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Suicide Attempts in Turkish University Students: The Role of Cognitive Style, Hopelessness, Cognitive Reactivity, Rumination, Self-esteem, and Personality Traits

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Abstract

Suicide is one of the major public health problems in young adults. Detecting the risk factors and correlates among university students might help identify students who are under risk and who need early interventions for suicide prevention. The current study aimed to investigate the cognitive style, self-esteem, hopelessness, rumination, cognitive reactivity, and personality characteristics of Turkish university students, who previously attempted suicide and who did not. A total of 355 university students (34 previous suicide attempters) were recruited for this study, and they completed the Ten-Item Personality Inventory (TIPI), the Ruminative Response Scale (RRS), the Leiden Index of Depression Sensitivity-Revised, the Beck Hopelessness Scale (BHS), the Cognitive Style Questionnaire-Short Form (CSQ), the Rosenberg Self-Esteem Scale (RSES), and the Hospital Anxiety and Depression Scale. Higher RRS, BHS, CSQ scores and lower TIPI-A and RSES scores were significantly associated with a previous suicide attempt. Negative cognitive style, hopelessness, and rumination were significant correlates of a previous suicide attempt. These cognitive factors may be targets in psychotherapy to reduce suicide attempts in college-age individuals.

Keywords Cognitive style · Hopelessness · Rumination · Suicide attempt · University students

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Introduction

Suicide is a major public health problem which impacts individuals, families, and communities, and almost one million people die by suicide each year worldwide (World Health Organization; WHO 2012). According to the World Health Organization (WHO) data, the annual global age-standardized suicide rate was 11.4/100.000 (8.0/100.000 for women and 15.0/100.000 for men) in 2012, whereas for Turkey age-standardized suicide rates were 4.2/100.000 for women and 11.8/100.000 for men (WHO 2014). In Turkey, according to the data of the Turkish Statistical Institute (TSI), the crude suicide rate was 4.11/100.000 (2.25/100.000 for women and 5.95/100.000 for men) in 2015 (Turkish Statistical Institute 2015). The difference between the TSI and the WHO data is due to the fact that the data of the TSI is not standardized according to age.

Specifically, college is a time of increased independence for young adults, and often entails waning parental support and consequently, a large proportion of students feel lonely, stressed, inadequate, anxious, and depressed. A large study showed that mental disorders were common among college students, had onsets that mostly occurred prior to college entry, and were typically untreated (Auerbach et al. 2016). Further, between 9 and 25% of college students reported suicidal ideation or behaviour (i.e., plan, intent, and/or attempts) (Becker et al. 2018; Drum et al. 2009; Holdaway et al. 2018). These high rates of suicidal behaviours have been alarming, and it has been suggested that the first onset of suicidal thoughts and behaviours in college appears to be higher than in the general population (Mortier et al. 2017). Another study pointed out that about 75% of suicidal thoughts and behaviours started before the age of 16, and that more than the half (53.4%) of lifetime suicide ideators transitioned to a suicide plan whereas almost a quarter (22.1%) of lifetime suicide planners transitioned to an attempt (Mortier et al. 2018a, b). Another study, on the other hand, proposed that college students had a significantly lower rate for suicidal thoughts and behaviors compared to their same-aged peers, but also demonstrated that any suicidality before the age of 18 was associated with reduced likelihood of college entrance as well as greater attrition from college (Mortier et al. 2018b). Transcultural comparisons between Turkish and American youth provided a differential vulnerability for and risk factors of suicide patterns (Coskun et al. 2012). These differences need to be investigated more thoroughly, and evaluating these factors among college-age youth may help identify and ameliorate suicide risk among Turkish young adults.

The term suicide encompasses a broad spectrum ranging from wish to die, suicidal ideation, suicidal plans, suicide attempts to suicide death (Bakhiyi et al. 2016). Suicidal ideation, thought or desire to end one's own life, is associated with suicide attempts (Sarkisian et al. 2019). Suicide attempt is defined as a non-fatal, self-directed, potentially injurious behavior with an intent to die as a result of the behavior, but that may or may not result in injury (Crosby et al. 2011). As many more individuals experience suicidal ideation than go on to make suicide attempts, examining factors that may be differentially related to suicidal ideation and attempts is a significant public health priority. Moreover, these experiences

seem to be temporally associated. De Leo et al. (2005) for example, showed that over 99% of suicide attempters planned their attempt or experienced suicidal ideation before their attempt and that over 50% of individuals who reported suicidal ideation or behaviour experienced all levels of 'less severe' suicidal thoughts and behaviours preceding their most severe experience (e.g. life not worth living, seriously considering suicide) (Butter et al. 2019). Non-suicidal self injury which can be defined as self-inflicted damage to one's self that lack evidence of suicidal intent, and suicidal ideation have each been shown to confer risk for suicidal attempts (Ribeiro et al. 2016; Washburn et al. 2012). There are many studies aimed to search the relationship between these entities and evaluate the risk factors. In a recent study, 456 adolescents who reported suicidal thoughts and 569 who reported non-suicidal self-harm at 16 years of age were included. Logistic regression analyses were used to explore associations between a wide range of prospectively recorded risk factors and future suicide attempts, assessed at the age of 21 years. Among participants with suicidal thoughts, the strongest predictors of transition to attempts were non-suicidal self-harm, cannabis use, other illicit drug use, exposure to self-harm (family, and higher levels of the personality type intellect/openness. Among participants with non-suicidal self-harm at baseline, the strongest predictors were cannabis use, other illicit drug use, sleep problems, and lower levels of the personality type extraversion (Mars et al. 2019). According to the results of a study which was conducted on 45 patients with suicide attempt or self-harm admitted to emergency department, the predictive factors of suicide attempt and self-harm were as follow: family function, hopelessness, and non-suicidality items of Hamilton scale, history of non-suicidal self-harm, and anxiety (Salman et al. 2014). In a more recent case-control study compared 55 cases of suicide attempt within the previous 12 months matched for age and sex with 55 nonsuicidal cases the results showed that borderline PD and depressive disorder predicted increased likelihood of future suicide attempts (Wongpakaran et al. 2019).

Many different theories of suicide have been proposed, including biological, sociological, and psychological proposed etiologies (Franklin et al. 2017). Previous research has already defined risk factors for suicidal behaviours in adolescence and young adulthood: (1) Individual-level factors, for example, gender, genetic traits (personality traits, cognitive styles), mental health, previous suicidal behaviour, alcohol or substance abuse. (2) Familial factors, for example, family history of suicide, trauma or mental illness. (3) Life stressors, for example, death of a parent, family breakdown, physical or sexual abuse, bullying. (4) Social-environmental and demographic factors, for example, lower socioeconomic status, rural residence (Borschmann et al. 2018; Waldvogel et al. 2008). Specific disorders with a strong relation to suicide include depression and other mood disorders, anxiety disorders, personality disorders, alcohol and drug use disorders, and schizophrenia (Assari et al. 2018). The presence of a psychiatric disorder and particularly major depressive disorder is a risk factor for suicide across all age groups (Prigerson et al. 2003). 45% of inpatient suicides were preceded by schizophrenia and organic mental disorders, whereas 32% of outpatients' suicides occurred in the context of depression, and substance-related, somatoform, anxiety, and adjustment disorders (Bachmann 2018;

Bertolote et al. 2003). Individuals with bipolar spectrum disorders experience high rates of suicide with previous reports indicating that 25 to 50% of individuals with bipolar I or II disorder have a lifetime history of a suicide attempt (Leverich et al. 2003; Stange et al. 2015; Valtonen et al. 2005), and twenty to thirty times greater risk than the general population (Pompili et al. 2013).

Maladaptive cognitions play an important role in depression and anxiety disorders and also in suicidal ideation or attempt. A depressogenic attributional/cognitive style, for example, may lie behind depressive as well as suicidal (mediated by hopelessness) cognitions, and this cognitive style of thinking may be defined as a tendency to associate negative life events to internal, stable, and global factors. Individuals with this style of thinking infer that negative consequences will follow from current negative events, and they believe that the occurrence of negative events means that the self is flawed (Abramson et al. 2002; Rickelman and Houfek 1995). Conclusions from a literature review on 21 studies lent support to the effect of depressogenic cognitive style on depressed mood in children and adolescent (Jacobs et al. 2008). Further, negative inferential styles were suggested to be positively associated with suicidal ideation (Kleiman et al. 2014a, b). Theoretical models of suicide have suggested that making negative appraisals about the future following stressful life events may facilitate the progression of feelings of entrapment toward suicide ideation (Malhi et al. 2013; Stange et al. 2015). Findings from a study conducted on adolescent suicide attempters revealed that this group have a cognitive style that promotes a more negative evaluation of events and situations (Kienhorst et al. 1992).

Hopelessness is defined as "a system of cognitive schemas whose common denominator is negative expectations about the future" (Beck et al. 1974a, b, p. 864), or a "lowered expectation of obtaining certain goals and a diminished belief in the likelihood of achieving success" (Melges and Bowlby 1969). Hopelessness has an important role in the aetiology of depression, and it may also be a predictor of suicide. In some prospective studies, a correlation was shown between hopelessness, suicidal ideation and depression (Beck et al. 1974a, b; Chioqueta and Stiles 2003). Individuals with depression and higher levels of hopelessness, since not all individuals with depression experience feelings of hopelessness, report higher levels of suicide intention (Beck et al. 1985). Several studies have found a strong association between hopelessness and attempted suicide or death through suicide (Beck et al. 1990; Jaiswal et al. 2016; Klonsky et al. 2012). Moreover, a 10-year cohort study showed that a given assessment of hopelessness (baseline, 6-months, 24-months, and 48-months) reliably predicted attempted suicide up to 4–6 years later (Klonsky et al. 2012). Hopelessness has been independently and repeatedly associated with increased risk for suicidal ideation, suicide attempts, and death by suicide, both prospectively and retrospectively (Hewitt et al. 1998; Mccullumsmith et al. 2014; Samuelsson et al. 2006). Hopelessness has also been implicated in exacerbating the influence of other known factors for suicide (Steeg et al. 2016). Thus, the assessment of hopelessness is particularly important in clinical practice, as it can lead to isolation, or may inhibit help-seeking behaviors. Recognizing high levels of hopelessness in patients is rather important, as hopelessness is a modifiable risk factor whose impact can be reduced through appropriate psychotherapeutic interventions (Aloba et al. 2015; Efstathiou et al. 2018).

How easily maladaptive cognitions may be triggered by low mood even if the mood state is not pathological may be referred to as cognitive reactivity (CR) (Antypa et al. 2010a, b). Previous research demonstrated that CR measured by the Leiden Index of Depression Sensitivity-Revised (LEIDS-R) (Van der Does 2002) differentiated between previously depressed and never depressed individuals (Van der Does 2002; Van der Does and Williams 2003). Further, higher scores on the LEIDS-R prospectively predicted depression onset in healthy individuals and a new depressive relapse in depressed individuals (Booij and Van der Does 2007; Kruijt et al. 2013; Figueroa et al. 2015). The LEIDS-R scores also differentiated individuals with severe depression from individuals with milder depression forms (Batmaz et al. 2017). The rumination and aggression/hostility subscales were helpful for the distinction of depression subtypes, and higher scores on the hopelessness/suicidality and aggression/hostility subscales were reported in depressed individuals with a history of suicide (Moulds et al. 2008; Antypa et al. 2010a, b). Moreover, CR was associated with suicidality independent of anxiety and genetic vulnerability factors for depression (Antypa and Van der Does 2010).

One of the other identified risk factors for suicidal ideation and attempts is rumination (Rogers and Joiner 2017), and it is defined as, "repetitively and passively focusing on symptoms of distress and on the possible causes and consequences of these symptoms" (Nolen-Hoeksema1991). Importantly, this perseverative and fixated thought does not lead to active problem solving (Nolen-Hoeksema et al. 2008). Based on factor analyses conducted by Treynor et al. (2003), rumination is commonly separated into two subtypes: brooding (i.e., 'a passive comparison of one's current situation to some unachieved standard') and reflection (i.e., 'a purposeful turning inward to engage in cognitive problem solving to alleviate one's depressive symptoms'). Rumination and its relationship with suicidal behaviours have been the subject of research in many studies. A systematic review, for example, demonstrated that increased rumination was associated with increased suicidality (Morrison and O'connor 2008). A more recent study reported similar results, in which brooding was specifically associated with suicidal risk, ideation, and attempts regardless of poor sleep (Holdaway et al. 2018). Moreover, Law and Tucker concluded that there was enough evidence to support rumination and other repetitive negative thinking styles as an etiological and maintenance factor of suicidality (Law and Tucker 2018). In another study which was conducted on 352 college students and examined the relation between cognitive styles (i.e. brooding, reflection, distraction) and cognitive inflexibility in differentially predicting history of non-suicidal self-injury only, suicide attempt only, or both; the results showed that brooding uniquely predicted suicide attempt only history while reflection uniquely predicted history of non-suicidal self-injury only and both (Polanco-Roman et al. 2015).

Self-esteem, an individual's sense of his/her value or worth, or the extent to which a person values, approves of, appreciates, prizes, or likes himself/herself (Allen et al. 1991), is another risk factor for suicide (Wild et al. 2004). In a study among college students, even after controlling for the severity of depression, levels of self-esteem were associated with past suicidal ideation (Vella et al. 1996). However, in psychiatric inpatients, the level of self-esteem did not differ between suicidal and non-suicidal adolescents (Dori and Overholser 1999). Yet, other research showed

that suicidal behaviours of inpatients were suggestive of lower self-esteem after the attempt (Palmer 2004). Similarly, in psychiatric outpatients, even in the context of depression and hopelessness, low self-esteem was an additional risk factor for suicidal ideation (Bhar et al. 2008). Interestingly, another study reported that damaged self-esteem, defined as high implicit self-esteem combined with low explicit self-esteem, was consistently associated with increased levels of depressive symptoms, suicidal ideation, and loneliness, while defensive or fragile self-esteem, defined as high explicit and low implicit self-esteem, was not (Creemers et al. 2012). Moreover, in another study, low self-esteem in early childhood was linked to suicidal ideation in early adulthood, especially in boys (McGee et al. 2001). Low self-esteem has further been identified as a mediator between gratitude and suicidal ideation (Lin 2015). According to the results of another study which was carried on 62 adolescents, age ranged from 15 to 18 years, the adolescent group who were hospitalized after a suicide attempt had lower level of self-esteem (Maraš et al. 2013). In a similar vein, results of another research revealed that depressed inpatients with a history of suicidal ideation and history of at least one suicide attempt had a significantly higher suicide risk score and significantly lower self-esteem score than depressed inpatients with no history of suicidal ideation and no history of suicide attempt as well as a significantly higher risk score and significantly lower self-esteem score than depressed inpatients with a history of suicidal ideation but no history of suicide attempt (Palmer 2004). On the other hand, the literature is equivocal concerning the role of high levels of self-esteem as a protective factor for suicidality (Johnson et al. 2011), and some studies have reported a positive moderating effect of high self-esteem among college students (De Man and Gutierrez 2002; Kleiman and Riskind 2013). Thus, more research is needed to understand the relationship between self-esteem and suicidality.

Personality traits have been investigated as correlates of suicidal behaviours, and neuroticism and extraversion were reported to be related to risk for suicidal ideation, suicide attempts, and completed suicides in a review article (Brezo et al. 2006). Interestingly, a later study demonstrated different results regarding neuroticism, in which a negative correlation was found between neuroticism and suicide rates (Voracek 2009). In another more recent study the results showed that the people who have attempted suicide who suffer from mental disorders present with significantly higher level of neuroticism (Bi et al. 2017). Consistent with that, in a study in which 365 bipolar, 296 major depressive disorder patients and 315 community controls were recruited to assess their lifetime suicidality, it is revealed that extraversion showed protective effect. High neuroticism or harm avoidance had prominent and independent risk effects on suicidal ideation and attempt (Su et al. 2018). Further, a large study from Sweden used a factor analysis of a personality questionnaire, and the results indicated that the study population consisting of suicide attempters had no specific personality structure (Hirvikoski and Jokinen 2012). On the other hand, a recent study focusing on the personality factors of patients with depression suggested that the self-directedness character dimension differentiated previous suicide attempters from non-attempters (Seo et al. 2014). This result was replicated in a study population consisting of university students (Lee et al. 2017). Therefore, the

literature on the effect of personality traits is far from being conclusive, and further research is needed, especially on different age groups.

As summarized above, cognitive style, self-esteem, hopelessness, rumination, cognitive reactivity, and personality characteristics of university students might help to some extent identify who is at risk for suicidal behaviours. Unfortunately, their role in suicide attempts is yet to be determined, and the present findings in the literature are not definitive and some reports are even contradictory. Therefore, the current study aimed to investigate these cognitive factors in university students and to highlight the differences between a group of participants who previously attempted suicide with another group of participants who did not. Further, we aimed to investigate whether the above-mentioned cognitive factors and clinical correlates for suicidal behaviours also played a role in a Turkish college-age population and to demonstrate any potential cultural differences. We also aimed to find out whether any of the correlates were suitable candidates as treatment targets in cognitive behavioural therapy, and subsequently to emphasize the need for early interventions for reduce suicide attempts. We hypothesized that students with a suicide attempt history would score higher on neuroticism, ruminate more frequently, be more prone to depressed mood, feel more hopeless, demonstrate a more negative cognitive style, and have lower self-esteem than students who never attempted suicide. We also hypothesized that a suicide attempt would be associated with higher levels of neuroticism, rumination, cognitive reactivity, hopelessness, negative cognitive style, and lower levels of self-esteem. Further, we hypothesized that these cognitive factors would be correlated with suicide attempts in this Turkish college-age population.

Methods

Participants

A total of 355 young adults aged 18–25 (mean age (standard deviation, SD) = 19.59 (6.27) years, 72.7% female, 97.2% single) were recruited for this study. The participants were Turkish university freshmen who were taking a developmental psychology, behavioural science or nursing course, and they were offered extra credit if they participated in the study. Participants who had any psychiatric disorders which might prevent answering the questions of the scales (e.g. who were in an acute psychotic/manic episode), or who had serious suicidal ideation or presented with a suicide attempt at the time of the interview were excluded from the study.

For statistical analyses, the participants were classified into two groups, i.e. participants who previously attempted suicide and participants who never did. Thirty-four of the 355 young adults (9.58%) had attempted suicide previously. The groups differed from each other in terms of their marital status, family history of psychiatric disorder, and previous treatment for a psychiatric disorder. Participants with a suicide attempt history were less likely to be married, more frequently had a family member with a psychiatric disorder, and had received treatment for psychiatric disorder more frequently. These results are presented in Table 1.

Table 1 Demographic features and group differences for scale scores between groups that did or did not attempt suicide

Variable	All participants	Previous suicide attempt (Yes)	Previous suicide attempt (No)	t (*df*)/X^2 (*df*)	*p*
	Mean (SD)/n (%)	Mean (SD)/n (%)	Mean (SD)/n (%)		
Age	19.59 (±6.27)	20.94 (±7.96)	19.44 (±6.06)	−1.31(343)	0.188
Gender (female)	258 (72.7%)	21 (61.8%)	237 (73.8%)	2.25 (1)	0.133
Marital status (single)	345 (97.2%)	30 (88.2%)	315 (98.1%)	10.99 (1)	0.001
Family history (yes)	40 (11.3%)	12 (35.3%)	28 (8.7%)	21.71(1)	0;000
Previous psychiatric treatment history (yes)	40 (11.3%)	11 (33.3%)	29 (9.1%)	17.53 (1)	0.000
Previous hospitalization (yes)	4 (1.1%)	4 (1.3%)	0 (0.0%)	0.43 (1)	0.512
Medical disorder (yes)	28 (7.9%)	7 (20.6%)	21 (20.6%)	77.87 (3)	0.000
Social support	3.82 (±1.09)	3.08 (±1.26)	3.90 (±1.05)	4.20 (353)	0.000
Childhood trauma	1.60 (±1.35)	2.00 (±1.43)	1.56 (±1.34)	−1.80 (353)	0.072
Quality of life	3.65 (±0.92)	3.20 (±1.09)	3.70 (±0.89)	3.02 (353)	0.003
HADS_Anx	18.50 (±2.60)	17.97 (±2.94)	18.56 (±2.56)	1.26 (352)	0.207
HADS_Dep	16.05 (±2.01)	16.64 (±3.06)	15.99 (±1.86)	−1.80 (353)	0.072
RRSBROOD	11.34 (±2.86)	12.58 (±3.66)	11.21 (±2.74)	−2.67 (353)	0.008
RRSREFLECT	11.44 (±2.87)	12.29 (±3.69)	11.35 (±2.76)	−1.81 (352)	0.070
RRS	22.78 (±5.14)	24.88 (±6.83)	22.56 (±4.88)	−2.51 (352)	0.012
HOP	8.02 (±3.82)	8.11 (±3.91)	8.01 (±3.81)	−0.15 (353)	0.878
ACC	8.74 (±3.49)	9.82 (±4.34)	8.62 (±3.38)	−1.90 (353)	0.058
AGG	10.22 (±4.52)	11.94 (±4.38)	10.04 (±.50)	−2.33 (353)	0.020
CON	10.28 (±3.79)	10.79 (±3.54)	10.23 (±3.81)	−0.82 (353)	0.412
RAV	12.05 (±3.92)	11.58 (±4.38)	12.10 (±3.88)	0.73 (353)	0.464
RUM	12.19 (±4.65)	11.44 (±4.36)	12.27 (±4.68)	0.99 (353)	0.320
LEIDS-R	61.53 (±18.02)	63.70 (±16.95)	61.30 (±18.14)	−0.73 (353)	0.460

Table 1 (continued)

Variable	All participants	Previous suicide attempt (Yes)	Previous suicide attempt (No)	t (*df*)/X^2 (*df*)	*p*
	Mean (SD)/n (%)	Mean (SD)/n (%)	Mean (SD)/n (%)		
TIPI_E	4.57 (± 1.53)	4.64 (± 1.79)	4.56 (± 1.50)	− 0.28 (349)	0.775
TIPI_A	5.02 (± 1.27)	4.48 (± 1.55)	5.08 (± 1.23)	2.63 (350)	0.009
TIPI_C	5.08 (± 1.37)	5.05 (± 1.41)	5.08 (± 1.37)	0.11 (349)	0.911
TIPI_ES	4.35 (± 1.28)	4.01 (± 1.41)	4.38 (± 1.27)	1.61 (349)	0.107
TIPI_O	4.63 (± 1.26)	4.61 (± 1.42)	4.63 (± 1.24)	0.09 (350)	0.928
BHS	5.85 (± 4.56)	7.94 (± 5.63)	5.62 (± 4.38)	− 2.83 (347)	0.005
RSES	1.08 (± 0.77)	0.91 (± 1.01)	1.10 (± 0.74)	1.37 (353)	0.171
CSQ_Inter	45.61 (± 5.27)	47.12 (± 7.88)	45.44 (± 4.89)	− 1.73 (331)	0.084
CSQ_Glob	41.17 (± 6.62)	45.50 (± 9.17)	40.70 (± 6.11)	− 4.10 (340)	0.000
CSQ_Stab	39.25 (± 8.27)	45.26 (± 9.90)	38.60 (± 7.82)	− 4.58 (349)	0.000
CSQ_NeqC	21.19 (± 3.86)	22.24 (± 3.26)	21.08 (± 3.90)	− 1.63 (350)	0.102
CSQ_SelfW	44.57 (± 8.90)	46.58 (± 9.97)	44.35 (± 8.76)	− 1.39 (349)	0.165
CSQ	191.63 (± 24.68)	207.40 (± 32.78)	189.88 (± 23.02)	− 3.89 (319)	0.000

HADS_Anx Hospital Anxiety and Depression Scale_Anxiety; *HADS_Dep* Hospital Anxiety and Depression Scale_Depression; *RRS* Ruminative Response Scale; *RRS-BROOD* Ruminative Response Scale_Brooding; *RRSREFLECT* Ruminative Response Scale_Reflection; *HOP* hopelessness; *ACC* acceptence; *AGG* aggression; *CON* control; *RAV* risk aversion; *RUM* rumination; *LEIDSR* Leiden Index of Depression Sensitivity-Revised; *TIPI* Ten-Item Personality Inventory; *E* extraversion; *A* agreeableness; *C* conscientiousness; *ES* emotional stability; *O* openness; *BHS* Beck Hoplessness Scale; *RSES* Rosenberg Self-Esteem Scale; *CSQ* Cognitive Style Quessionaire; *CSQ_Inter* Cognitive Style Quessionaire_Internal; *CSQ_Glob* Cognitive Style Quessionaire_Global; *CSQ_Stab* Cognitive Style Quessionaire_Stable; *CSQ_NeqC* Cognitive Style Quessionaire_Negative Consequences; *CSQ_SelfW* Cognitive Style Quessionaire_Self Worth

Procedure

The students were briefed about the study aims and if they agreed to take part in the study, they were invited to the outpatient clinic of the psychiatry department for a clinical interview. The interviews were scheduled on different time points, so the students did not come across each other during the interviews. A face-to-face semi-structured diagnostic interview was conducted by experienced psychiatrists or psychiatry residents according to the criteria of the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (American Psychiatric Association 2013). The semi-structured interview was based on the Mini International Neuropsychiatric Interview, and the module on suicidality was completed to assess for previous suicide attempts (Sheehan et al. 1998). After the diagnostic interview, participants were asked to complete the clinical measures used in the study. All the measures that were used in this study were self-report scales, and it took the participants about 30–45 min to complete all of them. Turkish versions of the scales were used in the study.

Clinical Measures

Demographic and Clinical Data Form: This form was developed by the investigators, and it consisted of questions about the age, sex, marital status, family history of psychiatric disorder, previous psychiatric treatment history, comorbid medical disorder, and whether the participant ever attempted suicide.

Hospital Anxiety and Depression Scale (HADS) (Zigmond and Snaith 1983): This is a 14-item self-report scale, which is used to screen for, and to determine the severity of depressive and anxiety-related symptoms. The Turkish version has a cut-off score of 7 for depression, and 10 for anxiety (Aydemir et al. 1997).

Ten-Item Personality Inventory (TIPI) (Gosling et al. 2003): This is a brief measure based on the five-factor model of personality, and it consists of five dimensions, i.e. openness to experience, extraversion, agreeableness, emotional stability, and conscientiousness. The TIPI was reported to correlate well with much lengthier scales that measure the same personality dimensions. The Turkish version of the scale was used in this study (Atak 2013).

Ruminative Response Scale-Short Form (RRS) (Treynor et al. 2003): This scale is used to rate the severity of rumination, which has previously been reported to correlate with depression. The scale has two subscales, i.e. reflection, and brooding. While the reflection subscale is considered to help individuals cope with negative affect by facilitating problem-solving, the brooding subscale is generally considered not to be an adaptive way of overcoming problems or distressing thoughts. A total score of the RRS might also be used to measure the intensity of rumination, and the higher the score, the more engagement in rumination. In the present study, the Turkish version of the RRS (Erdur-Baker and Bugay 2010) was used with a Cronbach's α of 0.772.

Leiden Index of Depression Sensitivity-Revised (LEIDS-R) (Van der Does 2002): This is a 34-item self-report scale, consisting of six subscales, and higher scores on this scale demonstrate higher degrees of cognitive reactivity (CR) to depression. The subscales of the scale are hopelessness/suicidality (HOP), acceptance/coping (COP), aggression/hostility (AGG), control/perfectionism (CON), risk aversion (RAV), and rumination (RUM). All of these subscales have been defined as psychological vulnerability factors to depression. The Turkish version of the LEIDS-R was used in this study (Batmaz et al. 2015a, b), and its Cronbach's α was 0.878.

Beck Hopelessness Scale (BHS) (Beck et al. 1974a, b): This is a 20-item self-report inventory, and it is used to measure the three aspects of hopelessness, i.e. feelings about the future, loss of motivation, and expectations. The BHS may be used to identify the risk of suicide patients with depression who previously attempted suicide. The higher the scores, the higher the risk for suicide. The Turkish version of the BHS was used (Durak and Palabiyikoglu 2006), and it had a Cronbach'sα value of 0.852.

Cognitive Style Questionnaire-Short Form (CSQ) (Meins et al. 2012): This is a self-report scale consisting of 72 statements about 8 hypothetical negative situations, and it is used to assess the negative cognitive style of the respondents, which may be associated with vulnerability to depression. The CSQ is based on the hopelessness theory of depression, and it consists of 5 dimensions, i.e. internality, globality, stability, self-worth, and negative consequences. These dimensions propose that a person with a negative cognitive style makes negatively biased inferences about the causes, consequences, and self-worth implications of negative life events. Higher scores on these dimensions indicate a more negative view of the self, the life event itself, and the future. The Turkish version of the CSQ was used in this study (Batmaz et al. 2015a, b), and the Cronbach's α was 0.853.

Rosenberg Self-Esteem Scale (RSES) (Rosenberg 1965): This is a 10-item self-report scale, and it is used to assess self-esteem. Higher scores on the RSES correspond to lower levels of self-esteem. The Turkish version of the RSES was used in this study (Cuhadaroglu 1985).

Statistical Analyses

All analyses were performed using SPSS for Windows, Version 22.0 (IBM Corp 2013). Demographic and clinical data of the participants were analyzed by descriptive statistics. For group comparisons, independent samples *t* test and Chi squared were used. Bonferroni corrections were applied when there were multiple comparisons. Intercorrelations between suicide attempt and other variables were evaluated by Pearson's correlation coefficients. A binary logistic regression model with stepwise backward selection method was used to identify the correlates for a suicide attempt, in which the dependent variable was the presence of a suicide attempt, and the correlates were age, sex, personality characteristics, and the total scores of the scales used in the study. Statistical significance was set at a p value < 0.05.

Ethical Approval

The study was carried out at the outpatient psychiatric clinic of Tokat Gaziosmanpasa University Hospital (Tokat, Turkey). Before conducting this study, ethical committee approval was obtained from the Clinical Research Ethics Committee, and all participants gave written informed consent.

Results

A total of 355 university students, of whom 34 were previous suicide attempters, were recruited for this study. Demographic features and group statistics are presented in Table 1. There were no differences between the groups in terms of age and gender. 88.2% of previous suicide attempters were single, 35.3% had a positive family history, and 33.3% had previous psychiatric treatment history ($p=0.001$, $p<0.001$, $p<0.001$, respectively). Social support and quality of life mean scores were higher in the group who had no previous suicide attempts ($p<0.001$, and $p=0.003$, respectively). There were no statistically significant differences between the HADS-Anx and HADS-Dep mean scores of the groups. Among the ruminative response subscale scores, RRS-BROOD was higher in attempters group ($p=0.008$). LEIDS-R scale mean score was 63.70 (± 16.95) in the attempters group, but not statistically significantly different ($p=0.460$) whereas the BHS mean score was 7.94 (± 5.63) and the difference was statistically significant ($p=0.005$) compared to the non-attempters. TIPI-A mean score was higher in the non-attempters group ($p=0.009$). CSQ total score, CSQ-Stab, and CSQ-Glob scores were also higher in the previous suicide attempters group ($p<0.001$).

Table 2 presents the correlations between the study variables. RRS, BHS, CSQ-SF mean scores were higher in the suicide attempter group and also statistically correlated with a suicide attempt ($p<0.5$, $p<0.01$, $p<0.01$ respectively).

Table 3 shows the results of the logistic regression analysis, and correlates of suicide attempt. Higher scores of RRS (OR 1.077), BHS (OR 1.109), and CSQ (OR 1.023) were significant factors associated with a suicide attempt. This association revealed that the cognitive style, hopelessness and rumination may be correlated withsuicide attempts. Lower scores of TIPI-A (OR 0.602), and RSES (OR 0.499) were also significant correlates of previous suicide attempts. TIPI-C scores were not significantly associated with suicide attempt.

Discussion

Since suicide is one of the major public health problems, detecting its risk factors and predictors in order to prevent it, and find therapeutic ways to handle it have become essential issues in the field of psychiatry. In this study, we investigated the differences between the cognitive profile of university students who attempted to commit suicide and who did not. In our study, the term ‘cognitive profile of the students’ was referred to combination of repetitive negative thinking, negative attributional style,

Table 2 Intercorrelations for suicide attempt and correlates

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Suicide attempt	–														
2. Age	.071	–													
3. Sex	−.080	.040	–												
4. HADS Depression	−.067	.117*	.081	–											
5. HADS Anxiety	.096	.020	.014	.075	–										
6. TIPI-E	.015	−.104	.001	.076	.081	–									
7. TIPI-A	−.139**	.005	.162**	.097	−.143**	.202**	–								
8. TIPI-C	−.006	.001	.112*	.133*	.019	.401**	.348**	–							
9. TIPI-ES	−.086	.056	.001	.270**	−.087	.045	.283**	.198**	–						
10. TIPI-O	−.005	−.017	.038	.068	.045	.272**	.216**	.308**	−.019	–					
11. RRS	.133*	−.076	.004	.339**	−.029	−.115*	−.130*	−.173**	−.295**	.032	–				
12. LEIDS-R	.039	−.023	−.060	.318**	.001	−.061	−.135*	−.204**	−.175**	−.049	.341**	–			
13. BHS	.151**	.027	−.240**	.277**	.117*	−.224**	−.212**	−.392**	−.191**	−.224**	.228**	.235**	–		
14. RSES	−.073	−.099	−.128*	.271**	−.053	.262**	−.071	.258**	.199**	.121*	.238**	.239**	.305**	–	
15. CSQ-SF	.213**	−.006	−.211**	.145**	.136*	−.090	−.145**	−.213**	−.217**	−.139*	.140*	.339**	.384**	.121*	–

Suicide attempt coded as 1 = Yes, 0 = No; sex coded as 1 = Female, 0 = Male

HADS Hospital Anxiety and Depression Scale; *TIPI* Ten-Item Personality Inventory; *E* Extraversion; *A* Agreeableness; *C* Conscientiousness; *ES* Emotional Stability; *O* Openness; *RRS* Ruminative Response Scale; *LEIDS-R* Leiden Index of Depression Sensitivity-Revised; *BHS* Beck Hopelessness Scale; *RSES* Rosenberg Self Esteem Scale; *CSQ-SF* Cognitive Style Questionnaire-Short Form

*$p < 0.05$; **$p < 0.01$

Table 3 Last step of the logistic regression analysis and correlates of suicide attempt

Variable	*B*	*SE*	*OR*	95% CI	Wald statistic	*p*
RRS	0.074	0.040	1.077	1.005, 1.166	3.372	0.046
TIPI-A	−0.508	0.182	0.602	0.421, 0.859	7.802	0.005
TIPI-C	0.356	0.192	1.427	0.979, 2.080	3.423	0.064
BHS	0.104	0.048	1.109	1.009, 1.220	4.578	0.032
RSES	−0.696	0.293	0.499	0.281, 0.885	5.649	0.017
CSQ-SF	0.022	0.009	1.023	1.004, 1.041	5.908	0.015

CI confidence interval for odds ratio (*OR*); *TIPI* Ten-Item Personality Inventory; *A* agreeableness; *C* conscientiousness; *RRS* Ruminative Response Scale; *BHS* Beck Hopelessness Scale; *RSES* Rosenberg Self Esteem Scale; *CSQ-SF* Cognitive Style Questionnaire-Short Form

cognitive reactivity, hopelessness, and self-esteem. Cognitive reactivity to depression, cognitive style, rumination, hopelessness, personality traits, and self-esteem were each evaluated with self-report scales. Higher RRS, BHS, CSQ-SF scores were significantly associated with suicide attempt in the logistic regression analysis, and this association revealed that negative cognitive style, hopelessness and rumination may have correlation with suicide attempts. Lower TIPI-A and RSES scores were also significant correlates in this model, and the results revealed that agreeableness in personality trait and high self-esteem were negatively correlated with suicide attempts. Overall, significant differences in the cognitive style, cognitive reactivity, and personality traits between the groups might highlight correlates for suicide attempts, and guide clinicians to proper therapeutic approaches. Therefore, the current study's findings partially confirmed our hypotheses.

Hopelessness and Suicide Attempt

In this current study, one of our research hypothesis was that hopelessness has an important role in the aetiology of depression and could be a correlate for suicidality. In several previous studies this issue was repeatedly investigated (Chioqueta and Stiles 2005; Elis et al. 2016; Klonsky et al. 2012; Links et al. 2012). In our cross-sectional study, group comparisons of BHS mean scores were higher in the attempters, and this was statistically significant. Besides this finding, our logistic regression analysis revealed that BHS was a significant factor associated with a suicide attempt. Previously, a prospectively designed 10-year follow-up study suggested that hopelessness reliably predicted attempted suicide up to 4 to 6 years later, but not beyond and that it could be accepted as one of the important predictors of suicide attempt (Klonsky et al. 2012). In another prospective cohort study, which was designed by Links et al. (2012) patients were followed-up 1, 3 and 6 months after hospital discharge. One of the significant results of this trial was that higher suicide ideation at 1 month following discharge was significantly related to the level of hopelessness reported by the participant during hospital admission. Thus, it was suggested that hopelessness could be a predictor for suicide ideation and attempt (Links et al. 2012). Overall, our findings were consistent with these previous results.

Cognitive Style and Suicide Attempt

The role of negative cognitive style in depression, and also in the development of suicidal ideation has been supported by research (Alloy et al. 2006; Kleiman et al. 2014a, b). In this model, individuals who are vulnerable to depression and suicide are said to have a negative cognitive style in which they attribute stable and global causes to the occurrence of negative events, and expect negative future implications from the events. Indeed, several studies found that negative cognitive style interacted with (i.e., was activated by) negative events to predict suicidal ideation (Hirsch et al. 2009; Joiner and Rudd 1995; Priester and Clum 1992; Stange et al. 2015). In the present study, consistent with our hypotheses, CSQ total scores, globality and stability scores, which may be used as an indicator of negative cognitive style, were higher in the attempters group. Besides these results, CSQ total scores were significantly associated with suicide attempt in the logistic regression analysis, which may suggest that there was a relationship between negative cognitive style and suicidal attempt.

Rumination and Suicide Attempt

Rumination has two subtypes: brooding and reflection. In several trials, there were reports that brooding and/or reflection might be associated with suicide attempt (Chan et al. 2009; Stange et al. 2015). In our study, brooding mean scores were higher in the attempters group, and this result was statistically significant. Reflection mean scores and RRS total scores were also higher in the previous suicide attempters group, but they were not statistically significant. In many previous clinical trials, it was indicated that brooding was more strongly associated with suicidal ideation than reflection (Treynor et al. 2003; Miranda and Nolen-Hoeksema 2007; O'Connor and Noyce 2008), and our findings were compatible with these previous results. However, in a study, which was designed by Stange et al. (2015) the results were only significant for reflection, but not for brooding, and they suggested that reflection might lead to suicidal ideation among individuals with certain vulnerabilities. In the correlation analysis of our study, RRS mean scores correlated with a suicide attempt. In the logistic regression analysis, RRS scores were significant correlates for a suicide attempt. Overall, considering these results, we may suggest thatthere was a relationship between rumination and suicidal attempt.

Cognitive Reactivity and Suicide Attempt

Cognitive reactivity to depression is another notable issue in suicide ideation and attempt. In our study, LEIDS-R total scores were higher in the attempters group, but this was not statistically significant. HADS-Dep mean scores were also not significantly different between the groups. This may be the reason why the LEIDS-R total scores remained similar between the groups. In addition, HOP and AGG subscales, which were reported to be elevated in depressed individuals with a history of suicide, were not statistically different between the groups. In the logistic regression

analysis, LEIDS-R and its subscales were not found to be associated with suicide attempts. However, in a previous study, which was carried out by Antypa et al., the results supported that LEIDS-R total score and LEIDS-HOP subscale score could be a predictor of prior suicidality (Antypa et al. 2010a, b). The current study failed to replicate these findings.

Self-esteem, Personality Traits, and Suicide Attempt

Self-esteem and personality traits are other important issues for suicide ideation and attempt. Low self-esteem has been implicated in samples of adolescents who have attempted suicide (Kienhorst et al. 1990), and it has also been found to be related to increased suicidal tendencies, and seriousness of suicidal intent in adolescent psychiatric inpatients (Robbins and Alessi 1985). In a previous study, which was carried out by Brausch and Gutierrez, it was suggested that low self-esteem could be a risk factor for non-suicidal self-injury, and also for suicide attempt (Brausch and Gutierrez 2010). Our findings, consistent with previous studies, demonstrated that low self-esteem was correlated with suicide attempt. The most popular model of personality in recent decades has been the Five Factor Model. Some of the studies based on this personality model suggested that emotional instability was related to suicidal ideation (Chioqueta and Stiles 2005; DeShong et al. 2015; Kerby 2003; Velting 1999). Findings of the relevance of other personality traits showed a relationship between suicidal ideation and low Extraversion (DeShong et al. 2015), a relationship with low Conscientiousness (Kerby 2003; Velting 1999), low Agreeableness (Kerby 2003), and high Openness to experience (Chioqueta and Stiles 2005). In our study, only the Agreeableness was negatively correlated with suicide attempt. Other traits were not correlated with a suicide attempt.

Future Implications

The current findings of our study enhance our understanding of the risks and correlates of suicide attempts among university students. Determining the risk factors for suicide has an important role in both preventing suicide and choosing the right treatment modality. During the clinical intervention of a patient, the crucial findings of the cognitive profile of the patient can guide us. Systematically assessing the cognitive style, cognitive reactivity, personal traits etc. of the patient can enhance understanding of potential mechanisms of the suicide ideation or attempt, and choosing the appropriate therapeutic approaches such as cognitive behavioural approaches.

This study has some important clinical implications. First, since this was a cross-sectional study with suicide attempts having happened in the past, the current cognitive profile of the university students might actually be clues for trait-like characteristics of their cognitive profile rather than being due to emotional state-dependent changes. Accordingly, targeting rumination, negative cognitive style, and hopelessness, and fostering self-esteem even when students are not experiencing psychiatric difficulties may have protective qualities against suicide attempts. Second, group differences between suicide attempters and non-attempters provide insight into which

items should be directly added to the agenda of a therapeutic intervention after a suicide attempt and alleviating hopelessness, negative cognitive style, and rumination, as well as increasing self-esteem, might prove helpful in offering psychotherapy. Third, the high rate of suicide attempts in Turkish university students warrants the need for education about vulnerability to suicide and screening for mental health issues in youth. Early identification of individuals under risk might decrease the number of suicide-related losses, and increase awareness about psychiatric disorders. Fourth, a study like this, in which a comprehensive assessment of different psychological models of suicide was used, might help better understand and conceptualize cases with a previous suicide attempt, and facilitate an integrative individualized therapeutic approach to each case. Fifth, given the significant relationship of cognitive processes involved in suicide attempts, these results indicate that cognitive behavioural therapy and its variations like metacognitive therapy for rumination need to be further implemented for the treatment of suicide survivors. There is still a great lack of evidence-based treatment options for survivors of suicide and studies in which the cognitive processes proposed in the current study may be selectively offered to people who attempted to commit suicide to better identify the core components of therapy needed to be targeted to achieve optimal results in preventing newer attempts.

Strength and Limitations

Several strengths and limitations of the study need to be mentioned. In the current study, our data consisted of a large sample size. Additionally, our study was carried on a community sample of university students, which may limit the occurrence of confounding factors that result from comorbid psychopathologies when clinical samples are used. Because of the complexity of the suicidal process, using a multivariate approach in this study was another strength of this study. This is also one of the few studies focusing specifically on suicidality in Turkish university students, and a wide range of psychological instruments of assessment was used, which helped investigate a relatively comprehensive picture of the cognitive profile of these students. Yet, the present study has also some limitations. First, in this study, self-report measures were used. As known, self-report instruments are subject to social desirability, which can push responders to deny certain problems. Second, our study was cross-sectional, and a history of suicidal attempt was documented only respectively and relied solely on the report of the participants. Third, due to the cross-sectional design of the study, it is not clear whether the current findings were as a result of the scarring caused by a suicide attempt or whether this specific cognitive profile represented vulnerability for suicide attempts. It is unquestionable that a prospective study may be needed to confirm the causal relationship between the cognitive profile and future suicide ideation and attempt. Fourth, although the religion may have an important role on suicide, we did not collect any data on religious faith or spirituality for the study, so we can not comment on any relationship between these variables and suicide attempt.

Conclusion

In conclusion, the findings of this study indicated that hopelessness, negative cognitive style, rumination (brooding), and cognitive reactivity to depression had some impact on suicide attempts in Turkish university students. Among these factors, cognitive style, hopelessness, and rumination were strong and significant correlates of suicide attempts. Furthermore, high self-esteem and agreeableness were found negatively correlated with suicide attempt, and this was yet another remarkable finding of this study. Increasing our understanding of the risk factors and correlates of suicide is an important step toward enhancing suicide prevention among university students, and also toward providing proper treatment with better outcomes.

Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflicts of interest.

Human and Animal Rights All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants involved in the study.

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