0.111	0.539**	1								
MCQ-30 Total	0.267**	0.544**	0.754**	0.548**	0.785**	0.775**	1							
RTSQ	0.189**	0.195**	0.389**	0.259**	0.621**	0.552**	0.642**	1						
PBRS	0.188**	0.385**	0.452**	0.271**	0.317**	0.369**	0.519**	0.426**	1					
NBRS	0.225**	0.077	0.362**	0.114	0.505**	0.244**	0.362**	0.346**	0.003	1				
NBRS 1	0.191**	0.119	0.340**	0.104	0.544**	0.277**	0.398**	0.412**	0.049	0.927**	1			
NBRS 2	0.200**	0.002	0.305**	0.077	0.322**	0.116	0.223**	0.166**	-0.063	0.858**	0.602**	1		
PSWQ	0.071	0.213**	0.458**	0.209**	0.681**	0.435**	0.620**	0.511**	0.503**	0.243**	0.268**	0.142*	1	
GAD-7	0.217**	0.142*	0.370**	0.207**	0.601**	0.328**	0.498**	0.483**	0.312**	0.461**	0.505**	0.253**	0.564**	1
BDI	0.419**	0.157**	0.377**	0.265**	0.614**	0.353**	0.560	0.457**	0.327**	0.360	0.357**	0.277**	0.581**	0.655**

*p≤0.050. **p<0.01.

DISCUSSION

Our study is the first study which examines and compare the effects ACEs over dysfunctional metacognitions, positive and negative beliefs regarding rumination, anxiety, depression and worry levels between healthy individuals with or without ACEs which evaluated via psychiatric evaluation, SCID-1, and SCID-2. Main results of our study is individuals with ACEs had higher levels of worry, anxiety, depressive symptoms which is consistent with the previous studies in individuals with psychopathology (4) and having ACEs increase levels dysfunctional negative and positive metacognitive beliefs about rumination and worry when compared to those who were not exposed to such adverse experiences in childhood. Additionally, participants with ACEs had higher levels of negative beliefs about uncontrollability and danger, lack of cognitive confidence, cognitive self-consciousness, need for controlling thoughts and total MCQ-30 scores which may increase the risk of development of psychopathology when experience stressful life events, even for those did not meet the psychopathology criteria yet.

Previous studies showed the association between negative experiences of childhood and various social, emotional and cognitive problems and psychological and physical health problems (8) and negative metacognitive beliefs are strongly related to negative emotions such as anxiety, fear, and stress. However, none of these studies show the association between ACEs and metacognitions and rumination in individuals without any psychopathology.

According to literature, individuals with trauma-related disorders may have the dysfunctional metacognitions regarding not trusting their memory which leads to observation and critical evaluation of their memory as well as memory defects resulting interruption of the information processing continuity which disturbs habituation and learning (29). In our study, participants with ACEs had higher scores in cognitive confidence subscale of MCQ-30, which questioned participants' belief that memory is weak and it cannot be trusted when compared to individuals with no ACEs. Furthermore, cognitive self-consciousness, one of the metacognitive beliefs, is directing individuals' attention towards their thoughts and cognitive processes in the course of thinking and focus more on their ideas and become more engaged and fused in their thoughts (30). Additionally, cognitive self-consciousness increases the impact of another metacognitive belief which "uncontrollability and danger" on the individual's cognitive and emotional state (31). Uncontrollability is that the worry and rumination are uncontrollable, and danger is that the stress and physical symptoms and worries can give physical and physiological harm (32). Based on our findings, it can be noted that individuals with at least 1 ACEs monitor their cognition the and finds anxiety, worry, stress, and physical symptoms are dangerous and worry and rumination is uncontrollable. Therefore, worries were more dangerous for these individuals; they use thought suppression more often over healthy coping (17). Individuals with ACEs might be more prone to have psychopathology because they hold higher levels of negative metacognitive beliefs which lead to coping as CAS towards the negative stressor and life events.

Rumination is defined as a recurrent mode of thinking about the past even when it is not necessary to think (9), may have desirable or unintended consequences. The belief that rumination is useful to come out of the depression is called positive metacognitive beliefs about ruminations, on the contrary, the beliefs that rumination cannot be prevented, and destructive for individuals are called negative beliefs about rumination (33, 34). Throughout this process, negative metacognitive beliefs may get stronger that ruminative thoughts cannot be controlled and that they are harmful (35). According to our findings, the scores of positive and negative beliefs related to rumination were higher among participants with ACEs when compared to ones with no ACEs. Based on this result, people with high ACE scores may tend to respond more frequently a ruminative way to cope with negative thoughts that occur in the face of any stressor and ends with the emergence of more rumination and negative emotions, and it blocks functioning of the healthy coping mechanism. Thus, more negative thoughts may increase due to responding to negative thoughts in this way which perpetuates the prolonged emotional problem. Ruminative thinking has a strong relationship between childhood traumatic experiences, and increased symptoms of depression and anxiety are presented in previous researches in individuals with psychopathology (35). This study presented that the presence of positive and negative beliefs related to rumination is associated with the increase in the severity of depression and anxiety and that individuals may have ACEs have increased levels of positive and negative beliefs.

The methodological limitation of this study is that the mean age of the sample is cumulative in the 19-22 age range. In later studies on this subject, increasing the sampling age range will increase the strength of the generalization. Additionally, using the self-report type of scales applied to patients which may increase the comprehension risk and will decrease the reliability of the results. Another limitation is that attention deficit and hyperactivity disorder were not questioned in SCID-1 and SCID-2 interviews. In addition to this, inquiries about the participants' substance abuse are the declaration-based and cross-sectional model of the study should be considered as a restriction.

CONCLUSION

Even though negative childhood experiences do not lead to psychopathology, they may trigger the emergence of dysfunctional metacognitions which leads to more anxiety and rumination and make the individual vulnerable for further stressful life events and might decrease resilience. As a matter of fact, in this study, we found that people who report negative childhood experiences have higher scores regarding the need for control, uncontrollability

and danger, cognitive awareness, cognitive insecurity, and total metacognition scores. In addition, ruminative thinking styles are significantly higher. Our study may contribute to the literature in terms of showing that ACEs affect the metacognitions, anxiety, worry, and rumination, even when there is no psychopathology. ACEs may increase the risk for development of dysfunctional metacognitions and coping styles and aims to fill a gap in the literature since childhood traumatic experiences have not been studied from a metacognitive perspective before.

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