
THE ORGANIZATION STRUCTURE OF THE IRRATIONAL AND RATIONAL BELIEFS IN THE ANXIETY SYMPTOMS

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Abstract

The current study was designed to provide further evidence for the organization structure of irrational and rational beliefs in the symptoms of anxiety in a sample of college students ($N = 350$). The findings suggest that the primary irrational/rational beliefs process predict the symptoms of anxiety via secondary irrational/rational beliefs processes. The current findings also suggest that negative life events predict the anxiety symptoms via irrational and rational beliefs. The present findings emphasize that the types of irrational beliefs, especially AWF and LFT, are an important factor in the development of anxiety symptoms while types of rational beliefs, especially N-AWF, are an important factor in the development of anxiety symptoms.

Keywords: irrational beliefs; rational beliefs; symptoms of anxiety; college students

The Organization Structure of the Irrational and Rational Beliefs in the Anxiety Symptoms

Cognitive Therapy (CT) approach postulates that the fundamental problem in anxiety disorders is overactive cognitive patterns or schemata in the relation of danger that improperly aggravate and maintain anxiety response to events or situations that may represent a relatively amount of small real threat rather than the

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production of anxiety. When these threat schemata activated, they consistently formalized the attentional, perceptual, and inferential process of people with anxiety disorders in a dysfunctional manner. Therefore, people experience acute anxiety in response to the perceived threat by exaggerating the danger and underrating their potentiality (Reilly, Sokol, & Butler, 1999).

Rational Emotion and Behavior Therapy (REBT), as a prior form of Cognitive Behavior Therapy (CBT), postulates production of anxiety based on Ellis' ABC model. (David, Lyn, & Ellis, 2010). In the ABC model, A represents the negative life events, B stands for the beliefs about these events, and C represents cognitive, affective, and behavioral responses of the individual. According to this approach, the individual's irrational beliefs about the negative life events experienced lead to unhealthy negative emotions such as anxiety, depression, and anger rather than negative life events while rational beliefs generate adaptive negative emotions such as concern, sorrow, and regret (David et al., 2010).

Modern REBT approach describes four irrational belief processes that interact with one another playing a role in the development of psychological distress. These are demandingness, awfulizing, low frustration tolerance, and global evaluation of self/other (David et al., 2010). Demandingness (DEM), as primary irrational belief process, addresses to rigid/absolutistic requirements expressed as “must”, “should”, and “have to”. Awfulizing (AWF) refers to exaggerated evaluations of an adverse event as worse than it should be. Frustration intolerance (LFT) refers to the inability to tolerate or withstand stressful events. Global evaluation of self/other (GES/O) GES/O refers to adverse ratings about oneself and others (David et al., 2010; Hyland, Shevlin, Adamson, & Boduszek, 2014a). Ellis and Dryden (1997) postulated that DEM, as a core irrational belief, affects psychological distress through secondary evaluative irrational beliefs process (AWF, LFT, and GES/O). Numerous studies have tested and provided evidence of the validity of the model proposed by Ellis and Dryden (1997) (Buschmann et al., 2017; Diloranzo et al., 2007; Hyland et al., 2014a; Oltean, Hyland, Vallieres, & David, 2017; Turner et al., 2019). Although the role of irrational beliefs in the development of anxiety is well documented in the existing literature, much uncertainty persists regarding the role of rational beliefs.

REBT treats irrational beliefs as the cognitive vulnerability factor in the development of psychological distress while rational beliefs as the cognitive resilience factor (David et al., 2010). According to Ellis (1994) anxiety stems from irrational beliefs that are related with themes of perfectionism, self-directed should, and awfulizing/catastrophizing. Existing studies indicate that both demandingness and awfulizing (David et al., 2014; David, Schnur, & Belloiu, 2002), awfulizing, low frustration tolerance, other-directed should and self-worth (Chang & D’Zurilla, 1996), personal perfection, catastrophizing and demand for approval (Deffenbacher et al., 1986) are significant predictor of high anxiety, and demandingness as primary irrational beliefs and awfulizing as secondary irrational belief process

predict a higher level of anxiety. Similarly, Bushmann et al. (2017) found that DEM predicted anxious affect via LFT. Finally, Turner, Carrington, and Miller (2019) reported that DEM predicted anxiety symptoms through AWF and GES. Afterward, on the basis of clinical evidence derived from REBT, Ellis (2003) offers two major forms of anxiety, namely ego anxiety and discomfort anxiety. Ellis (2003) suggests that ego anxiety arises when people perceive a threat related to their self, self-worth, and need for approval by others and that when they consider this threat as worse than should be. However, discomfort anxiety occurs when they feel that their comfort is threatened and that when they do not evaluate it in a realistic manner (Ellis, 2003). Ellis (2003) suggests that while ego anxiety is accompanied by a feeling of depression, discomfort anxiety is accompanied by a feeling of anxiety.

REBT offers that rational beliefs function as a cognitive resilience factor in stressful situations and product adaptive response to negative life events (David et al., 2010). By enhancing his/her resilience during times of emotional distress, rational beliefs protect a person against the production of psychological distress (Caserta et al. 2010). Recent findings indicate that rational beliefs negatively correlate with psychological distress (Oltean & David, 2018; Oltean et al., 2017), and moderated predictive effect of irrational beliefs on symptoms of post-traumatic stress (PTS). Similar to irrational beliefs process, modern REBT depicts four basic rational beliefs processes: preference (PRE), non-awfulizing (N-AWF), high frustration tolerance (HFT), and unconditional acceptance (UA; Hyland et al., 2014b; Oltean. et al, 2017). REBT approaches PRE as the primary rational belief process while N-AWF, HFT, and UA take it as secondary rational beliefs process. According to REBT primary rational belief process (PRE) influences psychological distress (symptoms of depressive/anxiety) via secondary rational belief processes (N-AWF, HFT, and UA; Hyland et al., 2014b; Oltean. et al, 2017). Hyland et al. (2014b) found that PRE predicted symptoms PTS through N-AWF, HFT, and UA. In a similar result was documented by Oltean et al. (2017), who found that PRE predicted subjective life satisfaction and symptoms of psychological distress via UA beliefs.

The current study

Although the relationship between anxiety and irrational beliefs is well documented by previous studies, few studies have sought to examine modern REBT's postulation that the organization structure of irrational and rational beliefs in product and maintenance of anxiety in the stressful situation. Since it is not clear enough which types of irrational and rational belief processes contribute to anxiety symptoms, new research is required to provide evidence for the role of irrational and rational cognitive processes in the production and maintenance of anxiety symptoms. Therefore, we conducted this study in order to fill this gap in existing REBT literature. In addition to this, findings from this study may serve as a basis for structuring psycho-education and intervention programs to prevent and reduce

anxiety symptoms. Similarly, addressing anxiety in the context of irrational and rational beliefs can help professionals create a conceptual / theoretical framework of when and how to intervene in the process of helping individuals suffering from anxiety symptoms.

First, we attempt to examine the organizational structure of irrational beliefs in the symptoms of anxiety. REBT explains DEM as a primary irrational belief process influencing psychological distress indirectly via secondary irrational beliefs processes (AWF, LFT, and GES; Ellis & Dryden, 1997). Previous findings provide evidence of the validity of the organization structure of irrational beliefs in the symptoms of psychological distress (e.g., Buschmann et al, 2017; Hyland et al., 2014a). Based on REBT's explanation and previous findings, we hypothesize that DEM will predict symptoms of anxiety via AWF, LFT, and GES (*Hypothesis 1*). In addition to this, REBT suggested that our beliefs act as a mediator variable in the relationship between activating event and cognitive, emotional and behavioral consequences (David et al., 2010). In this relationship, irrational beliefs related to activating event produce unhealthy consequence while rational beliefs lead to healthful consequences (David et al., 2017). Prior evidence suggested that irrational beliefs functioned as a mediator variable (Day and Maltby 2003; Jibeen, 2015). We, therefore, hypothesize that negative life event (NLEs) will predict irrational, in turn, irrational beliefs will predict symptoms of anxiety (*Hypothesis 2*).

Second, in order to prove further evidence regarding the organization structure of rational beliefs, we sought to investigate the organization structure of rational beliefs. REBT also posits that PRE as the primary RB process affecting psychological distress and psychopathology via the secondary RB process such as N-AWF, HFT, and UA. Based on this assumption and previous findings (Hyland et al. 2014b; Oltean. et al., 2017), we hypothesize that PRE will predict symptoms of anxiety via N-AWF, HFT, and UA (*Hypothesis 3*). Moreover, based on REBT's assumption that our beliefs act as a mediator variable in the relationship between activating event and cognitive, emotional and behavioral consequences (David et al., 2010), we hypothesize that NLEs will predict rational beliefs, in turn, rational beliefs will predict symptoms of anxiety (*Hypothesis 4*).

Method

Participants and procedure

Participants were 350 undergraduates (51.7% women and 48.3% men) enrolled in educational psychology and guidance in education courses from different department of Pamukkale University. Their age ranged from 18 to 36 with a mean of 21.19 years ($SD = 2.02$). Students participating in this study have diverse educational backgrounds in the majors of sociology, philosophy, English language and literature, tourism and hospitality management, history, gastronomy, contem-

porary Turkish dialects, mathematics, geography, economy, business management, and sport management. After informing the participants about the study, we declared that they were not obligated to participate in the study and could leave the study at any time. Following the participants' informed consent, we administered all measures in the classroom setting.

Measurement

Irrational and Rational Beliefs. We used the Abbreviated Turkish Version of the Attitude and Belief Scale 2 (TV-AVABS-2; Hyland, Shevlin, Adamson, & Boduszek, 2014c, Duru & Balkis, 2019) in order to determine participants' irrational and rational beliefs. TV-AVABS-2 includes 24 items and measures four irrational (DEM, AWF, LFT, and GES) and rational cognitive processes (PRE, N-AWF, HFT, and UA). The statements are rated on a 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree).

Symptoms of Anxiety. We used anxiety subscale of Brief Symptoms Inventory (BSI, Derogatis, 1992) to determine the participants' levels of symptoms of anxiety. The anxiety subscale includes 6 items with five response options from 0 (never) to 4 (excessively). The participants rated each item considering their moods in the recent six months including that day.

For the present study, we translated the anxiety symptoms scale of BSI from English into Turkish. Next, two academicians from the Psychological Counseling and Guidance translated it from Turkish into English. Finally, another academician who uses both languages effectively compared both forms. The last form of the anxiety symptoms was answered by 128 undergraduate students who were not included in the sample of the current study. We found Cronbach's alpha coefficients as .80 for anxiety symptoms. Then, we conducted CFA on a 6-item scale with data from the current study. The findings confirmed single-factor structure of anxiety symptoms: ($X^2/df = 1.467$), $p = .15$, RMSEA = .04 (.00 -.08), SRMR = .03, CFI = .99, TLI = .98.

Negative Life Event. We developed a 12-item negative life events checklist (NLEC) to identify the students' negative life events. The participants were asked to report the number of events they had experienced in the prior six months. The last form of the NLEC was answered by 128 undergraduate students who were not included in the sample of the current study. We found Cronbach's alpha coefficients as .91 for anxiety symptoms. Then, we conducted CFA on a 12-item scale with data from the current study. The findings confirmed a single-factor structure of anxiety symptoms: ($X^2/df = 1.182$), $p = .17$, RMSEA = .02 (.00 -.04), SRMR = .04, CFI = .95, TLI = .93.

Data Analyses

Data were analyzed in three steps using SPSS 22.0 and AMOS 22. At the first step, we examined the properties of the variables. At the second step, we conducted CFA in order to test the measurement model each measurement individually. At the third stage, we conducted structural equation model (SEM) analyses in order to test REBT's psychopathology and psychological health and ABC models (mediation role of irrational and rational beliefs). We performed two SEM analyses in order to test the mediation role of irrational belief. In the first SEM analysis, we tested the mediation role of general irrational beliefs. In the second SEM analysis, we test which type of irrational beliefs has a mediation role in the relationship between NLEs and anxiety symptoms. We followed the same procedure in order to examine mediation role of rational beliefs in the relationship between NLEs and anxiety symptoms.

Finally, we evaluated how models fitted the observed data by using, as suggested by Kline (2005), the following criteria. These are χ^2 (Chi-square), Root Mean Square of Error Approximations (RMSEA), and fit indices, Comparative fit index (CFI), Tucker Levinson fit index (TLI), Goodness of fit index (GFI), and, normed fit index (NFI) were considered to evaluate models. For each of these fit indices, values greater than 0.95 indicate very good fits. Also, SRMR values ≤ 0.05 and RMSEA values ≤ 0.08 , and, a non-significant χ^2 ($p > 0.05$), and X^2/d ratio was below the suggested 3:1 ratio represent acceptable model fit (Kline 2005).

Results

Descriptive statistics

Table 1 presents means, standard deviations, and ranges for each of the variables for the total sample. Descriptive analyses indicated that the means of the NLEs was 1.63 (SD = 1.67; scores ranged 0-8), the means of the anxiety symptoms was 4.63 (SD = 3.8; scores ranged 0-21), the means of the general irrationality was 33.13 (SD = 6.14; scores ranged 16-50), and the means of the general rationality was 45.40 (SD = 5.28; scores ranged 26-60).

Table 1. Descriptive statistics for all variable in the current study.

	Mean	SD	Range	Possible Range
Negative life events	1.63	1.67	0-8	0-12
Anxiety symptoms	4.62	3.80	0-21	0-24
DEM	11.33	2.08	3-15	3-15
AWF	7.56	2.74	3-15	3-15
LFT	9.73	2.66	3-15	3-15
GES	4.50	1.93	3-15	3-15

	Mean	SD	Range	Possible Range
IBs	33.13	6.14	16-50	12-60
PRE	10.94	2.58	3-15	3-15
N-AWF	11.17	2.29	3-15	3-15
HFT	10.56	2.51	3-15	3-15
UA	12.72	2.24	3-15	3-15
RBs	45.40	6.27	26-60	12-60

Note. DEM demandingness, AWF awfulizing, LFT low frustration tolerance, GES global evaluation of self, IBs irrational beliefs, PRE preference, N-AWF non-awfulizing, HFT high frustration tolerance, UA unconditional acceptance, RBs rational beliefs

The Measurement model of irrational beliefs

A four-factor model of IBs subscale of the ABS-2 AV was examined in which each latent variable was measured through three items. Although the fit of four-factor model to data was satisfactory ($X^2=147.517$, $d.f. = 48$, $p < .001$, GFI = .94, RMSEA = .08 (.06-.09), SRMR = .07, CFI = .91, TLI = .87, IFI = .91), TLI value was found to be below the acceptable limits. Next, we examined modification indices (MI) in order to determine sources of the misfit. Examination of MI results noticed that a remarkable residual covariance existed between item 3 (It's unbearable to fail at important things, and I can't stand not succeeding at them), which designed to measure LFT and item 22 ('I must be successful at things that I believe are important, and I will not accept anything less than success'), which was designed to measure DEM. Both item 3 and item 22 contain content specifically regarding the need for success. We decided to retain modifications. The re-specified model generated acceptable fit statistics ($X^2=108.466$, $d.f. = 47$, $p < .001$, GFI = .95, RMSEA = .06 (.04-.08), SRMR = .06, CFI = .94, TLI = .92, IFI = .94).

The Measurement model of rational beliefs

A four factor models of RBs subscale of the ABS-2 AV was examined in which each latent variable was measured through three items. The fit of four factor model to data was acceptable ($X^2=129.094$, $d.f. = 48$, $p < .001$, GFI = .95, RMSEA = .07 (.05-.08), SRMR = .05, CFI = .94, TLI = .92, IFI = .94).

Testing the structural organizational of irrational beliefs

We utilized the items and the total score to determine the latent variables. All four IBs latent variables were identified using their items. We created 2 parcels to determine anxiety symptoms' latent variables. We performed a structural model using 5 latent and 14 observed variables.

In the second step, for organization of irrational beliefs, the SEM analysis indicated that the model yielded an acceptable data-model fit: $X^2(66, N = 350) = 140.819$, $p < .001$, ($X^2/df = 2.134$), GFI = .95, RMSEA = .06 (.04-.07), SRMR = .06, CFI = .94, TLI = .92, IFI = .94.

Table 2 presents the standardized (direct and indirect) regression weights for the organizational structure of irrational beliefs in the emergence of anxiety symptoms. The findings from the SEM analysis indicated that DEM predicted AWF ($p = .03$) and LFT ($p < .001$) but not GES ($p = .94$) or anxiety symptoms ($p = .090$). Anxiety symptoms were significantly predicted by AWF ($p < .001$) and LFT ($p < .001$), but not by GES ($p = .40$). Moreover, DEM indirectly predicted anxiety symptoms via AWF and LFT ($\beta = .16$, 90% of Confidence Intervals (CI) = .09, .23, $p < .001$). Finally, DEM accounted for 6% of the variance in AWF, 7% the variance in LFT, and 0% the variance in GES. Furthermore, DEM, AWF, LFT, and GES accounted for 36 % the variance in anxiety symptoms. Briefly, these findings supported the organizational structure of irrational beliefs processes, in which the primary IB process (DEM) affects psychological distress through the secondary IB process (AWF and LFT, except GES).

Table 2. Standardized parameter estimates of organization structure of irrational/rational beliefs.

	Direct effect	Indirect effect (90 % CI)
DEM→AWF	.24**	
DEM→LFT	.27**	
DEM→GES	.01 ^{ns}	
DEM→Anxiety symptoms	-.12 ^{ns}	.16(.09, .23)** via AWF and LFT
AWF→ Anxiety symptoms	.43**	
LFT→ Anxiety symptoms	.27**	
GES→ Anxiety symptoms	.05 ^{ns}	
PRE→ N-AWF	.24**	
PRE→HFT	.34**	
PRE→UA	.27**	
PRE→Anxiety symptoms	.09 ^{ns}	-.13(-.21, -.07)** via N-AWF and HFT
NAWF→ Anxiety symptoms	-.25**	
HFT→ Anxiety symptoms	-.20*	
UA→ Anxiety symptoms	.01 ^{ns}	

* $p < .05$, ** $p < .001$

Testing mediation role of irrational beliefs

We conducted two models to test the mediation role of irrational beliefs. In the first model, we used DEM, AWF, LFT, and GES as irrational beliefs latent construct. We created 2 parcels to determine NLEs and anxiety symptoms' latent variables. We performed a structural model using 3 latent and 8 observed variables.

Testing structural Model1

Result of SEM analysis indicate that the model 1 was good data-model fit $\chi^2(17, N = 350) = 35.919, p < .001, (\chi^2/df = 2.113)$, GFI = .97, RMSEA = .06 (.03-.08), SRMR = .04, CFI = .96, TLI = .93, IFI = .96.

Table 3 presents the standardized (direct and indirect) regression weights for the mediating role of irrational beliefs in the emergence of anxiety symptoms. Parameter estimate noticed that NLEs predicted irrational beliefs ($p < .001$) and anxiety symptoms ($p < .001$). Irrational beliefs predicted anxiety symptoms ($p < .001$). Moreover, NLEs indirectly predicted symptoms of anxiety via irrational beliefs ($\beta = .18, 90\% \text{ of CI} = .11, .29, p < .001$). Finally, NLEs explained 22% of the variance in irrational beliefs. NLEs and irrational beliefs explained 52% of the variance in anxiety symptoms.

Testing structural Model2

In the second model, to test which type of irrational beliefs has a mediation role in the relationship between NLEs and anxiety symptoms, we utilized the items and the total score to determine the latent variables. All four IBs latent variables were identified using their items. We created 2 parcels to determine NLEs and anxiety symptoms' latent variables. We performed a structural model using 6 latent and 16 observed variables.

Analysis indicated that the model yielded an acceptable data-model fit: $\chi^2(88, N = 350) = 178.559, p < .001, (\chi^2/df = 2.029)$, GFI = .94, RMSEA = .05 (.04-.07), SRMR = .05, CFI = .94, TLI = .92, IFI = .94.

Parameter estimates from SEM analysis showed that NLEs positively predicted AWF ($p < .001$), LFT ($p < .001$), and anxiety symptoms ($p < .001$). Anxiety symptoms were positively predicted by AWF ($p = .013$) and LFT ($p = .003$). Moreover, NLEs also indirectly predicted symptoms of anxiety via AWF and LFT ($\beta = .17, 90\% \text{ of CI} = .11, .26, p < .001$). Finally, NLEs accounted for 1% of the variance in DEM. NLEs and DEM accounted for 22% of the variance in AWF, 15% of the variance in LFT and 1% of the variance in GES. Furthermore, NLEs, DEM, AWF, LFT, and GES accounted for 59 % of the variance in anxiety symptoms. Briefly, these findings supported the REBT's postulation that our beliefs mediated the relationships between NLEs and emotional consequences.

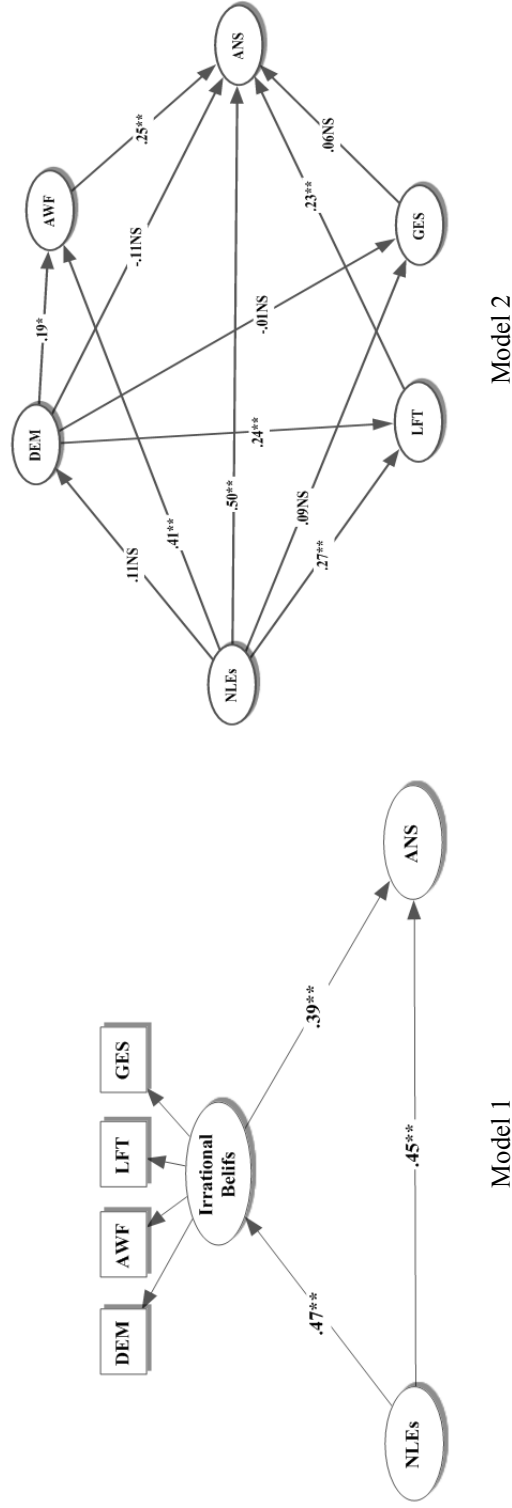


Figure 1. Mediating role of irrational belief.

Testing the organizational structure of rational beliefs

We utilized the items and the total score to determine the latent variables. All four RBs latent variables were identified using their items. We created 2 parcels to determine anxiety symptoms' latent variables. We performed a structural model using 5 latent and 14 observed variables.

In the second step, for organization of rational beliefs, the SEM analysis indicated that the model yielded an acceptable data-model fit: $\chi^2(67, N = 350) = 163.220, p < .001, (\chi^2/df = 2.436)$, GFI = .94, RMSEA = .06 (.05-.07), SRMR = .05, CFI = .94, TLI = .92, IFI = .94.

Table 2 presents the standardized (direct, indirect and total) regression weights for the organizational structure of rational beliefs in the emergence of anxiety symptoms. The results of the SEM analysis noticed that PRE predicted N-AWF ($p < .001$) and HFT ($p < .001$), and UA ($p < .001$), but not anxiety symptoms ($p = .16$). Anxiety symptoms were significantly predicted by N-AWF ($p = .003$) and by HFT ($p = .035$), but by UA ($p = .40$). Moreover, PRE indirectly predicted anxiety symptoms via N-AWF and HFT ($\beta = -.13$, 90% CI = $-.21, -.07, p < .001$). Finally, PRE accounted for a 6% variance in N-AWF, an 11% variance in HFT, and a 7% variance in UA. Furthermore, PRE, N-AWF, HFT, and UA accounted for a 14 % variance in anxiety symptoms. Briefly, these findings supported the organizational structure of rational beliefs processes, in which the primary RBs process (PRE) affects anxiety symptoms through the secondary RBs process (N-AWF and HFT, except UA).

Testing mediation role of rational beliefs

We conducted two models to test the mediation role of rational beliefs. In the first model, we used PRE, N-AWF, HFT, and UA as rational beliefs latent construct. We created 2 parcels to determine NLEs and anxiety symptoms' latent variables. We performed a structural model using 3 latent and 8 observed variables.

Testing structural Model1

Result of SEM analysis indicate that the model 1 was better data-model fit $\chi^2(17, N = 350) = 12.220, p < .001, (\chi^2/df = .719)$, GFI = .99, RMSEA = .00 (.00-.03), SRMR = .03, CFI = 1, TLI = 1, IFI = 1

Table 3 presents the standardized (direct, indirect and total) regression weights for the mediating role of rational beliefs in the emergency of anxiety symptoms. Parameter estimate noticed that NLEs negatively predicted rational beliefs ($p = .008$) and anxiety symptoms ($p < .001$) positively. Rational beliefs negatively predicted anxiety symptoms ($p = .004$). Moreover, NLEs indirectly predicted symptoms of anxiety indirectly via rational beliefs ($\beta = .06$, 90% of CI = $.03, .11, p = .002$). Finally, NLEs explained 6 % of the variance in rational beliefs. NLEs and rational beliefs explained 43% of the variance in anxiety symptoms.

Table 3. Standardized parameter estimate of mediation of irrational/rational beliefs.

	Direct effect	Indirect effect (90 % CI)
Irrational Beliefs (IBs) Model 1		
NLEs→IBs	.47**	
NLEs→Anxiety symptoms	.45**	.18(.11, .29)**
IBs→Anxiety symptoms	.39**	
Irrational beliefs (IBs) Model 2		
	Direct effect	Indirect effect (90 % CI)
NLE →DEM	.11 ^{ns}	
NLE →AWF	.41**	
NLE →LFT	.27**	
NLE →GES	.09 ^{ns}	
NLE→ Anxiety symptoms	.50**	.17(.11, .26)** via AWF and LFT
DEM→ Anxiety symptoms	-.11 ^{ns}	
DEM→AWF	.19*	
DEM→LFT	.24**	
DEM→GES	-.01 ^{ns}	
AWF→ Anxiety symptoms	.25*	
LFT→ Anxiety symptoms	.23**	
GES→ Anxiety symptoms	.06 ^{ns}	
Rational beliefs(RBs) Model 1		
	Direct effect	Indirect effect (90 % CI)
NLEs→RBs	-.25**	
NLEs→Anxiety symptoms	.55**	.06(.03, .11)**
RBs→Anxiety symptoms	-.24**	
Rational beliefs(RBs) Model 2		
NLEs→PRE	.02 ^{ns}	
NLEs → N-AWF	-.17*	
NLEs → HFT	-.25**	
NLEs → UA	-.04 ^{ns}	
NLEs → Anxiety symptoms	.58**	.04(.01, .08)* via N-AWF
PRE→ N-AWF	.24**	
PRE→HFT	.34**	
PRE→UA	.27**	
PRE→Anxiety symptoms	.03 ^{ns}	
NAWF→ Anxiety symptoms	-.19*	
HFT→ Anxiety symptoms	-.05 ^{ns}	
UA→ Anxiety symptoms	-.05 ^{ns}	

* $p < .05$, ** $p < .001$

Testing structural Model2

In the second model, to test which type of rational beliefs has a mediation role in the relationship between NLEs and anxiety symptoms, we utilized the items and the total score to determine the latent variables. All four rational beliefs latent variables were identified using their items. We created 2 parcels to determine NLEs and anxiety symptoms' latent variables. We performed a structural model using 6 latent and 16 observed variables.

SEM analysis demonstrated that the model yielded an acceptable data-model fit: $\chi^2(89, N = 350) = 179.430, p < .001, (\chi^2/df = 2.016)$, GFI = .94, RMSEA = .05 (.04-.07), SRMR = .05, CFI = .95, TLI = .93, IFI = .95.

Parameter estimates of SEM analysis revealed that NLEs predicted N-AWF ($p = .026$), HFT ($p = .004$), anxiety symptoms ($p < .001$). N-AWF significantly predicted anxiety symptoms ($p = .016$). Furthermore, NLEs indirectly predicted symptoms of anxiety through N-AWF ($\beta = .04$, 90% of CI = .01, .08, $p = .023$). Finally, NLEs accounted for 0% the variance in PRE. NLEs and PRE accounted for 9% of the variance in AWF, 18 % of the variance in HFT and 7% of the variance in UA. Furthermore, NLEs, PRE, N-AWF, HFT, and UA accounted for 44 % of the variance in anxiety symptoms. Briefly, these findings indicated that general rational beliefs mediated the relationships between NLEs and emotional consequences.

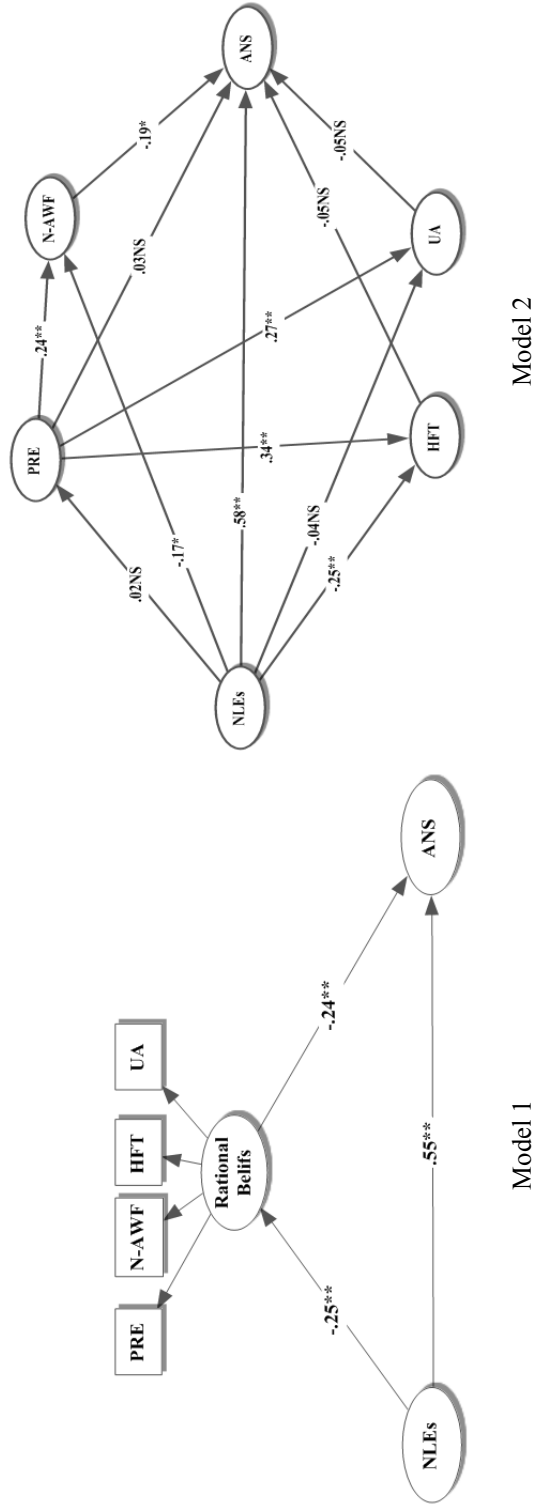


Figure 2. Mediating role of rational belief.

Discussion

We have conducted the current study to provide further empirical evidence for the organizational structure of irrational and rational beliefs in the production of anxiety symptoms, and for Ellis' ABC model. Initially, we tested the validity of the organization of irrational and rational beliefs for the current sample. Next, we examined two structural models in order to prove additional evidence on Ellis's ABC model.

Our first hypothesis is that DEM will predict the symptoms of anxiety via AWF, LFT, and GES. The findings from SEM analysis demonstrated an acceptable model fit, and irrational beliefs as a whole accounted for 36 % of the variance in anxiety symptoms. The current findings suggested that rigid and absolutistic demands predicted the evaluative irrational cognitive process, AWF, and LFT, which in turn predicted symptoms of anxiety. These findings are consistent with previous studies indicating that primary irrational cognitive process contributed to anxiety symptoms, and anxious affect via evaluative irrational cognitive process, AWF (Turner et al., 2019) and LFT (Buschmann et al., 2017), and provide additional empirical evidence for REBT theory that DEM beliefs represents primary irrational cognitive process, while AWF, LFT and GES represent secondary irrational cognitive process in the development of psychological distress. This finding is also in line with prior research findings indicating that LFT (Chang & D'Zurilla, 1996) and AWF (David et al., 2014; David et al., 2002; Deffenbacher et al., 1986) are a predictor of higher anxiety.

Regarding second hypothesis, results from SEM analysis revealed that NLEs and irrational beliefs as a whole explained 52% of the variance in anxiety symptoms. The current results demonstrate that NLEs predict irrational beliefs, especially AWF and LFT, which in turn predict symptoms of anxiety. The current findings suggest that students who evaluating NLEs in an unrealistic manner or as unbearable, are more likely to develop anxiety symptoms. These findings are in line with Ellis's (1994, 2003) explanation regarding the occurrence of anxiety. Ellis (2003) argues that anxiety arises when a person believes that s/he should get what s/he wants (not get what s/he does not want), and that it is awful and intolerable when s/he does not get what s/he wants as s/he must. Ellis (1994) suggests that holding irrational beliefs related theme of awfulizing often results in anxiety. The current findings also suggest AWF and LFT function as a mediator variable in the relationship between NLEs and anxiety symptoms. This finding provides further support to REBT' postulation regarding the mediating role of irrational beliefs between activating events and unhealthy emotional consequences (David et al., 2010).

Regarding the organizational structure of rational beliefs, we hypothesized that PRE as primary rational beliefs process would predict the symptoms of anxiety through evaluative rational beliefs processes (N-AWF, HFT, and UA). The

findings from SEM analysis demonstrated an acceptable model fit, and rational beliefs as a whole accounted for 14 % of the variance in anxiety symptoms. The current findings suggested that PRE as primary rational belief process positively predicted secondary rational cognitive process, N-AWF, and HFT, which in turn predicted symptoms of anxiety. PRE also predicted the symptoms of anxiety through N-AWF and HFT. These findings are consistent with findings from previous studies indicating that the primary rational cognitive process contributed to psychological distress symptoms through the secondary rational cognitive process (Hyland et al. 2014a; Oltean et al., 2017). Current findings provide important empirical contributions to assumption of REBT about the organizational structure of rational beliefs in the occurrence and maintenance of psychological distress.

In respect of fourth hypothesis, findings from SEM analysis demonstrated that NLEs and rational beliefs as a whole accounted for 43 % of the variance in symptoms of anxiety. Current findings indicate that types of rational cognitive processes, especially N-AWF, act as a mediating variable in the relationship between NLEs and symptoms of anxiety. Oltean and David (2017) found that higher level of rational beliefs is related to a lower level of psychological distress, which is in good agreement with findings of the current study. Our findings suggest that students who are exposed NLEs are less likely to develop anxiety symptoms when they evaluate NLEs, especially in a realistic manner. These findings provide additional evidence on REBT's assumption that rational beliefs generated adaptive and functional emotional consequences and act as a cognitive resilience factor in the stressful situation (David et al., 2010).

Finally, our findings are reported in this study are subject to at least two limitations. First, our findings are limited by the use of a cross-sectional design. We cannot make a certain conclusion in respect of causality. In order to confirm the REBT's postulation regarding the mediation role of the irrational/rational cognitive process in the relationship between NLEs and psychological distress, future studies should examine it within the longitudinal or experimental design. Another limitation of this study is related with the sampling. The current sample consists of undergraduate students. Thus, the generalizability of these findings is only limited to this population. In order to contribute to the generalizability of the current findings, the current study should be replicated within a clinical population.

In conclusion, current study has gone some way towards enhancing both our understanding of the organizational structure of irrational/rational beliefs in the development of psychological distress, and the mediating role of irrational/rational beliefs in the relationships between activating events and emotional consequences. First, the empirical findings in the present study provide additional support for REBT's assumption on the organizational structure of irrational/rational beliefs in the occurrence of psychological distress. Current findings highlighted that core irrational/rational cognitive process indirectly predicted the symptoms of anxiety via evaluative irrational/rational cognitive processes. Finally, the empirical findings

in this study provide further support to the underlying theory of REBT and revealed that irrational beliefs could be a vulnerability factor while rational beliefs act as a cognitive resilience factor in the occurrence of anxiety symptoms. Furthermore, the findings highlighted that the types of irrational beliefs, especially AWF and LFT, are an important factor in the development of anxiety symptoms while types of rational beliefs, especially N-AWF is an important factor. Thus, therapeutic interventions should focus on dealing with irrational beliefs, especially AWF and LFT, and enhancing rational beliefs, especially N-AWF, in order to decrease symptoms of anxiety.

Conflict of interests

The authors declare no conflicts of interest with respect to the research, authorship, and/or publication of this article.

Compliance with Ethical Standards

Ethical Approval: 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: Informed consent was obtained from all individual participants included in the study.

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