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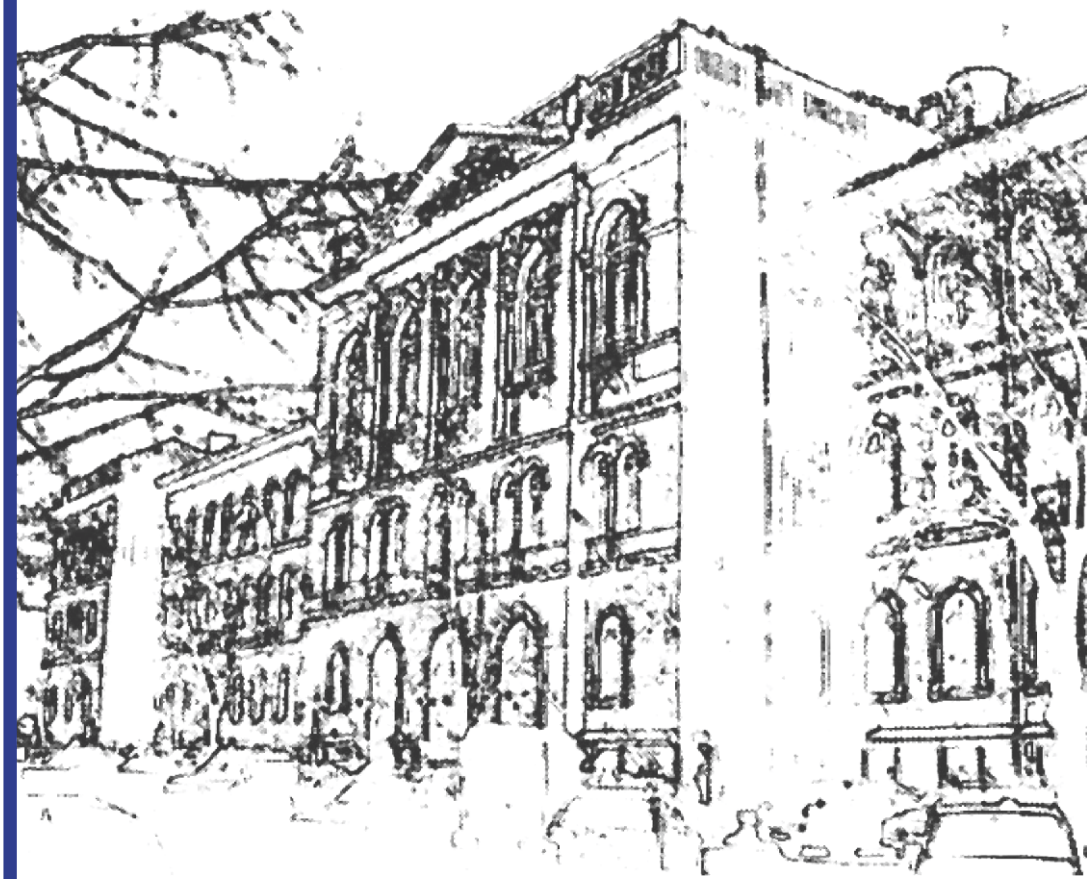

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ARTICLES SECTION

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MINDFULNESS AND SELF-COMPASSION DECREASE EMOTIONAL SYMPTOMS, SELF-CRITICISM, RUMINATION AND WORRY IN COLLEGE STUDENTS: A PRELIMINARY STUDY OF THE EFFECTS OF GROUP SELF-COMPASSION-BASED INTERVENTIONS

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Abstract

The present study aimed to evaluate the effect of a brief protocol that consisted in 4 sessions based on the Mindful Self-Compassion (MSC) program administered as a group intervention in an online format, on indicators of self-compassion, self-efficacy, self-criticism, depression, anxiety, stress, mindfulness, rumination and worry. A pretest-posttest experimental design was used with a wait-list control group with random assignment. The sample consisted of university students (N= 35) who received the modified MSC program. Results suggest that the program increased indicators of self-compassion (d= 1.603), self-efficacy (d= 0.655) and mindfulness (rB = 0.954), and reduced levels of depression (rB= 0.980), stress (d= 1.050), rumination (d = 0.626) and worry (d= 1.077). The implications of brief self-compassion-based interventions as an effective strategy for addressing emotional issues in college students are discussed.

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Keywords: Mindful Self-Compassion, compassion, self-criticism, emotional symptoms, rumination, worry.

The Covid-19 pandemic has generated an increase in symptoms of anxiety and depression in the world´s population, as well as a decrease in happiness and quality of life (Cao et al., 2020; Gritsenko et al., 2020; Li et al., 2020; Rajkumar, 2020). These alterations could be more representative in populations with higher vulnerability to stressful events, such as university students (Amézquita Medina et al., 2003; Ramírez, 2012; Tosevski et al., 2010).

Preliminarily, research in Colombia does not provide an extensive evaluation of the student population in the context of the COVID-19 pandemic, however, some results of studies conducted in educational settings suggest that changes derived from restrictions related to the pandemic lockdown, and adaptation to the remote teaching model generated an impact on the mental health of university; for example, in the research conducted by Gamboa et al. (2020), it was found that out of a sample of 100 teachers and 394 university students, 14% of the respondents showed mild depressive symptoms, 6% scored at a moderate level and 3% reached a severe score, characterized mainly by indicators such as feelings of sadness, loss of interest in activities, feelings of tension or motor agitation and feelings of guilt consequent to the implementation of measures of confinement and social distancing. Another relevant study was developed by García-Espinosa et al. (2021), in which in a sample of 1149 universities, a prevalence of 47.08% y 27.06% was found for symptoms of depression and anxiety respectively. These results indicate that the COVID-19 pandemic could be a trigger that worsens preexisting mental health conditions in college students, generating a higher level of impairment at the academic, social, and family levels, as well as a greater deterioration in the overall functioning of this vulnerable population (Chang et al., 2021; Deng et al., 2021).

A range of psychological interventions have shown efficacy in the treatment of emotional problems as those mentioned above such as Behavioral Activation (Hopko et al., 2003; Parra et al., 2019), Cognitive Behavioral Therapy (Zhang et al., 2019), Acceptance and Commitment Therapy (Luciano et al., 2014; Ruiz, Flórez, et al., 2018), Mindfulness-Based Therapies (Sass et al., 2019) and Compassion-Focused Therapy (Kirby et al., 2017). Regarding the efficacy of mindfulness and compassion-based interventions applied via the Internet, evidence has been found related to the reduction of indicators of emotional symptoms and an increase in indicators of subjective perception of quality of life in clinical and non-clinical populations (Sevilla-Llewellyn-Jones et al., 2018; Spijkerman et al., 2016). Likewise, low-intensity interventions adapted to a virtual/digital format show promising results related to the positive impact on mental health indicators during

the Covid pandemic (Matiz et al., 2020; Mercado, 2020; Sammons et al., 2020; Wei et al., 2020)

Multiple studies have linked self-compassion with different positive psychological effects, among which stand out, lower levels of anxiety and depression (Neff & Germer, 2013), lower indicators of rumination, perfectionism and fear of failure (Neff, 2003a; Neff et al., 2005), lower tendency to suppress negative thoughts or emotions (Leary et al., 2007), greater ability to effectively cope with stressful life situations or events (Costa & Pinto-Gouveia, 2011; Sbarra et al., 2012; Vettese et al., 2011) higher level of functioning in interpersonal relationships (Neff & Beretvas, 2013), as well as an increase in self-care behaviors (Adams & Leary, 2007; Kelly et al., 2010; Terry & Leary, 2011).

According to Neff (2003a, 2016), self-compassion can be defined as a type of self-to-self relationship that represents a compassionate attitude towards one's self (experiencer) when faced with personal suffering and constitutes a process where the individual seeks to recognize and be moved by one's suffering without avoiding or ignoring it, which generates the desire to alleviate such suffering by having a self-dealing based on understanding.

Self-compassion comprises 3 interacting components: 1) self-kindness; 2) a sense of common humanity; and 3) mindfulness, which refers to noticing one's own painful experiences in a balanced way without ignoring or amplifying unpleasant aspects of oneself and one's life (Neff, 2003b). The Mindful Self-Compassion program (Germer & Neff, 2019) is a training congruent with this line of interventions, which was designed to promote the development of mindfulness and self-compassion skills to favor effective coping with negative situations or life events (Allen & Leary, 2010).

Although preliminary evidence has been found on the effectiveness of MSC training in different populations, it is still unknown whether such effects are replicable in populations vulnerable to suffering from different types of emotional problems, such as graduate or undergraduate professionals (Germer & Neff, 2019). Likewise, an absence of literature has been recognized regarding the effect of interventions based on self-compassion in the Latin American population (Naismith et al., 2020).

Consistent with this, other transdiagnostic mechanisms have been pointed to as possible maintainers of psychological distress. For example, self-criticism, which refers to a form of negative self-evaluation about different aspects and may generate feelings of inferiority, failure, and guilt (Gilbert, 2007); repetitive negative thinking styles such as rumination, a type of perseverative thinking whose content is focused on past or present events, and worry, whose content is mainly focused on future events (Fresco et al., 2002; Nolen-Hoeksema et al., 2008). Both maintain prolonged states of negative affect and psychological problems in the presence of stressful life events and have a negative relationship concerning processes such as self-

compassion, mindfulness, and self-efficacy (Raes, 2010; Samaie & Farahani, 2011; Smeets et al., 2014).

Therefore, the main objective of the present study was to evaluate the application of a brief MSC protocol administered online in university students who reported elevated indicators of anxiety and depressive symptomatology. Our hypotheses were as follows: (1) the experimental group will show significant improvement differences in measures of self-compassion, self-efficacy and mindfulness skills compared to the waiting list (2) the experimental group will show significant decreases in self-criticism, emotional symptoms, rumination, and worry compared to the waiting list (3) based on previous findings on mindfulness and self-compassion interventions we expect small to moderate effect sizes in the measures obtained in the experimental group receiving the mindfulness and self-compassion-based protocol intervention compared to the waitlist control group.

Method

Design

The present study had a two-arm pilot study design. Participants were randomly assigned by blocks to experimental conditions or waitlist group. The implementation of pilot studies allows the collection of preliminary data on the performance of the interventions and can therefore increase the efficiency and validity of the treatments through the performance of subsequent studies with greater control of variables such as randomized clinical trials, and can therefore be considered as essential precursors of high-quality clinical trials (Kistin & Silverstein, 2015).

Participants

The sample of this study consisted of 35 subjects, experimental group n = 18 (M = 23.10, SD = 3.73; 55.55% undergraduate students and 44.44% graduate students) and a control group (waiting list) n = 17 (M = 23.40, SD = 2.89; 82.35%) of undergraduate students and 17.64% graduate students.

Inclusion criteria: (a) Subjects over 18 years of age, who were enrolled in undergraduate or graduate studies in higher education institutions, (b) who presented clinically significant indicators of emotional symptoms measured through the Depression, Anxiety and Stress Scale - 21 (DASS 21, cut-off points depression 5-6, anxiety 4, stress 8-9).

Exclusion criteria were: (a) participants who were receiving some type of psychological, psychiatric or pharmacological treatment, (b) having received a

previous clinical diagnosis, or (c) presented elevated indicators of suicidal ideation in the Suicide Risk section of the International Neuropsychiatric Interview (MINI).

Treatment

Brief protocol based on the Mindfulness and Self-Compassion program (MSC).

This program was designed with the aim of training mindfulness and self-compassion skills through psychoeducation, teaching formal and informal meditation strategies, experiential exercises to promote the use of a compassionate voice and the handling of intense emotions and interpersonal interaction (Germer & Neff, 2019; Neff & Germer, 2013). The protocol for the present study was an adapted version of the original MSC to be implemented in an online group format with a duration of 4 sessions of approximately 2 hours, once a week via the Google Meet platform.

In session 1, self-compassion and mindfulness were conceptualized; in session 2, practices of loving-kindness and compassionate voice were developed; in session 3, personal values were identified, and skills based on self-compassion and mindfulness were trained to cope with emotional experiences; and finally, in session 4, interpersonal difficulties were explored, gratitude practices were performed and recommendations were given to continue the practice of the trained skills. In addition, a complementary manual to the program was used, which was divided according to the structure of the sessions containing the theoretical components seen in the sessions and exercises and recommendations for daily practice and the effective development of the skills trained.

The content of the protocol was taken from the book *"Teaching The Mindful Self-Compassion Program".* A guide for professionals (Germer & Neff, 2019), and from the adaptation of the same by Arcila (2019). The content of the consultant activity manual was taken from "*The Mindful Self-Compassion Workbook. A proven way to accept yourself, build inner strength, and thrive"* (Germer & Neff, 2019), and the translation and adaptation of the content was done in conjunction with an expert translator.

Therapist

A clinical psychologist trained in cognitive behavioral therapy with a clinical experience of 4 years introduced the implementation of the MSC treatment. The therapist's age was 25 years. The intervention was supervised in all its phases by an expert clinical psychologist (8 years of clinical experience) with certification in the Mindfulness-Based Stress Reduction (MBSR) program and previous training in cognitive and contextual behavioral therapies.

Assessment

All the questionnaires used in this research have good psychometric properties and were administered before the beginning of the intervention and after it ended.

Treatment Effects

The dependent variables were divided into two categories of instruments: primary outcome measures and secondary outcome measures. Since one of the main objectives of this study was to explore the effect of the MSC on the indicators of self-compassion, self-criticism, emotional symptoms and mindfulness, these were determined to be the primary outcome measures. Secondary outcomes include measures of self-efficacy, rumination, and worry.

Primary Outcomes

Self-Compassion Scale (Raes et al., 2011). It is a 5-point Likert-type scale (1 = rarely; 5 = almost always), composed of 26 items assessing the reported frequency of self-compassionate behaviors. The scale is divided into positive scores for Self-kindness, Common Humanity and Mindfulness (positive SCS), and negative scores for Self-criticism, Self-isolation and Over-identification (negative SCS). For this study, the Spanish version was used which shows a Cronbach's coefficient of .87 for the full scale, and .71 - .77 in the 6 subscales(Garcia-Campayo et al., 2014); however, this scale does not have validation in the Colombian population.

Forms of Self-Criticizing/Attacking and Self-Reassuring Scale (Gilbert et al., 2004)**.** Is a 4-point Likert-type scale (0 = not at all; 4 = extremely). It consists of 22 items and three subscales (Inadequacy, Reassurance and Hatred) in which critical or supportive positions towards others are evaluated when experiencing difficult life situations. This scale lacks validation in the Colombian population, however, it has a Cronbach's Alpha of .90.

Depression Anxiety and Stress Scales – 21 (Antony, Cox, Enns, Bieling, & Swinson, 1998)**.** A 4-point Likert-type scale (0 = has not happened to me; 3 = has happened to me a lot, or most of the time), consisting of 21 items and 3 subscales (depression, anxiety and stress). It aims to characterize symptom scores as normal, mild moderate, severe and extremely severe. For this study, the Spanish version validated in Colombia was used (Ruiz, Martín, et al., 2017), which shows a Cronbach's Alpha from .92 to .95 (depression from .86 to .92; anxiety from .80 to .87; stress from .80 to .86).

Mindful Attention Awareness Scale (Brown y Ryan, 2003)**.** It is a 15-item, 6-point scale (1 = almost always; 6 = rarely), which assesses the extent to which individuals are attentive while performing different tasks. The version validated in Colombia was used (Ruiz et al., 2016), which shows excellent internal validity (α = .92).

Secondary Outcomes

General *Self*-Efficacy Scale (Baessler y Schwarzer, 1996)**.** A scale of 10 4-point Likert-type items (0 = never; 4 = always), evaluates the perception of one's abilities to cope with different stressful situations in daily life. The validated version was used in Colombia, which shows a Cronbach's Alpha of .87 and a correlation between two halves of .88 (Zambrano, Vargas-Nieto, Olaya, Avila, Guerrero and Hernandez, manuscript in preparation).

Ruminative Responses Scale - Short Form (Treynor, Gonzales, & Nolen-Hoeksema, 2004)**.** A 10-item 4-point Likert-type scale (1 = rarely; 4 = almost always), was designed to assess the tendency to ruminate about feelings of sadness. It is divided into two subscales, brooding (α = .77) and reflection (α = .77). The Spanish version adapted for Colombia shows adequate psychometric properties on both subscales which shows a Cronbach's Alpha of α = .79 for the brooding subscale and α = .79 for the reflection subscale (Ruiz, Sierra, et al., 2017).

Penn State Worry Questionnaire (Meyer, Miller, Metzger, & Borkovec, 1990)**.** It is a self-report instrument consisting of 16 items, on a 5-point Likert scale (1 = not at all typical for me; 5 = fairly typical for me), designed to assess chronic and unfocused worry. The short version validated in Colombia was used (Ruiz, Monroy-Cifuentes, et al., 2018), which shows adequate psychometric properties (α = .95).

Suicide risk assessment

Suicide Risk section of the International Neuropsychiatric Interview. – MINI. It is a structured assessment interview for the identification of suicide risk indicators, consisting of 6 items whose response format is dichotomous Yes/No (Sheehan et al., 1998).

Data analysis

All statistical analyses were performed using the free-access software JASP version 0.13.1 (JASP Team, 2021). Finally, the G*Power program was used to corroborate the statistical power of the analyses performed.

Results

Initially, the Shapiro-Wilk test was performed to evaluate the distribution of the data. Subsequently, to evaluate the changes in the variables of interest between the experimental group and the control group between the pre-treatment and post-treatment stages, the Wilcoxon signed-rank test and the Student's *t*-test for related samples were used (intragroup analysis); to assess the differences between the groups in the post-treatment phase (intergroup analysis) we used a repeated measures ANOVA analysis of variance. Furthermore, the effect size was estimated by calculating Cohen's *d* to establish the magnitude of change of the intervention on the variables studied (Cohen, 1992).

The Shapiro-Wilk test of the experimental group evidenced compliance with the assumption of normal distribution ($p > 0.05$) for most of the data (DASS-21 ANX; DASS-21 STR; SCS SK; SCS CH; SCS M; SCS SC; SCS SI; SCS OI; FSCRS I; FSCRS H; FSCRS R; RRS REF; RRS BRO), except for the depression subscale of the DASS-21 questionnaire and the MAAS questionnaire.

Between-group analysis

To determine whether the experimental group showed significant changes compared to the waiting list control group, a 2 (group) x 2 (stage) repeated measures analysis of variance was performed (Table 1). A significant interaction effect between the group and stage variable was observed in the scales of stress (DASS STR F (1) = 7.118, p = 0.012, η_p^2 = 0.177, 1 - β = 0.30), self-compassion (SCS F (1) = 34.301, $p < 0.001$, η_p^2 = 0. 510, 1 – β = 0.98, self-kindness subscale (SCS SK F (1) = 17,191, $p < 0.001$, η_p^2 = 0.343, 1 – β = 0.67), common humanity subscale (SCS CH F (1) = 6,925, p = 0. 013, η_p^2 = 0.173, 1 – β = 0.30), Mindfulness subscale (SCS M F (1) = 12,666, p = 0.001, η_p^2 = 0.277, 1 – β = 0.39), self-criticism subscale (SCS SC F (1) = 29,120, $p < 0.001$, η_p^2 = 0.469, 1 – β = 0.96), self-isolation subscale (SCS SI F (1) = 10,038, p = 0.003, η_p^2 = 0.233, 1 – β = 0.35), over-identification subscale. (SCS OI F (1) = 33,060, $p < 0.001$, η_p^2 = 0.500, 1 – β = 0.98), inadequacy subscale (FSCRS I F (1) = 17.661, $p < 0.001$, η_p^2 = 0.349, 1 – β = 0.69), hatred subscale (FSCRS R F (1) = 15.916, $p < 0.001$, η_p^2 = 0.325, 1 – β = 0.59), self-efficacy (EAG F (1) = 4,290, p = 0.046, η_p^2 = 0.115, 1 - β = 0.25), worry (PSWQ F (1) = 15,714, $p < 0.001$, η_p^2 = 0.323, 1 - β = 0.58) and mindfulness skills (MAAS F (1) = 20,359, $p < 0.001$, η_p^2 = 0.382, 1 - β = 0.80).

A significant main effect of the group variable was also observed for the subscales DASS-21 DEP F *(1)* = 5,782, p = 0.022, η_p^2 = 0.149, *1* – β = 0,09, SCS F *(1)* = 10,021, p = 0.003, η_p^2 = 0.233, *1* – β = 0.07, SCS SK F *(1)* = 15,127, $p <$ 0.001, η_p^2 = 0.314, *1* – β = 0,09, SCS CH F *(1)* = 5,371, p = 0.027, η_p^2 = 0.140, *1* –

β = 0.10, SCS SC *F (1)* = 4,132, *p* = 0.050, η_p^2 = 0.111, *1* – β = 0.11, SCS SI *F (1)* = 5,801, *p* = 0.022, η_p^2 = 0.150, *1* – β = 0,09, FSCRS I *F (1)* = 6,132, *p* = 0.019, η_p^2 = 0.157, *1* – β = 0.09 y FSCRS H *F (1)* = 6,321, *p* = 0.017, η_p^2 = 0.161, *1* – β = 0.09.

To avoid type 1 errors, we decided to use post hoc analysis with the Bonferroni correction since this conservative statistical approach offers a stricter form of error control than most control alternatives (VanderWeele & Mathur, 2019). We found significant differences between the experimental group and the control group in the post-treatment stage. Concerning the variable of emotional symptoms in the experimental group, significant reductions were observed in the subscales DASS-21 Depression of 4,680 points (*M* = 3.556; *SD* = 1,563; *p* = 0.022; Pbonf = 0.026) and DASS-21 stress of 4,144 points (*M* = 6.444; *SD* = 1,434; *p* = 0.085; Pbonf = 0.033) in comparison with the control group.

Regarding the Self-Compassion variable, significant increases were observed in the SCS scale scores of 1.023 points (*M* = 3.641; *SD* = 0.184; *p* = 0.003; Pbonf < 0.001), and the SCS SK subscales of 1.331 points (*M* = 3.778; *SD* = 0.243; *p* < 0. 001; Pbonf < 0. 001), SCS HC of 0.750 points (*M* = 3.5; *SD* = 0.214; *p* = 0.027 Pbonf = 0.005), SCS M of 0.748 points (*M* = 3.793; *SD* = 0.220; *p* = 0.071; Pbonf = 0.008), and FSCRS R of 5.307 points (*M* = 22.722; *SD* = 1.903; *p* = 0.196; Pbonf = 0.046) in the experimental group in contrast to the waitlist control group.

Concerning the Self-criticism variable, significant reductions were evidenced in the SCS SC subscale scores of 1,161 points (*M* = 2.344; *SD* = 0.292; *p* = 0.050; Pbonf = 0.002), SCS SI of 1,114 points (*M* = 2.444; *SD* = 0.312; *p* = 0.022 Pbonf = 0.005), SCS OI of 1,066 (*M* = 2.417; *SD* = 0.301; *p* = 1.860; Pbonf = 0.005), and FSCRS I of 9,275 points (*M* = 12.667; *SD* = 2.362; *p* = 0.019 Pbonf = 0.001).

Finally, the experimental group did not show superior differences to the waiting list control group in the variables of self-efficacy, rumination, worry and mindfulness in the post-treatment stage.

Table 1. Repeated measures analysis of variance 2 (group) X 2 (phase).

	Group	Pre-treatment	Post-treatment	Intra-group effect (interaction group*phase)			Inter-group effect		
		M (SD)	*M (SD)*	*F*	*p*	η_p^2	*F*	*p*	η_p^2
DASS-21 DEP	MSC	7.556 (5.447)	3.556 (3.014)	14.456	0.069	0.097	5.782	0.022*	0.149
	Control	9.588 (4.691)	8.235 (4.994)						
DASS-21 ANX	MSC	6.056 (3.873)	4.056 (3.096)	3.379	0.075	0.093	3.379	0.075	0.093
	Control	8.176 (4.953)	6.647 (4.873)						
DASS-21 STR	MSC	11.167 (3.618)	6.444 (3.129)	7.118	0.012*	0.177	3.161	0.085	0.087
	Control	11.412 (4.597)	10.588 (5.363)						
SCS	MSC	2.587 (0.579)	3.641 (0.524)	34.301	<.001**	0.510	10.021	0.003**	0.223
	Control	2.586 (0.542)	2.618 (0.526)						
SCS SK	MSC	2.733 (0.820)	3.778 (0.636)	17.191	<.001**	0.343	15.127	<.001**	0.314
	Control	2.459 (0.670)	2.447 (0.726)						

	Group	Pre-treatment	Post-treatment	Intra-group effect (interaction group*phase)			Inter-group effect		
		M (SD)	*M (SD)*	*F*	*p*	η_p^2	*F*	*p*	η_p^2
SCS CH	MSC	2.639 (0.708)	3.500 (0.582)	6.925	0.013*	0.173	5.371	0.027*	0.140
	Control	2.706 (0.645)	2.750 (0.586)						
SCS M	MSC	2.861 (0.749)	3.792 (0.687)	12.666	0.001**	0.277	3.482	0.071	0.095
	Control	2.897 (0.552)	3.044 (0.588)						
SCS SC	MSC	3.644 (0.867)	2.344 (0.754)	29.120	<.001**	0.469	4.132	0.050*	0.111
	Control	3.576 (0.871)	3.506 (0.957)						
SCS SI	MSC	3.403 (0.810)	2.444 (0.834)	10.038	0.003**	0.233	5.801	0.022*	0.150
	Control	3.632 (1.043)	3.559 (0.994)						
SCS O	MSC	3.667 (0.748)	2.417 (0.664)	33.060	<.001**	0.500	1.860	0.182	0.053
	Control	3.353 (1.097)	3.482 (0.997)						
FSCRS I	MSC	20.278 (7.622)	12.667 (6.748)	17.661	<.001**	0.349	6.132	0.019*	0.157
	Control	21.765 (7.571)	21.941 (5.815)						
FSCRS H	MSC	4.389 (3.415)	3.222 (3.001)	0.865	0.359	0.026	6.321	0.017*	0.161
	Control	6.647 (4.015)	6.471 (3.923)						
FSCRS R	MSC	16.722 (6.095)	22.778 (5.298)	15.916	<.001**	0.325	1.745	0.196	0.050
	Control	17.412 (5.421)	17.471 (5.647)						
EAG	MSC	25.833 (6.662)	29.611 (5.511)	4.290	0.046*	0.115	0.357	0.554	0.011
	Control	26.647 (5.958)	26.706 (4.959)						
RRS REF	MSC	11.556 (3.451)	10.778 (2.184)	0.004	0.950	0.001	0.280	0.600	0.008
	Control	12.000 (3.953)	11.294 (2.867)						
RRS BRO	MSC	11.944 (3.472)	10.500 (2.358)	0.001	0.974	0.001	1.474	0.233	0.043
	Control	13.235 (3.977)	11.765 (3.308)						
PSWQ	MSC	28.889 (11.999)	19.278 (10.851)	15.714	<.001**	0.323	0.013	0.910	0.003
	Control	24.647 (11.113)	24.353 (11.264)						
MAAS	MSC	48.611 (15.953)	63.611 (13.929)	20.359	<.001**	0.382	0.127	0.724	0.004
	Control	56.000 (15.338)	52.882 (15.070)						

Note. statistically significant differences between groups. DASS-21 DEP: Depression subscale. DASS-21 ANX: anxiety subscale. DASS-21 STR: stress subscale. SCS: Self-compassion scale. SCS SK: self-kindness subscale. SCS CH: common humanity subscale. SCS M: Mindfulness subscale. SCS SC: self-criticism subscale. SCS SI: self-isolation subscale. SCS O over-identification subscale. FSCRS I: inadequacy subscale. FSCRS H: hatred subscale. FSCRS R: reassurance subscale. EAG: self-efficacy scale. RRS REF: reflection subscale. RRS BRO: brooding subscale. PSWQ: Penn State Worry Questionnaire. MAAS: Mindfulness attention and awareness scale. *$p < 0.05$ **$p \leq 0.01$

Within-group analysis

Measures of emotional symptoms in the experimental group showed significant differences between pre-treatment and post-treatment stages. In the Depression subscale, a significant reduction was found estimated in a range of 4 points with a large effect size (p <.001; rB= 0.980; 1 - β = 0.65), as well as, in the Stress subscale a significant reduction of 4.72 points was observed (SD = 1. 060; p <.001) with a large effect size (d= 1.050; 1 - β = 0.77); as for the Anxiety subscale, no significant effects of the intervention were found (p = 0.056).

Regarding the Self-Compassion measures, in the SCS scale a significant increase of 1.054 points was evidenced (SD = 0.155; p <.001), with a large effect

size in the overall scale (d= 1. 603; 1 - β = 0.99), as well as, in the Self-Kindness subscale an increase of 1.044 points on average was found (SD = 0.179; p <.001) with a large effect size (d= 1.375; 1 - β = 0.97). In the Common Humanity subscale, there was an average increase of 0.861 points (SD = 0.228; p =.002) with a large effect size (d= 0.890; 1 - β = 0.67), and in the Mindfulness subscale an increase of 0.931 points on average (SD = 0.172; p <. 001) with a large effect size (d= 1.272; 1 - β = 0.94); as for the FSCRS scale, a significant increase of 6.056 points on average (SD = 1.200; p <.001) with a large effect size (d= 1.1891 - β = 0.89) was found in the Reassurance subscale.

In the negative subscales of the SCS related to the Self-criticism measures, a significant reduction of 1.300 points on average was evident (SD = 0.212; p <. 001. 001) with a large effect size (d= 1.444; 1 - β = 0.98), in the Self-Isolation subscale a reduction of 0.958 points on average (SD = 0.237; p <.001) with a large effect size (d= 0.954; 1 - β = 0. 65), and in the Over-identification subscale a reduction of 1.250 points on average (SD = 0.212; p <.001) was found with a large effect size (d= 1.390; 1 - β = 0. 97); additionally, in the FSCRS scale, significant effects were found in the Inadequacy subscale with a reduction of 7.611 points on average (SD = 1.627; p <.001) with a large effect size (d= 1.102; 1 - β = 0.82). However, no significant differences were found for the Hatred subscale (p = 0.160).

The self-efficacy indicators of the EAG questionnaire showed a significant increase of 3.778 points on average (SD = 1.359; p = 0.013) in the post-treatment stage, with a moderate effect size (d= 0.655; 1 - β = 0.64). Concerning the Rumination variable, significant differences were found only for the Brooding subscale, in which, a reduction of 1.444 points on average (SD = 0.544; p = 0.017), and a moderate effect size (d = 0.626; 1 - β = 0.64) was found. No changes were observed in the Reflection subscale (p = 0.358). On the other hand, in the Worry measures, a reduction of 9.611 points on average (SD = 2.104; p <.001) was found in the results of the PSWQ questionnaire, with a large effect size (d= 1.077; 1 - β = 0.80). Likewise, in the MAAS questionnaire, an estimated increase in a range of 13.5 points was observed between treatment stages (p <.001), with a large effect size (rB = 0.954; 1 - β = 0.61). The waitlist control group only showed significant differences in the brooding subscale of the RRS-SF questionnaire with a reduction of 1.471 points on average (p = 0.019; SD = 0.563) during the 4 weeks. No significant changes were observed in any of the other variables.

Discussion

The present study aimed to explore preliminarily the effect of a brief group intervention based on MSC through a pilot study, delivered through synchronous

virtual sessions on indicators of self-compassion, self-criticism, self-efficacy, emotional symptoms, mindfulness, rumination and worry in Colombian university students.

Based on our preliminary findings and the between-subjects analyses, the effects of the intervention seemed to be superior to the change that occurred in the waiting list group in the variables of emotional symptoms, self-compassion and self-criticism; however, there was found no significant differences concerning mindfulness (primary outcome), self-efficacy, rumination and worry (secondary outcomes). This could be explained due to the small number of participants in each group, since as established by Kazdin (2016) a small sample size could reduce statistical power, making it difficult to detect differences between groups and negatively affect the accuracy of this estimate. As a result, we can´t accept hypotheses 1 and 2, more specifically regarding the primary variable of mindfulness, and the secondary variables of self-efficacy, worry and rumination.

Regarding intra-subject analyses, we found promising results related to the effect of the MSC protocol on variables such as self-compassion, self-criticism, emotional symptoms and mindfulness (all variables show a $p < 0.05$). The protocol seems to be effective in decreasing emotional symptoms, self-critical behaviors, and increasing core processes related to compassion-focused therapy such as self-compassion, self-efficacy, and mindfulness; also, changes were observed with moderate to large effect sizes (consistent with hypothesis 3).

These results are consistent with similar research in student populations in which the effect of training in mindfulness and self-compassion skills to increase emotional and psychological well-being was examined. For example, in the study conducted by Smeets et al. (2014), increases in self-compassion, mindfulness, optimism and self-efficacy were evidenced, as well as a reduction in rumination (large effect sizes), after the application of face-to-face modality of a 3-session protocol based on the MSC program in university students. Likewise, Andersson et al. (2021) found that mindfulness and self-compassion increased and stress indicators decreased after 6 weeks of self-compassion training delivered through a mobile phone app (moderate and large effect sizes).

In our research, participants who received the MSC treatment evidenced reductions in emotional symptom indicators below clinically relevant ranges, suggesting that increases in mindfulness, self-compassion, and self-efficacy improve subjects' psychological functioning by intervening and modifying underlying transdiagnostic processes of psychopathology such as self-criticism (Beato et al., 2021; MacBeth & Gumley, 2012), rumination (Krieger et al., 2013), and worry (Blackie & Kocovski, 2018).

An interesting finding was observed in the indicators of rumination, in which only the brooding subscale (in contrast to the reflection scale) had a clinically relevant decrease. This particular style of negative repetitive thinking (brooding-

focused rumination) has generally been related to the maintenance of depressive symptoms (Burwell & Shirk, 2007; Crane et al., 2007; Rutter et al., 2020), so changes in this type of rumination could indicate that an increase in self-compassionate behaviors promotes the reduction of perseverative thought patterns characterized by negative, problem-focused self-evaluation without altering those repetitive thought patterns that focus on identifying possible solutions to the experienced problematic situation, favoring problem-solving (Fresnics et al., 2019; Wu et al., 2019).

Another relevant finding is the change observed in the self-efficacy variable, which has been established as a protective factor by increasing the indicators of emotional and psychological well-being and influencing the relationship between the stressful life situations experienced and the type of emotional reaction evoked by these (Schönfeld et al., 2017). Interventions aimed at increasing self-efficacy could therefore be very valuable in improving emotional adjustment to stressful life situations such as those caused by COVID-19-associated confinement (Ransing et al., 2020). In comparison, this intervention would be on the same track as other brief interventions designed to address emotional issues in the context of the pandemic. For example, Wang et al., (2021), evidenced a reduction in "negative emotions" and an increase in "positive emotions" through a brief intervention based on cognitive reappraisal. This would imply that short-term, virtual-based psychological interventions are effective in addressing the stress responses generated by the COVID-19 pandemic by facilitating the use of adaptive and coping strategies in multiple populations with different cultural characteristics.

In addition, evidence has been found that increases in self-efficacy produce greater effectiveness in work and academic contexts, which would be beneficial considering the different effects of academic failure on the emotional well-being of university students (Amézquita Medina et al., 2003; Peixoto & Almeida, 2010).

Because increased self-compassion is related to increased indicators of self-efficacy, Liao and collaborators (2021) report that a self-compassionate attitude would allow people to consider failures and difficulties as a common part of the human experience, whereas mindfulness would help individuals to maintain a balanced perspective on failure, preventing them from maximizing the implications and consequences or interpreting it as an indicator of personal worth. This could suggest that self-compassion may become a protective factor that helps individuals maintain a positive evaluation of self-efficacy even when experiencing personal failures or difficulties in daily life (Liao et al., 2021; Manavipour & Saeedian, 2016; Neff et al., 2005).

Regarding hypothesis 3, the effect size for the changes in the dependent measures is identified as being moderate to large (d = 0.6 - 1.12), which could indicate that the intervention used is useful to promote increases in variables such as self-compassion and mindfulness, as well as, reduction of emotional

symptomatology and problematic thought patterns such as rumination and worry in a way that implies a significant clinical impact (Kazdin, 2016; Naing et al., 2006); however, these results should be taken with caution given the small sample size, since it would not be advisable to generalize the results to other populations, as this is not a representative size of the reference population that was intended to be studied.

Limitations

The results of the present research should be analyzed considering some important limitations. Although the high percentage of female participants, as well as the small sample size, are a trend that can be observed in other previous studies (MacBeth & Gumley, 2012; Neff & Germer, 2013; Smeets et al., 2014), these types of factors can be considered a threat to external validity which decreases the generalizability of the results.

Another limitation to mention is the questionnaires used as outcome measures. Although other studies have reported adequate psychomotor properties in the Spanish-speaking population (Naismith et al., 2019; Neff, 2015; Tóth-Király & Neff, 2021), these have not been subjected to an adequate cultural validation process, so the measures obtained may not be entirely accurate (Baião et al., 2015).

Finally, it is acknowledged that the very small sample size, the lack of preliminary analyses that would allow calculating the adequate sample size for the study and the attrition of participants throughout the study (n = 22), could be considered threats against the validity by statistical conclusiveness and internal validity respectively (Kazdin, 2016). Also, given the preliminary nature of the study as well as the sample size, the large effect sizes obtained in our analyses should be interpreted with caution. For example, Funder & Ozer (2019) have mentioned that these types of results obtained with small samples may be due to problems of overestimation of the implemented analyses, so further replication studies with larger samples are necessary. Therefore, the conduct of future better-controlled studies with larger sample sizes would allow for more robust conclusions (Brysbaert, 2019).

Conclusions

The results of this study suggest that brief interventions based on compassion-focused therapy are effective in training mindfulness and self-compassion skills even if they are delivered in a digital format. Considering that mindfulness and self-compassion promotes emotional adjustment in the face of stressful life situations (Beato et al., 2021), this therapy format is recognized as

useful for addressing emotional, affective and behavioral problems resulting from the current COVID-19 pandemic in populations vulnerable to developing some type of mood disorder (Caballero-Domínguez et al., 2020; Ramírez-Ortiz et al., 2020; Xiong et al., 2020).

Likewise, it is recognized that factors such as self-criticism, rumination and worry are central transdiagnostic processes in the origin and maintenance of different types of emotional and affective disorders (Schanche, 2013; Wahl et al., 2019). Therefore, building and adapting therapeutic models and strategies that focus on addressing these processes is imperative to maximize professional and therapeutic practice, promoting research beyond intervention efficacy and focusing on identifying and explaining underlying change processes (Hofmann & Hayes, 2019). However, these results should be taken with caution because the small sample size prevents the generalization of results and maintains low statistical power.

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Authors' contributions. All authors conducted the statistical analyses, interpreted the results, and critically revised the manuscript. All authors read and approved the final manuscript.

Ethics statements. The authors have respected the Ethical Principles for Psychologists and the Code of Conduct established by the British Association for Behavioural and Cognitive Psychotherapies and the British Psychological Society. The study was approved by a review by expert judges from Fundación Universitaria Konrad Lorenz. Bogotá, Colombia. Participants gave written informed consent.

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SOCIAL ANXIETY FROM AN ATTACHMENT THEORY PERSPECTIVE: THE MEDIATING ROLE OF EARLY MALADAPTIVE SCHEMA DOMAINS AND REJECTION SENSITIVITY

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Abstract

Social anxiety is a common problem. Several factors play a role in the development and maintenance of social anxiety. Since relationship with parents is specifically an important factor, it is important to examine social anxiety from an attachment theory perspective. Studies indicate that early maladaptive schemas and rejection sensitivity may play a role in the relationship between attachment pattern and psychological distress. Therefore, the aim of the present study is to examine the mediating role of early maladaptive schema domains and rejection sensitivity in the relationship between internal working models of attachment and social anxiety. The sample of the study consisted of 557 university students (199 male, 358 female) between the ages of 17-27 (M = 20.69, SD = 1.79). Liebowitz Social Anxiety Scale, Relationship Scales Questionnaire, Young Schema Questionnaire-Short Form 3, and Rejection Sensitivity Questionnaire were administered to the participants. Results of the mediation analysis with Bootstrapping showed that Impaired Autonomy schema domain and rejection sensitivity mediated the relationships between attachment self-model and social anxiety. Moreover, schema domains of Impaired Autonomy, Impaired Limits and Unrelenting Standards, and rejection sensitivity mediated the relationship between attachment other-model and social anxiety. The current study may contribute to the literature by providing an understanding of how the relationship between attachment and social anxiety may emerge. Clinicians aiming to increase clients' functionality and quality of life should/could focus on their clinical practice on the above early maladaptive schema domains and rejection sensitivity.

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In the Diagnostic and Statistical Manual of Mental Disorders (Fifth Edition) (American Psychiatric Association, 2013), social anxiety is defined as "marked fear or anxiety about one or more social situations in which the individual is exposed to possible scrutiny by others" (p. 202). Social anxiety disorder is a common psychological problem with an estimated lifetime prevalence rate of 12.1% (Kessler et. al., 2005). On the other hand, it is stated that social anxiety symptoms are frequently seen in the general population, although it is not a high level to be diagnosed with social anxiety disorder (Pélissolo et al., 2000; Stein et al., 1994, 2000). It is important to understand the factors related to social anxiety to develop effective interventions due to how it affects functionality and quality of life (Acarturk et al., 2008, 2009; Aderka et al., 2012; Rodebaugh, 2009; Safren et al., 1996; Schneier et al., 1994).

According to relevant literature, familial and parental factors are among the etiological factors (Bruch, 1989; Bruch et al., 1989; Rapee & Melville, 1997), and early life experiences such as parental attitudes, parent-child interaction, and quality of the parent-child bond are associated with social anxiety (Bruch & Heimberg, 1994; Neal & Edelman, 2003; Rapee & Spence, 2004). Similarly, attachment patterns are also considered to be related to social anxiety because they originate from early experiences and influence subsequent relationships (Bowlby, 1973). On the other hand, some researchers suggest that attachment theory can provide an explanation of social anxiety by combining the social anxiety theories in a meaningful way (see Vertue, 2003). One of the theories discussed in this context is Leary's (2001) extended self-presentation theory, which defines three conditions for social anxiety (i.e., motivation to make a particular impression on others, doubt that one will not make a desired impression, relational devaluation and social exclusion). Vertue (2003) stated that these three conditions could be related to attachment and proposed a unified theory of social anxiety. In the following, the main variables of the current research and the relationships between them will be mentioned, and then the explanations of this theory will be discussed.

Attachment theory (Bowlby, 1969/1982, 1973, 1980) suggests that a child develops mental representations of attachment relationship as a result of interactions with their caregiver. These mental representations, defined as "internal working models", are divided into two types: internal working models of self and other. These models can be positive or negative depending on the quality of the relationship between the child and the caregiver (Bowlby, 1973). Based on this information, Bartholomew and Horowitz (Bartholomew, 1990; Bartholomew & Horowitz, 1991) developed a four-category model of attachment involving secure, preoccupied, fearful, and dismissing attachment styles. Some researchers classified attachment in

two dimensions; anxiety, which is related to the self-model, and avoidance, which is related to the other-model (Brennan et al., 1998; Fraley et al., 2000). As studies suggest, there are two main dimensions underlying the adult attachment pattern: "self-model," which comprises the beliefs and expectations about the lovability of self, and the "other-model," which comprises the beliefs and expectations about the sensitivity and availability of others (Bowlby, 1973).

Bowlby (1988) suggested that internal working models and attachment patterns that develop with early experiences and maintain their importance throughout life affect mental health as determinants of coping with stressful life events. In this context, studies that examine the relationship between attachment and social anxiety showed that insecure attachment (Bayramkaya, 2009; Bifulco et al., 2006; Brumariu & Kerns, 2008; Eng et al., 2001; Öztürk & Mutlu, 2010), especially preoccupied attachment style, which is characterized by negative mental representations of self, and fearful attachment style, which is characterized by negative internal working models of self and other (Van Buren & Cooley, 2002; Wenzel, 2002), are associated with social anxiety. Consistent with these findings, Vertue (2003) stated that three conditions which extended self-presentation theory (Leary, 2001) defines for social anxiety, could be directly or indirectly related to the internal working models of attachment. On the other hand, it is stated in relevant literature that social anxiety may include dysfunctional beliefs about self and others (Pinto-Gouveia et al., 2006), which are consistent with the mental representations of the related attachment patterns. The relationship between these mental representations or dysfunctional beliefs, which are gathered around the themes such as dependence, incompetence, failure, and rejection, with Young's (1990, 1999) "Early Maladaptive Schemas" (EMSs) (Pinto-Gouveia et al., 2006) and rejection sensitivity (Ayduk et al., 2000; Berenson & Downey, 2006) will be presented below through research findings.

According to schema theory (Young, 1990, 1999), EMSs develop as a result of early life experiences in which core emotional needs are not met. EMSs originating from early life experiences and developing throughout childhood and adolescence are based on the individual's relationships with oneself and other people. It is stated that these cognitive structures formed by memories, emotions, cognition, and bodily sensations can form the basis of psychological distress. Young defined 5 schema domains formed as a result of the universal basic emotion needs not being met: Disconnection and Rejection, Impaired Autonomy, Impaired Limits, Other-Directedness, Over Vigilance and Inhibition. These schema domains comprise 18 EMSs (Young et al., 2003).

Contemporary models of social anxiety suggest that negative beliefs or mental representations of self and other, or EMSs play a role in social anxiety (e.g., Heimberg et al., 2010). Some researchers assert that cognitive schemas may represent individual differences in attachment patterns (Platts et al., 2002), and that repeated negative experiences with attachment figures may contribute to the development of EMSs (Gay et al., 2013). Young suggests that EMSs may underlie

psychological distress (Young et al., 2003). EMSs are conceptualized as internal representations of experiences with attachment figures, and attachment patterns are suggested to function as a bridge between the early experiences and schemas (Chorpita & Barlow, 1998; Mason et al., 2005; Platts et al., 2002). From this point, some researchers carried out various studies based on the hypothesis that EMSs may mediate the relationship between attachment and psychopathology (e.g., Bosmans et al., 2010; Roelofs et al., 2011, 2013). It is also important to test this hypothesis for social anxiety, a common psychological problem.

Considering the aforementioned, when the relationship between attachment patterns and EMSs is examined, research showed that insecure attachment patterns are associated with EMSs. A study examining the relationship between attachment styles and EMSs (Mason et al., 2005) has been reported that participants with a preoccupied attachment style that includes a negative self-model and with a fearful attachment style that includes a negative view of both self and others have more EMSs compared to participants with a secure and dismissing attachment style. There was no significant difference between preoccupied and fearful attachment styles. According to the results of another study examining the longitudinal relationship between child and adult attachment patterns and EMSs (Simard et al., 2011), adults with ambivalent attachment during childhood scored higher than those with secure attachment from various schemas that included all schema domains except the Impaired Limits schema domain. Participants with preoccupied attachment during adulthood had higher scores for various schemas covering all schema domains than securely attached participants. Consistent with the idea of mental representations that develop in the early period of life can contribute to the development of schemas by determining the individual's attention and relationship with the environment (Platts et al., 2002), results of the research showed that specific elements related to internal working models may be associated with EMSs (Simard et al., 2011).

In addition to studies that reported attachment patterns to be associated with EMSs, research also determined that EMSs are associated with social anxiety. In these studies, the schema domains of Disconnection and Rejection, Impaired Autonomy and Other-Directedness were found to be associated with social anxiety (Calvete, 2014; Calvete et al., 2013, 2015; Eldoğan & Barışkın, 2014; Mairet et al., 2014; Pinto-Gouveia et al., 2006). These findings are consistent with the three conditions that Leary (2001) proposes for social anxiety. Accordingly, since it includes the importance that individuals attach to the needs and desires of others rather than their own (Young, 2003) in order to maintain relations with others and to gain their approval, the Other-Directedness schema domain can contribute to "the desire to make a positive impression on others" (Leary, 2001) which is associated with a high need for approval (Arkin et al., 1980; Vertue, 2003). Beliefs such as inadequacy and failure (Young, 2003) related to the schemas in the Impaired Autonomy domain can contribute to the belief that "one will fail to leave a positive impression on others" (Leary, 2001) by having an effect on the individuals'

perception of their social skills. On the other hand, the Disconnection and Rejection schema domain may contribute to the belief that "relationships with others will decrease in value and be abandoned by others" (Leary, 2001), as it includes the thought that needs such as love, belonging, and acceptance will not be met and thus avoiding relationships (Young, 2003). According to Vertue (2003) the need for approval included negative evaluations of the self in relation to parents' attitudes that are critical, controlling and lacking in supporting the development of the individual (Allaman et al., 1972). Therefore, it is related to the internal working models of attachment. On the other hand, negative perception towards social skills (Bowlby, 1982) is considered to be associated with internal working attachment models, as it includes the information about one's skills in the context of relationships with others. Finally, the belief that one will be abandoned by others because cannot make a positive impression is also related to internal working models of attachment, since it includes negative evaluations of self and others (Vertue, 2003), and these three conditions result from negative mental representations. Thereby, considering the cognitive models of social anxiety and the relations between attachment and EMSs with each other and social anxiety, EMSs were considered as one of the mediating variables in this study.

As mentioned before, social anxiety is associated with some dysfunctional beliefs (e.g., dependence, incompetence, failure) (Heimberg et al., 2010; Pinto-Gouveia et al., 2006). One of the themes related to these beliefs includes rejection (Pinto-Gouveia et al., 2006). Therefore, it is considered that these negative beliefs may also be associated with rejection sensitivity, aside from EMSs. Rejection sensitivity is based on the assumption that early experiences of rejection are internalized and influence subsequent relationships (Feldman & Downey, 1994). This is a concept used to explain the maladaptive reactions individuals show when they are rejected (Downey & Feldman, 1996). Rejection sensitivity originates from attachment theory and is used to define people who "tend to anxiously expect, readily perceive, and overreact to rejection" (Downey & Feldman, 1996, p. 1327; Downey et al., 1994, p. 497). Rejection sensitivity, which has an effect on people's various relationships (Downey & Feldman, 1996; Downey et al., 1998) is considered to be a factor that stems from early rejection experiences, becomes active in social situations where there is a possibility of rejection, maintains rejection expectations and thus affects interpersonal relationships (Downey et al., 1999). Feldman and Downey (1994) mentioned that rejection sensitivity, which has been shown to damage interpersonal relationships (e.g., Ayduk et al., 2000), may also be a feature of social anxiety.

Considering the aforementioned characteristics, rejection sensitivity is considered to be a related and overlapping concept with Leary's (2001) final condition for social anxiety, which is "believing that one's relations with others will decrease in value and be rejected by others" as a result of failing to make a positive impression on others. On the other hand, relevant literature indicated that rejection sensitivity is related to attachment as well as social anxiety. Research showed that

individuals with an insecure attachment pattern are more sensitive to rejection than individuals with secure attachment (Feldman & Downey, 1994). In addition, findings showing that rejection sensitivity is related to both preoccupied and fearful attachment styles (Khoshkam et al., 2012), as well as anxiety and avoidance dimensions of attachment (Özen et al., 2011), revealed that rejection sensitivity may be related to mental representations of self and other. Vertue (2003) stated that as a result of these mental representations being consistent with the extended self-presentation theory (Leary, 2001), individuals may have beliefs that the value of their relationships will deteriorate, and they will be rejected by others. Research shows that these beliefs are associated with social anxiety (Nichols, 1974). Taking all the points mentioned earlier regarding the relationship between attachment and social anxiety into consideration, rejection sensitivity has also been considered as another mediating variable, in addition to early maladaptive schema domains.

The general aim of this study was to investigate the mediating role of early maladaptive schema domains and rejection sensitivity in the relationship between internal working models of attachment (self and other) and social anxiety. Consistent with the research findings in the relevant literature and the extended self-presentation theory (Leary, 2001), schema domains of Disconnection and Rejection, Impaired Autonomy and Other-Directedness, and rejection sensitivity are expected to mediate the relationship between the self-model and social anxiety. Furthermore, schema domains of Disconnection and Rejection and Impaired Autonomy, and rejection sensitivity are expected to mediate the relationship between the other-model and social anxiety. By investigating these mediating effects, this study may contribute to the literature by providing an understanding of how the relationship between attachment and social anxiety may emerge.

Method

Participants

The sample of the study consisted of 557 university students who were attending to their undergraduate education at Bursa Uludag University's (Northwest side city of Turkey) various faculties and departments. While 358 (64.3%) of the participants were female, 199 (35.7%) were male. The age range of the participants was 17-27 and the average age was 20.69 (*SD* = 1.79).

Measures

Demographic Information Form: The form consisted of 20 items and was prepared by the researchers; it includes information about age, gender, marital status, education, family, income, and place of residence.

Liebowitz Social Anxiety Scale (LSAS): The LSAS developed by Liebowitz (1987) aims to assess social interaction and performance situations where individuals with social anxiety may experience fear or avoidance. It consists of 24 items and two subscales (i.e., social interaction and performance). Level of fear and avoidance for each item is assessed on the 4-point scale. The total score is obtained by summing the fear and avoidance subscales. High scores indicate high levels of social anxiety and avoidance. Cronbach's alpha coefficients for both fear and avoidance subscales are 0.92, and 0.96 for the whole scale (Heimberg et al., 1999). The LSAS was adapted to Turkish by Soykan et al. (2003). Cronbach's alpha coefficients were determined as 0.96 and 0.95 for fear and avoidance subscales, and 0.98 for the whole scale.

Relationship Scales Questionnaire (RSQ): The RSQ developed by Griffin and Bartholomew (1994) consists of 17 items and four subscales which are secure, preoccupied, fearful, and dismissing. Each item is assessed on the scale which is rated between 1-7. Scores for each of the four attachment styles are obtained by summing the items aimed at measuring each attachment style and dividing by the number of items in the subscale. Griffin and Bartholomew (1994a) reported that the Cronbach's alpha coefficients of the subscales ranged from 0.41 to 0.71. The authors stated that these values were not due to the psychometric inadequacy of the subscales, but to the fact that each subscale included two models of self and other together. Turkish adaptation of the scale was conducted by Sümer and Güngör (1999). The Cronbach's alpha coefficients of the subscales of the Turkish form ranged from 0.27 to 0.61.

The method developed by Griffin and Bartholomew (1994b) was used to calculate the scores for the self and other models used in this study, and the obtained scores were calculated to correspond to the anxiety and avoidance dimensions of attachment. In this method, in which the scores of four attachment styles are used, negative self-model score representing the anxiety dimension was obtained by subtracting the scores of attachment styles that include positive mental representations of the self from the scores of attachment styles that include negative mental representations of the self ([preoccupied+fearful]-[secure+dismissing]). Similarly, negative other-model score representing the avoidance dimension was obtained by subtracting the scores of attachment styles that include positive mental representations of other from the scores of attachment styles that include negative mental representations of other ([fearful+dismissing]-[secure+preoccupied]). The increase in the scores calculated by this method denotes that the negative evaluations of self or others increase (Bartholomew, n.d.).

Young Schema Questionnaire-Short Form 3 (YSQ-SF3): The YSQ-SF3 (Young et al., 2003) evaluating EMSs, consists of 90 items, which includes five schema domains and 18 schemas. Each item is assessed on the scale which is rated between 1-6.

Soygüt et al. (2009) adapted the YSQ-SF3 to Turkish and found that the Turkish form of the scale consisted of 14 factors covered by the five schema

domains. It was observed that the factors generally overlapped with the original form, but the number of factors was different, and the items could take place in different dimensions from the original form. The five schema domains included of the Turkish form used in this study and the 14 EMSs covered by these schema domains are shown in Table 1 in comparison with the original form. The Cronbach's alpha coefficients range from 0.63 to 0.80 for EMSs, and between 0.53 and 0.81 for schema domains.

Table 1. Early Maladaptive Schema Domains in the YSQ-SF 3 Original and Turkish Form and the Schemas Included

YSQ-SF3 Original Form (Young et al., 2003)		YSQ-SF3 Turkish Form (Soygüt et al., 2009)	
Schema Domains	Schemas	Schema Domains	Schemas
Disconnection and Rejection	Abandonment/Instability Mistrust/Abuse Emotional Deprivation Defectiveness/Shame Social Isolation/Alienation	Disconnection	Emotional Deprivation Emotional Inhibition Social Isolation/Mistrust Defectiveness
Impaired Autonomy and Performance	Dependence/Incompetence Vulnerability to Harm or Illness Enmeshment/Undeveloped Self Failure	Impaired Autonomy	Enmeshment/Dependence Abandonment Failure Pessimism Vulnerability to Harm
Impaired Limits	Entitlement/Grandiosity Insufficient Self-Control/Self-Discipline	Impaired Limits	Entitlement /Insufficient Self-Control
Other-Directedness	Subjugation Self-Sacrifice Approval-Seeking/Recognition-Seeking	Other-Directedness	Self-Sacrifice Punitiveness
Overvigilance and Inhibition	Negativity/Pessimism Emotional Inhibition Unrelenting Standards/Hypercriticalness Punitiveness	Unrelenting Standards	Unrelenting Standards Approval-Seeking

Rejection Sensitivity Questionnaire (RSQ): The RSQ developed by Downey and Feldman (1996) consists of 18 items which assess individual's rejection sensitivity. Each item includes a hypothetical interpersonal situation that is likely to be rejected by others. Individuals' concern about the outcome of the situation, and the likelihood of others accepting are assessed separately on the scale, which is rated between 1-6. High scores indicate an increased expectation of acceptance, and low scores indicate an increased expectation of rejection. For calculating the rejection sensitivity score, firstly, the acceptance expectation scores for each item are converted into rejection expectations (rejection expectation = 7 – acceptance expectation), and then these scores are multiplied by the degree of anxiety or worry about the relevant item. The score that can be obtained from each item is between 1 and 36, and the total rejection sensitivity score is obtained by taking the average of the scores of 18 items. Cronbach's alpha coefficient of the RDQ is 0.83.

The data of two different studies (Göncü & Sümer, 2011; Özen et al., 2011) were used to adapt the RSQ to Turkish and eight items, which cover common situations related to rejection expectations in a Turkish cultural context, were added to the scale. The Cronbach's alpha coefficient of the Turkish form is 0.86 (Göncü & Sümer, 2011).

Procedure

Before the data collection process, ethical approval was obtained from the Bursa Uludag University Faculty of Medicine Clinical Research Ethical Committee. After the purpose of the study was explained and the informed consent form was read and signed by the participants, the instruments were administered in the classrooms in paper-pencil format. Participants completed the survey in an average of 30 minutes. All participants who agreed to participate filled out the survey and there was no dropout. Participants did not receive any benefits in exchange for their participation.

Statistical Analyses

Pearson correlation analysis was performed to examine the relationships between variables. The Bootstrap method was used in the evaluation of mediating effects; thus, the role of schema domains and rejection sensitivity were evaluated simultaneously (Parallel Multiple Mediator Model). In this method, it is stated that instead of conducting separate analyses for each mediating variable, entering all mediator variables together into the model provides various advantages (e.g., examining the effects of mediators separately (specific indirect effect) and together (total indirect effect), controlling the effects of mediators on each other) (Hayes, 2013). The bootstrap method includes obtaining the indirect effect and the confidence interval (CI) for this effect by resampling. The confidence interval does not include zero indicates that the indirect effect is significant (Preacher & Hayes, 2008). PROCESS (Model 4) was used in the analyses and the number of resampling was determined as 5000.

Results

Significant positive associations were found between social anxiety with self and other models, as well as with all schema domains except the Impaired Limits schema domain, and rejection sensitivity. The self-model was positively associated with the schema domains of Disconnection, Impaired Autonomy, Other-Directedness and Unrelenting Standards, and rejection sensitivity. The other-model was also positively associated with the schema domains of Disconnection, Impaired Autonomy, Impaired Limits and Unrelenting Standards, and rejection sensitivity. In

addition, the relationship between the four attachment styles, which differ from each other in terms of self and/or other model, and the other research variables was also examined. The results showed that insecure attachment styles other than dismissive attachment were positively, secure attachment on the other hand, negatively associated with social anxiety and rejection sensitivity. Furthermore, it was found that all insecure attachment styles showed significant positive associations with schema domains (except the relationship between preoccupied attachment style and Impaired Limits schema domain). Means, standard deviations, and correlation coefficients of variables are presented in Table 2.

Table 2. Means, Standard Deviations, and Correlation Coefficients Between Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Social Anxiety	-												
2. Negative Self-Model	.35**	-											
3. Negative Other-Model	.20**	.03	-										
4. Secure Attachment	-.37**	-.60**	-.49**	-									
5. Preoccupied Attachment	.14**	.63**	-.45**	-.07	-								
6. Fearful Attachment	.25**	.49**	.74**	-.32**	.03	-							
7. Dismissing Attachment	.02	-.35**	.71**	-.05	-.20**	.41**	-						
8. Disconnection	.37**	.25**	.32**	-.26**	.17**	.37**	.29**	-					
9. Impaired Autonomy	.53**	.33**	.20**	-.28**	.23**	.30**	.13**	.66**	-				
10. Impaired Limits	-.00	-.05	.21**	-.04	.04	.15**	.33**	.30**	.26**	-			
11. Other-Directedness	.27**	.09*	.08	-.03	.13**	.14**	.14**	.29**	.45**	.35**	-		
12. Unrelenting Standards	.23**	.17**	.09*	-.12**	.23**	.16**	.16**	.25**	.40**	.45**	.42**	-	
13. Rejection Sensitivity	.42**	.25**	.14**	-.27**	.14**	.18**	.05	.35**	.39**	.09*	.15**	.10*	-
M	45	-.82	.35	4.12	3.85	3.88	4.43	47.60	62.09	25.42	37.08	30.38	8.60
SD	21.71	2.13	2.54	.88	1.03	1.18	1.08	16.02	19.74	6.52	8.45	8.01	3.19

**p < .05, **p < .01*

Two separate Bootstrap analyses (Parallel Multiple Mediator Model) (Hayes, 2013) were conducted to test the mediating role of the schema domains and rejection sensitivity in the relationship between self, and other models with social anxiety. The effect of other-model was controlled in the analysis of self-model, and the effect of self-model was controlled in the analysis of other-model.

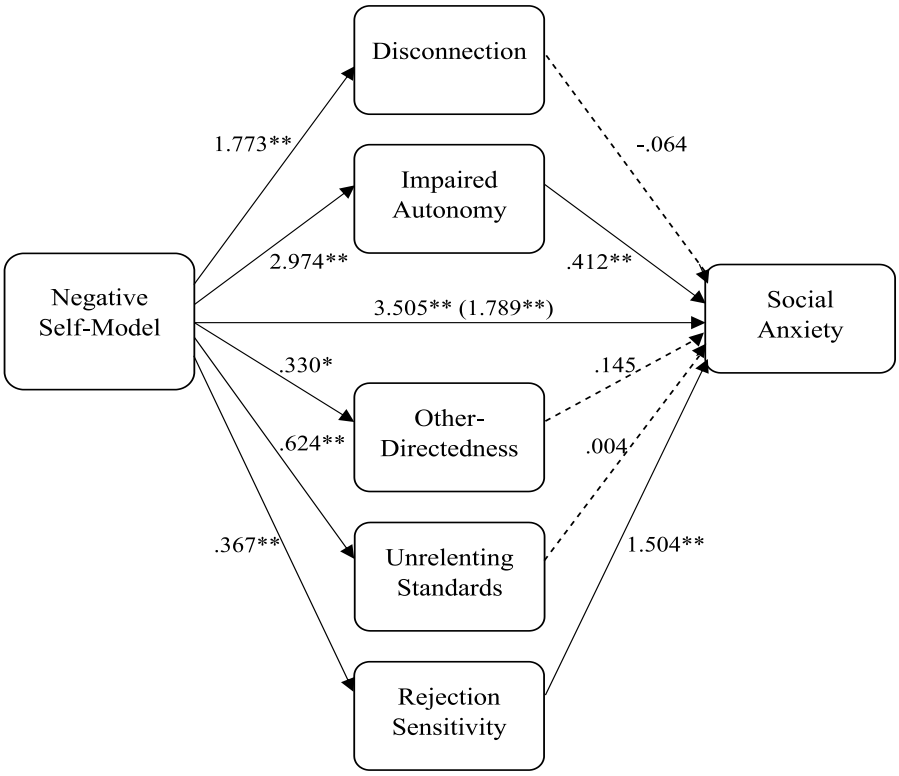

Figure 1. The Mediating Role of Schema Domains and Rejection Sensitivity in the Relationship Between Self-Model and Social Anxiety

Note. Unstandardized beta coefficients are presented in the figure. *$p < .05$, **$p < .01$, **$p < .001$

Firstly, the mediating role of schema domains that correlate with self-model (i.e., Disconnection, Impaired Autonomy, Other-Directedness, and Unrelenting Standards) and rejection sensitivity, in the relationship between self-model and social anxiety, was examined after controlling for other-model. It was revealed that model was significant ($F_{7,549} = 45.884$, $p < .001$) and explained 37% of the variance. Results of the bootstrap analysis showed that self-model was significantly associated with schema domains of Disconnection ($B = 1.773$, $p < .001$, % 95 CI [1.20, 2.35]), Impaired Autonomy ($B = 2.974$, $p < .001$, % 95

CI [2.26, 3.69]), Other-Directedness (B = .330, p = .049, % 95 CI [.01, .66]) and Unrelenting Standards (B = .624, p < .001, % 95 CI [.32, .93]), and rejection sensitivity (B = .367, p < .001, % 95 CI [.25, .49]). Impaired Autonomy schema domain (B = .412, p < .001, % 95 CI [.30, .52]) and rejection sensitivity (B = 1.504, p < .001, % 95 CI [1.00, 2.01]) were the only unique predictors of social anxiety. It was determined that both total effect (B = 3.505, p < .001, % 95 CI [2.73, 4.28]), and direct effect of self-model on social anxiety (B = 1.789, p < .001, % 95 CI [1.06, 2.52]) were significant. Results indicated that total indirect effect was significant (B = 1.716, % 95 CI [1.25, 2.21]). When the effects of mediators were separately examined, only indirect effects through Impaired Autonomy schema domain (B = 1.226, % 95 CI [.81, 1.72]) and rejection sensitivity (B = .552, % 95 CI [.31, .84]) were significant after controlling for all other mediators. In other words, the effect of self-model on social anxiety takes place through Impaired Autonomy schema domain and rejection sensitivity after controlling for other-model (see Figure 1).

Secondly, the mediating role of schema domains that correlate with other-model (i.e., Disconnection, Impaired Autonomy, Impaired Limits, and Unrelenting Standards) and rejection sensitivity in the relationship between other-model and social anxiety, was examined after controlling for self-model. It was revealed that model was significant ($F_{7,549}$ = 50.274, p < .001) and explained 39% of the variance. Results of the bootstrap analysis showed that other-model was significantly associated with schema domains of Disconnection (B = 1.971, p < .001, % 95 CI [1.49, 2.46]), Impaired Autonomy (B = 1.445, p < .001, % 95 CI [.84, 2.05]), Impaired Limits (B = .533, p < .001, % 95 CI [.32, .74]) and Unrelenting Standards (B = .272, p = .039, % 95 CI [.01, .53]), and rejection sensitivity (B = .169, p = .001, % 95 CI [.07, .27]). The schema domains of Impaired Autonomy (B = .430, p < .001, % 95 CI [.33, .54]), Impaired Limits (B = -.607, p < .001, % 95 CI [-.86, -.35]) and Unrelenting Standards (B = .259, p = .018, % 95 CI [.04, .47]), and rejection sensitivity (B = 1.514, p < .001, % 95 CI [1.02, 2.01]) were the unique predictors of social anxiety. It was determined that both total effect (B = 1.572, p < .001, % 95 CI [.92, 2.23]), and direct effect of other-model on social anxiety (B = .966, p = .002, % 95 CI [.37, 1.56]) were significant. Results indicated that total indirect effect was significant (B = .606, % 95 CI [.18, 1.07]). When the effects of mediators were separately examined, indirect effects through schema domains of Impaired Autonomy (B = .622, % 95 CI [.32, 1.01]), Impaired Limits (B = -.324, % 95 CI [-.55, -.16]) and Unrelenting Standards (B = .070, % 95 CI [.01, .20]), and rejection sensitivity (B = .256, % 95 CI [.11, .47]) were significant after controlling for all other mediators. In other words, the effect of other-model on social anxiety takes place through schema domains of Impaired Autonomy, Impaired Limits and Unrelenting Standards, and rejection sensitivity after controlling for self-model (see Figure 2).

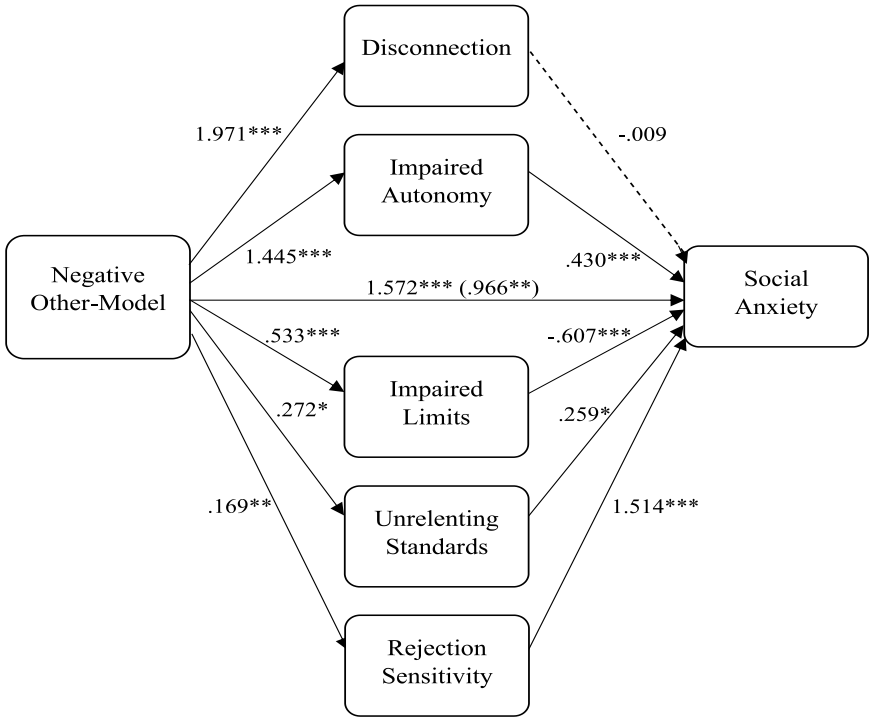

Figure 2. The Mediating Role of Schema Domains and Rejection Sensitivity in the Relationship Between Other-Model and Social Anxiety

Note. Unstandardized beta coefficients are presented in the figure. *$p < .05$, **$p < .001$

Discussion

In this study, it was aimed to investigate the mediating role of early maladaptive schema domains and rejection sensitivity in the relationship between internal working models of attachment and social anxiety. First, the relationships between the variables were examined, and it was determined that insecure attachment styles other than dismissive attachment, which included positive self and negative internal working models of others, were positively associated with social anxiety. This finding supports the results of previous research (e.g., Van Buren & Cooley, 2002; Wenzel, 2002) that preoccupied attachment style, including negative self-model, and fearful attachment style, including negative internal working models of both self and other, are associated with social anxiety. In addition, it was determined significant positive associations between social anxiety with both

internal working models of self and other, schema domains of Disconnection, Impaired Autonomy, Other-Directedness and Unrelenting Standards, and rejection sensitivity. These findings seem to be consistent with the assumptions of attachment theory (Bowlby, 1969/1982, 1973, 1980) and schema theory (Young, 1990, 1999; Young et al., 2003), and with the perspective that mental constructs based on early experiences may be related to social anxiety (Bruch & Heimberg, 1994; Neal & Edelman, 2003; Rapee & Spence, 2004). Attachment theory suggests that negative mental representations of self and/or other develop as a result of an individual's needs not being met responsively and consistently (Bowlby, 1973). These negative mental representations have an impact on the individual's subsequent relationships and may increase the risk of psychopathology by affecting the way the individual copes with stressful situations (Bowlby, 1988). On the other hand, schema theory states that basic emotional needs not being met properly may lead to the development of EMSs. EMSs are considered to form the basis of psychological distress (Young et al., 2003).

Results of the present study showed that both self and other models, schema domains of Impaired Autonomy, Impaired Limits and Unrelenting Standards, and rejection sensitivity predicted social anxiety. Internal working models of attachment, Impaired Autonomy schema domain and rejection sensitivity were expected to be associated with social anxiety consistent with Leary's (2001) extended self-presentation theory. In addition, the relationships between the schema domains of Impaired Limits and Unrelenting Standards with social anxiety can be explained by the conditions for social anxiety that was suggested by Leary (2001). According to this, individuals experience social anxiety when they believe that they will fail to leave the desired impression on others. Thus, if they do not care about the impression that they will leave on others or do not doubt they will be able to leave the desired impression, they do not experience social anxiety (Leary & Kowalski, 1995; Schlenker & Leary, 1982). In the context of the Unrelenting Standards schema domain, individuals' belief that they will fail to leave the desired impression may stem from the rigid and high standards that one internalizes to avoid rejection from others. On the other hand, since the Impaired Limits schema domain is negatively related to social anxiety, it may be that individuals with this schema may not care about the impression they leave on others or not worry about the impression that they will leave, because they think that they are special, and consider themselves superior to others (Young et al., 2003). Thus, they may be less likely to experience social anxiety.

Another result of the study is that Impaired Autonomy schema domain and rejection sensitivity mediated the relationship between self-model and social anxiety, and the schema domains of Impaired Autonomy, Impaired Limits and Unrelenting Standards, and rejection sensitivity mediated the relationship between the other-model and social anxiety. These results support the assumption that insecure attachment may have an impact on psychological distress through EMSs by

revealing the mediating role of the mentioned schema domains and rejection sensitivity in the relationship between internal working models of both self and other and social anxiety, and Vertue's (2003) point of view, which conceptualized social anxiety from an attachment theory perspective.

When the findings of the mediation analysis are examined, firstly, Impaired Autonomy schema domain and rejection sensitivity mediated the relationship between self-model and social anxiety. A negative view of self is related to lack of consistency of the individuals' needs being met or the lack of support of the attempt of autonomy (Bowlby, 1973). Negative self-model, which causes individuals to feel inadequate and worthless, may contribute to the development of the schemas in the Impaired Autonomy schema domain which is characterized by the feeling of inadequacy and low self-esteem (Young et al., 2003). It is worthy of note that these schemas are similar to the common belief of individuals with high social anxiety levels, that other people are socially more competent than themselves (Turner et al., 2003). Also, negative self-model may lead individuals to expect rejection and thinking that they will not be approved and abandoned by others as a result of feeling worthless and inadequate. Thus, individuals' negative evaluations of their social skills resulting from a negative view of self, and the belief that they will be rejected by others, can lead to social anxiety.

Secondly, schema domains of Impaired Autonomy, Impaired Limits and Unrelenting Standards, and rejection sensitivity mediated the relationship between other-model and social anxiety. A negative view of others is related to others not being sensitive to the needs of the individuals' and not meeting these needs appropriately (Bowlby, 1973). Similarly, Impaired Autonomy schema domain, which is comprised of negative perception of self and low self-esteem, can also develop as a result of the insensitivity of the important figures in the individual's life to the needs of the individual (Young et al., 2003). Along with the Impaired Autonomy schema domain, Unrelenting Standards schema domain, and rejection sensitivity were also mediators in the relationship between other-model and social anxiety. In this case, the negative other-model may cause individuals to expect rejection and to determine strict and high standards in order to avoid rejection from others. Thus, in relation to a negative view of others, individuals' low self-esteem, or the belief about not being accepted by others through not meeting high standards, and being rejected, can all lead to social anxiety. On the other hand, as a result of unresponsive attitudes associated with a negative view of others; schemas in the area of Impaired Limits may also develop, which was found in this study to mediate the relationship between other-model and social anxiety, as an overcompensation of some schemas such as Emotional Deprivation, Defectiveness, and Failure. Consistently, it can also be considered that the negative view of others may contribute to the development of Entitlement/Insufficient Self-Control schema consisting in the Impaired Limits schema domain, includes the belief that the individual is different and privileged from others through overcompensation.

Therefore, as mentioned earlier, individuals may think that they are special (Young et al., 2003) and do not care about the impression that they leave on others. Also, they may consider themselves superior to others (Young et al., 2003) and do not doubt about they will leave the desired impression. Thus, they may experience less social anxiety. Young et al. (2003) stated that when these individuals cannot meet high standards, their sense of superiority can turn into a sense of inferiority and shame, and such individuals may experience anxiety.

Examining the mediating effects, it is a remarkable result that the Disconnection schema domain, which is expected to mediate the relationship between both attachment models and social anxiety, such as the Impaired Autonomy schema domain, did not have a mediating effect. The Disconnection schema domain is considered to be consistent with the third condition for social anxiety of the extended self-presentation theory which is "the belief that one will be abandoned by others" (Leary, 2001). However, the Disconnection schema domain being not mediate the relationship between attachment and social anxiety is considered to be related to the fact that, the Abandonment schema, which overlaps with the aforementioned condition for social anxiety, was included in the Impaired Autonomy schema domain in the Turkish form, while it is in the Disconnection schema domain in the original form of the YSQ-SF3. Similarly, the Other-Directedness schema domain did not mediate the relationship between self-model and social anxiety. This may be related to the fact that the Approval-Seeking schema, which is consistent with the first condition of the extended self-presentation theory, "the desire to make a positive impression on others" (Leary, 2001), is included in the Unrelenting Standards schema domain in the Turkish version of the YSQ-SF3, unlike the original form. This situation may explain both the absence of a mediating effect of the Other-Directedness schema domain and the mediating role of the Unrelenting Standards schema domain, which includes the Approval-Seeking and the Unrelenting Standards schemas, in the relationship between the other-model and social anxiety.

In the present study, it is aimed to examine social anxiety within the framework of attachment theory. Considering the relevant literature, the mediating role of early maladaptive schema domains and rejection sensitivity in the relationship between internal working models of attachment and social anxiety has been examined, and a contribution to the literature has been made by presenting a perspective on the possible mechanisms of this relationship. By this means, a better understanding of the factors associated with social anxiety is considered important for the development and use of effective interventions. In other words, these theoretical findings regarding underling mechanisms of social anxiety can have practical implications. These mechanisms could be used as a basis for the development of effective interventions for social anxiety and interventions could target these mechanisms for change (i.e., the schema domains of Impaired Autonomy, Impaired Limits and Unrelenting Standards, and rejection sensitivity). In addition to revealing the role of internal working models of self and other in social

anxiety, the findings of this study showed that rejection sensitivity and EMSs based on attachment relationship can also be observed in social anxiety and may play a role in the relationship between attachment and social anxiety. This may explain the fact that a significant portion of individuals with social anxiety continue to show symptoms after cognitive behavioral treatment methods (Moscovitch, 2009). Consistent with the findings of previous studies (Calvete et al., 2015, Eldoğan and Barışkın, 2014; Pinto-Gouveia et al., 2006), EMSs are common in social anxiety. In addition, the fact that this study revealed that early maladaptive schema domains mediate the relationship between internal working models of attachment and social anxiety may have clinical implications for both assessment and treatment. Considering that individuals with social anxiety may experience difficulties related to these schemas, it may be important to evaluate these schemas during the clinical evaluation. In addition, to the techniques used in standard Cognitive Behavioral Therapy, with the consideration of the development history of the schemas in the domains of Impaired Autonomy, Impaired Limits and Unrelenting Standards, techniques used in Schema Therapy such as imagery rescripting, chair dialogues, empathetic confrontation, and limited reparenting can also be used. Thus, the therapeutic techniques of Schema Therapy that focus on the early foundations of schemas and specifically target these maladaptive schemas may reduce the possibility of persistence of symptoms after treatment. In addition to these variables that mediate the relationship between attachment and social anxiety in the therapy process, it may also be important to focus on attachment patterns. It is suggested that Schema Therapy could be effective in the treatment of social anxiety, since it also directly works on internal working models of attachment in the psychotherapy process (Young et al., 2003) as suggested by the attachment theory (Bowlby, 1988). On the other hand, besides to the clinical contributions of the research to the literature, such as presenting an overview of the mediating role of EMSs and rejection sensitivity in the relationship between attachment and social anxiety, and providing a perspective of the mechanism of this relationship, a significant statistical advantage was obtained by providing control by entering the possible mediating variables into the model at the same time with the Bootstrap method in the evaluation of mediating effects.

Besides various contributions to literature, there are also some limitations of the current study. The first is that it has not been studied with a clinical sample. Replicating the study with existing variables in a clinical sample may provide important information. In addition, it may be beneficial to use individual observations and interviews in future studies. It is stated that especially the evaluation of the attachment relationship is aimed at measuring processes partly outside of conscious awareness, and therefore, it may be more reliable to evaluate it with methods based on interview technique (Bartholomew & Moretti, 2002). Finally, the current research is a cross-sectional study. Indirect effects can be better understood by conducting longitudinal studies. Future studies apart from those

related with the methodological limitations of the study, may focus on the efficacy of Schema Therapy in the treatment of social anxiety disorder. In addition, in future studies, the development of interventions based on the mechanisms underlying social anxiety revealed by the results of this research and examining their effects will also make important contributions.

Authors' note

Conflict of interest. No potential conflict of interest was reported by the authors.

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THE LONGITUDINAL MEDIATING EFFECT OF DISTRESS TOLERANCE IN A MINDFULNESS-BASED INTERVENTION: A RANDOMIZED CONTROLLED TRIAL

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Abstract

Objective: The present study aimed to investigate the intermediary role of distress tolerance in Mindfulness-Based Intervention (MBI) with respect to self-perceived stress reduction.

Method: One hundred and twenty-nine adults with a high level of emotional distress were randomized into MBI groups or a waiting-list group. Levels of mindfulness skills, self-perceived stress, and distress tolerance (tolerance, appraisal, absorption, and regulation) were measured four times: pre-test, week 3, week 6, and post-test.

Results: The developmental trajectories modeled by the univariate latent growth curve showed that the factor intervention significantly predicted the slope of observing, non-reactivity, overall mindfulness, and distress appraisal during first six weeks. Bivariate latent growth curve models demonstrated a significant association between increases in the growth rate of distress appraisal and non-reactivity in participants receiving mindfulness training. Such an association was not observed among those who did not receive an MBI. Longitudinal mediation analyses further revealed that the effect of MBI on non-reactivity and self-perceived stress at week 6 was fully mediated by distress appraisal at week 3, respectively.

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Conclusions: Our results indicate that distress appraisal plays an important role during the earlier stage of MBI, which might contribute to a more effective and efficient intervention program in the future.

Keywords: Mindfulness, Stress, Distress Tolerance, Distress Intolerance, Distress Appraisal, Mediation

Previous empirical studies have largely established the effects of mindfulness-based interventions (MBIs) on alleviating suffering (Creswell, 2017). The current major focus of researchers and practitioners in the field of mindfulness is to advance our understanding of the mechanism chain of action underlying MBIs (Hölzel et al., 2011).

A significant challenge to uncovering the mechanism chain across MBIs is the heterogeneity among programs (Chiesa & Malinowski, 2011; Dimidjian & Segal, 2015). In most cases, formal mindfulness practices and psychoeducation are two core components of a standard modern MBI program. Formal mindfulness practices originated from traditional Buddhist meditation, whereas psychoeducational content was designed specifically according to the original target population (Crane et al., 2017). For instance, in addition to formal meditation practices, stress reactions, cognitive patterns, and life-relevant skills were emphasized in Mindfulness-Based Stress Reduction (MBSR), Mindfulness-Based Cognitive Therapy (MBCT), and Dialectical Behavioral Therapy (DBT), respectively (Kabat-Zinn & Hanh, 2009; Linehan, 2014; Teasdale, Williams, & Segal, 2014). The heterogeneity within the meditation instruction and psychoeducation courses indicates that many factors might be involved in the mechanism chain (Creswell, 2017). However, the core etiological processes across emotional disorders, as well as the "one-size-fits-all" intervention effects of MBIs, suggest the existence of transdiagnostic core mechanisms (Wielgosz, Goldberg, Kral, Dunne, & Davidson, 2019). Currently, most evidence demonstrates that mindfulness skills, a set of transdiagnostic protective factors (i.e., observing, describing, acting with awareness, non-judging of experience, and non-reactivity to inner experiences), could be one universal mechanism in MBIs (Gu, Strauss, Bond, & Cavanagh, 2015). Identifying other possible universal influential variables might propel further progress in understanding the mechanism chain, thus accelerating the development in this field.

Distress tolerance, one of the transdiagnostic emotional vulnerability factors, has received attention recently as a core mechanism of action in MBIs for its association with multiple emotional psychopathologies (K. M. Kraemer, Luberto, Hall, Ngo, & Yeh, 2020; Leventhal & Zvolensky, 2015). In broad terms, distress

tolerance (or intolerance) is an umbrella concept depicting one's self-perceived and actual capacity to withstand aversive states, covering multiple constructs such as tolerance of ambiguity, intolerance of uncertainty, discomfort intolerance, tolerance of negative affects, etc. (Leyro, Zvolensky, & Bernstein, 2010). In the narrower sense, distress tolerance refers to individual differences in how one reacts to negative emotions, which could be subsequently divided into four distinct but closely related processes: (1) tolerance (not considering distressing emotions unbearable), (2) appraisal (not showing a lack of acceptance of distress by feeling ashamed or scared when experiencing negative emotions), (3) absorption (full attention is not captured by the distressing emotions), and (4) regulation (not devoting great efforts to avoid or inhibit negative emotions; Gross, 2014; Simons & Gaher, 2005).

Theoretically, it is suggested, from both clinical psychological and Buddhist philosophic perspectives, that how one reacts to suffering plays a central role in the onset, development, maintenance, and recurrence of diverse psychological conditions (Campbell-Sills & Barlow, 2007; Teasdale, Chaskalson, & Kulananda, 2011). Previous studies indicated that individuals who showed high intolerance of negative affect were more likely to use maladaptive emotion regulation strategies to control or inhibit emotions including anxiety and depression. It further leads to a regulatory failure or a negative reinforcement of unhelpful strategies such as avoidance, rumination, substance use and self-injury which, in turn, reduces their quality of life, life satisfaction or lifespan (Barlow & Farchione, 2018; Daros & Williams, 2019; Linehan, 2014). Those who showed a high level of tolerance were found to have fewer problem behaviors aimed at dampening emotional responses (Zvolensky, Bernstein, & Vujanovic, 2011). Accordingly, in the present study, we focused on perceived affective distress tolerance.

One previous meta-analysis synthesized findings from relevant studies showing that distress tolerance of negative affects is significantly positively correlated to problem-solving (r = .08), reappraisal (.11), acceptance (.34), and mindfulness (.38), and negatively correlated to experiential avoidance (-.57), expressive suppression (-.19), rumination (-.29), and worry (-.54; Naragon-Gainey, McMahon, & Chacko, 2017). Furthermore, this construct has been described as a trait-like predictive factor for many emotional problems (Lass & Winer, 2020; Leventhal & Zvolensky, 2015), it has also been repeatedly demonstrated to be malleable in MBI studies, including those conducted on healthy people or patients suffering from eating disorders, obsessive-compulsive disorders, substances use disorders, or borderline personality disorder (Black & Amaro, 2019; Fahmy et al., 2019; Harris, Jennings, Katz, Abenavoli, & Greenberg, 2016; Juarascio et al., 2021; Külz et al., 2019; Lotan, Tanay, & Bernstein, 2013; McMain, Guimond, Barnhart,

Habinski, & Streiner, 2017). Therefore, distress tolerance could be a central mechanism variable in MBIs in both nonclinical and clinical samples and across diagnostic boundaries.

Although distress tolerance might play a major role in the mechanism chain of MBIs, empirical studies mainly address it as an outcome variable. Three studies have examined this chain cross-sectionally. Lotan et al. (2013) found that pre-post changes in trait mindfulness and state mindfulness could predict changes in overall distress tolerance. Two studies investigated whether distress tolerance would mediate the relationship between mindfulness skills and health-relevant outcomes. In Brem et al. (2019), distress tolerance mediated the association from non-judging and non-reactivity to psychological aggression perpetration and physical assault perpetration. de Lisle, Dowling, and Allen (2014) investigated the role of specific facets of distress tolerance in the relationship between mindfulness and psychological distress. Absorption significantly mediated the target relationship in gambling disorders, whereas the mediating effects for tolerance and regulation sub facets were not significant. Although the existing findings are inspiring, the cross-sectional design was limited in making causal inferences because temporal precedence is a premise (Kazdin, 2007, 2009).

In the current study, we would like to advance this investigation by exploring the potential mechanism role of distress tolerance in a randomized controlled trial on individuals suffering from high emotional distress (i.e., people who did not attain the diagnostic criteria but are at high risk of developing multiple emotional disorders; Barlow et al., 2010). Accordingly, a series of exploratory analyses are conducted with respect to intervention effects on self-perceived stress, underlying mechanism of action (i.e., mindfulness skills and affective distress tolerance), and potential moderator (sex).

Method

Procedure

The sample size was determined based on the predetermined schedule. Five hundred and thirty-two Chinese individuals completed our online questionnaires of recruitment. Three hundred and forty-four adults who met the inclusion criteria were invited to attend the subsequent screening process. Two hundred and fifty-four individuals received an online structured interview, i.e., the MINI-International Neuropsychiatric Interview, given by psychology graduate students and a research

assistant. Inclusion criteria were (1) an overall score of the 10-item Kessler Psychological Distress Scale no less than 22 (Taylor, Agho, Stevens, & Raphael, 2008), (2) no prior 8-week MBI training experience, (3) less than 20 mins/week of meditation practice, (4) no serious physical illness, (5) aged equal to or greater than 18, and (6) availability for the whole program. Participants were excluded if they met the criteria for a current or previous diagnosis of psychotic disorders, bipolar disorders, substance abuse or dependence, antisocial or borderline personality disorder, reported low emotional distress, suicide ideation or intention, or refusal to cooperate during the interview. Finally, one hundred and twenty-nine individuals were randomly assigned, independently by the third author, to either an online guided 8-week MBI group, an online self-help MBI group, or a waiting-list control group using a stratified random method. The strata were calculated based on the age range, and the final strata were determined when the sex ratio approached 1:1 within each stratum. All data were analyzed following the intention-to-treat (ITT) principle. The CONSORT flowchart of participants is illustrated in Figure 1. The whole intervention was conducted during the COVID-19 pandemic. All groups received the same online assessments at pre-test (2020/03/20–03/23), week 3 (2020/04/06–04/14), week 6 (2020/04/27–05/06), and post-intervention (2020/05/15–05/24), which also included questionnaires and behavioral tasks unrelated to the current study. Demographic information is presented in Table 1. All participants signed informed consent via an online document. A certificate was delivered to each participant of the intervention groups as a reward. For those in the control group, the online self-help course was provided after post-assessment as remuneration. The study was approved by the Association for Ethics and Human and Animal Protection in the School of Psychological and Cognitive Sciences, Peking University. No intervention-related unexpected adverse events were observed.

Table 1. Demographic statistics

Characteristic	Online MBI (n = 43)	Self-help MBI (n = 43)	Control (n = 43)	Condition difference	Total Sample (N = 129)
Age in years (M±SD)	32.16±9.10	32.23±9.72	32.35±8.90	$F_{(2, 126)} = .00$	32.25±9.17
Sex				$\chi^2_{(2)} = .10$	
Female	35	35	34		104
Male	8	8	9		25
Education in years (M±SD)	17.19±2.63	17.45±2.10	17.41±3.00	$F_{(2, 126)} = .13$	17.35±2.58

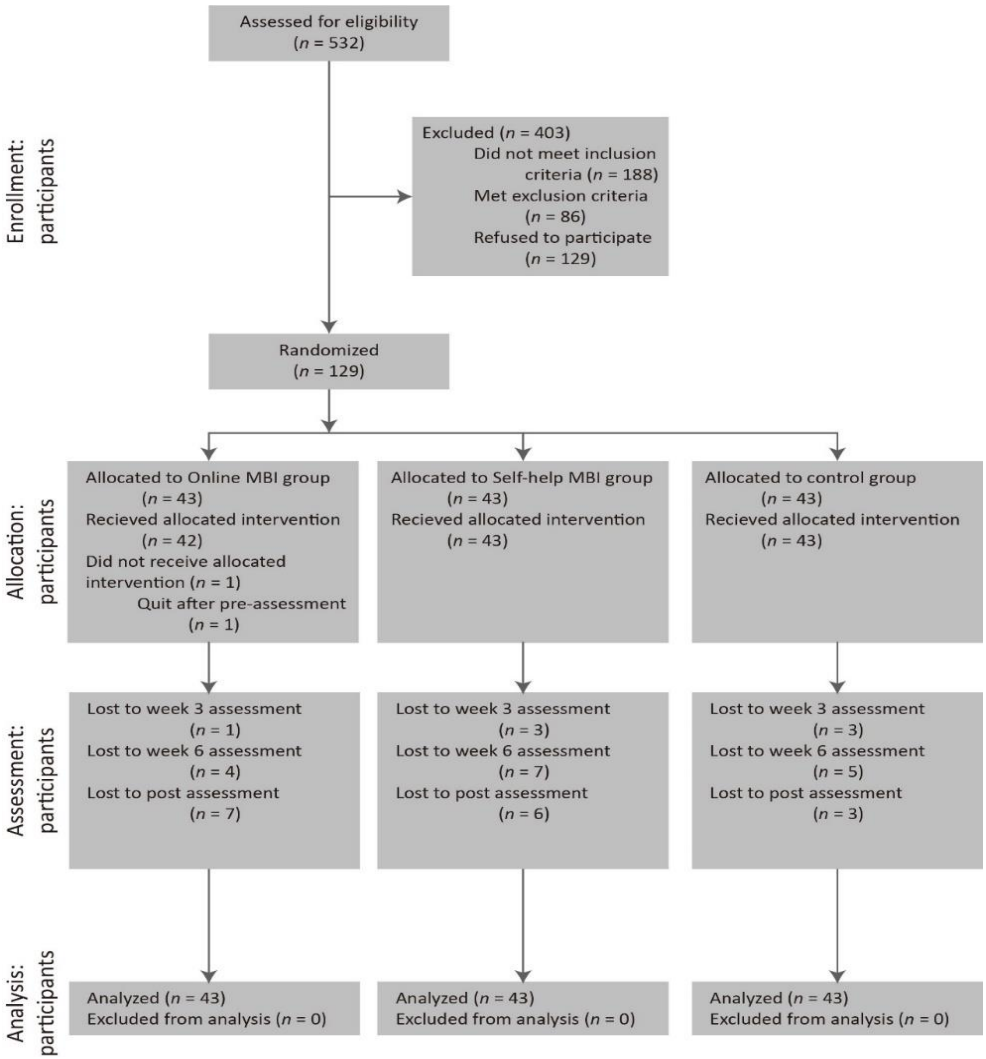

Figure 1. CONSORT Flowchart of Participants

Measures

We employed the 10-item Chinese version of the Kessler Psychological Distress Scale to evaluate the level of emotional distress (K10; Kessler et al., 2002) during the pre-screening. A higher overall score indicates a higher level of emotional distress (i.e., symptoms caused by emotions such as anxiety and depression). The cut-off value was set to 22, which corresponds to a "high" and a "very high" level of distress.

The 14-item Chinese version of the Perceived Stress Scale (CPSS) measures one's self-perceived stress (Cohen, Kamarck, & Mermelstein, 1983). Items are rated on a 5-point Likert scale from 0 to 4, with a higher overall score indicating a higher level of perceived stress. The CPSS showed a good internal consistency ($\alpha = .900$) in Yang, Huang, Wu, and Li (2007). In the current study, Cronbach's alpha was .910.

The Chinese version of the Five Facets of Mindfulness Questionnaire (FFMQ; Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006) and its 20-item version (Hou, Wong, Lo, Mak, & Ma, 2014) were adopted to assess an overall mindfulness level as well as five distinct facets of mindfulness (i.e., observing, describing, acting with awareness, non-judging of experience, and non-reactivity to inner experience). Items are rated on a 5-point Likert scale from 1 to 5, with a higher overall score representing a higher mindfulness level. Cronbach's alpha was .439 to .843 in the previous literature (Deng, Liu, Rodriguez, Xia, 2011) and .814 to .889 in the present study.

In the Distress Tolerance Scale, items were rated on a 5-point Likert scale (1 = *strongly agree* to 5 = *strongly disagree*), so that the total average score represents one's ability to withstand aversive emotional states (Simons & Gaher, 2005). The average score of each subdimension indicates one's tolerance level in each process: distress tolerance (e.g., with the item "I can't handle feeling distressed or upset"), distress appraisal (e.g., with the item "My feelings of distress or being upset are not acceptable"), distress absorption (e.g., with the item "When I feel distressed or upset, I cannot help but concentrate on how bad the distress actually feels"), and distress regulation (e.g., with the item "I'll do anything to stop feeling distressed or upset"). We adopted the Chinese version scale and did reverse coding to all items except item 6 to assure that current findings could be compared to previous studies employing the original version scale. Cronbach's alpha was .750 to .910 in the previous literature (You & Leung, 2012) and .720 to .820 in this study.

Instructed items were inserted for quality control in all assessments (9 at pre- and post-test, 5 at week 3 and week 6; e.g., with the item "Please select the number indicating *Not at all* for the current item"). Considering that participants might be less focused when completing online measurements without monitoring (i.e., outside the laboratory), a less strict standard was adopted in the current study by allowing participants to have one false answer out of all instructed items. Kam and Chan (2018) suggested that it showed a similar screening effect with the strictest cut-off value (i.e., all-or-none). The ratio of participants with >1 incorrect instructed item was 7.75% at the pre-test, 7.75% at week 3, 8.53% at week 6, and 8.53% at the post-test. These data were treated as missing values in data analysis.

Intervention

The intervention program (Figure 2), Mindfulness Intervention for Emotional Distress (MIED), was developed and provided by the corresponding author, a mental health supervisor with 20 years of clinical experience, 15 years of

mindfulness meditation practices, and 14 years of mindfulness education experience. The program was adapted, based on the MBSR, and the Unified Protocol for Transdiagnostic Treatment of Emotional Disorders, for individuals who were patients with anxiety and/or depression disorders or sub-healthy individuals (Cassiello-Robbins, Rosenthal, & Ammirati, 2021; Farchione et al., 2012). The guided intervention group completed an 8-week (50 days) training through Zoom meetings (Zoom, Zoom Video Communications, Inc., San Jose): A 2.5-hour session was held once per week. A silent day of 8 hours was inserted between week 6 and 7 as in the MBSR. Participants were instructed to practice MBSR-originated formal meditation (e.g., the body-scanning, mindful hatha yoga, sitting meditation, and walking meditation) for at least 15 minutes per day following given recordings in addition to their in-session practices. Participants were also encouraged to integrate mindfulness skills into their daily life activities. The online self-help courses (49 days) were delivered via the WeChat App (WeChat, Tencent Inc., Shenzhen). All course materials were recorded, written, edited, or proofread by the corresponding author. Participants were required to spend around 30 minutes every day reading psychoeducation materials and practicing formal and informal mindfulness activities following the given instructions.

Week	Themes	Examples
1	Mindfulness Practices: Bring your attention back to the present moment	**Q:** How should I accomplish a successful mindfulness practice? **A:** We have nowhere to go or no state to maintain. The operational core of the mindfulness meditation practice is to be aware of the object we're experiencing and accept any feelings or thoughts that occurred during the process. Any time you notice your mind wandering, just bring it back to the present moment. You don't need to blame yourself for that's how our brain works.
2	The Functions and Values of Emotions	**Q:** I don't want to feel any anxiety. How can I get rid of it? **A:** All we do is to help you restore your emotions, life, and work, rather than eliminate any emotion. In reality, all healthy people have emotions. No one can get rid of them. Emotions play vital roles for the human being, especially from an evolutionary perspective. Each emotion, whether we consider it a negative or a positive one, has its adaptive functions for us. For instance, anxiety helps us prepare for the future.
3	Emotional Distress: Origins and Coping	**Q:** Why do I feel like my life has been kind of ruined by anxiety? How to fight it? **A:** I agree. An inappropriate way to cope can indeed lead to more suffering caused by emotions like anxiety. In fact, the actions or reactions of fighting against those emotions would become the origins of your suffering. So the strategy we're using to help you restore your anxiety is to increase your capability of tolerance it. When you can participate in activities with the presence of anxiety, you may find that the detrimental effects of anxiety on you will be smaller and smaller.
4	Willingly "expose" yourself to Uncomfortable Feelings	
5	Reduce Maladaptive Avoidance and Emotion-Driven Behaviors	
6	Thoughts are just thoughts	
7	Facing the Feared Situations in Your Life	
8	Summary and Future Goals	

Figure 2. The weekly themes and examples of client-therapist dialogues for the MIED program.

Data Analysis

All data were analyzed using SPSS (20.0; SPSS, Inc, Chicago) or R statistical software environment (packages "lavaan," "tidyverse," "bruceR," "mediation," "semPower," and "bmem") with a significance level set at .05. Little's Missing Completely at Random (MCAR) test showed that the MCAR assumption could not be rejected for all measures (*ps* > .05). Missing data were handled using multiple imputation (Bell, Fiero, Horton, & Hsu, 2014). A set of one-way analysis of variance (ANOVA) was performed for baseline measures to assess whether all groups were comparable at the beginning of the intervention. Pearson *r* effect sizes are small (.10), moderate (0.30), or large (0.50). The intervention effects were analyzed with two-factor mixed-design ANOVAs (2 times: Pre-, Post) X (3 groups: Online guided intervention, Online self-help intervention, Waitlist control). The Partial eta-squared (η_p^2) was reported as an indicator of effect size in ANOVA tests. The Huynh-Feldt correction was used to compensate for sphericity violations. For modeling, data of two online intervention groups were pooled to obtain one single comparison with the blank control group. Development trajectories were independently modeled with linear univariate and bivariate latent growth curve models (LGCM). The latent factors, intercept (baseline level) and slope (rate of change across assessment periods) were estimated independently for each or each pair of outcomes. The factor loadings for the latent factor slope were fixed (0, 2, 5, 8). Model fit measures included Chi-Square/df ratio, root-mean-square error of approximation (RMSEA), comparative fit index (CFI), and Tucker-Lewis index (TLI). Chi-Square/df ratio lower than 3 and values below .08 for RMSEA indicated a good fit (MacCallum et al., 1996). Values above .90 for CFI and TLI were considered acceptable. The number of bootstrap samples for mediation models was 5000. Mediated effects and the corresponding 95% confidence intervals (CIs) were calculated. Continuous variables were mean-centered before performing the moderated mediation model. Post hoc power analyses were conducted based on the difference between slopes for linear bivariate regressions (Erdfelder, Faul, & Buchner, 1996), on the misfit indices RMSEA for the LGCMs (Jobst, Bader, & Moshagen, 2021), and on bootstrap confidence intervals for mediation analyses (Zhang, 2014).

Results

Treatment Adherence

The average class attendance ratio was 79.07% in the Online MBI group and 80.68% in the Self-help MBI group (*p* = .764). The numbers of participants completing all sessions were Online MBI (*n* = 16) and Self-help MBI (*n* = 10). The

overall loss to assessments was at 30.23% and more specifically, Online MBI at 27.91%, Self-help MBI at 37.21%, and Control group at 25.58%. One participant declined to participate in the assigned intervention due to a schedule conflict. Thirty-seven participants were unable to be contacted. One participant did not assess within the required time. Table 1 provides descriptive characteristics by group and for the total sample.

Baseline Conditions

There were no significant (*ps* > .05) differences in baseline age, sex, or education year by groups. Outcomes did not significantly differ by group (*ps* > .05) except for the observing facet ($p = .046$). The above findings demonstrated that all groups were similar at baseline. Table 2 provides correlations between baseline variables. As expected, self-perceived stress was significantly negatively correlated with all facets of distress tolerance as well as the overall distress tolerance (*ps* < .010).

Table 2. Pearson *r* correlations for Baseline Outcome Measures (*N = 129*)

Variable	1	2	3	4	5	6	7	8	9	10	11
1. CPSS Perceived Stress	—										
2. Distress Tolerance	–.506**	—									
3. Distress Appraisal	–.528**	.695**	—								
4. Distress Absorption	–.571**	.713**	.688**	—							
5. Distress Regulation	–.299**	.469**	.620**	.533**	—						
6. Overall Distress Tolerance	–.569**	.862**	.887**	.875**	.755**	—					
7. FFMQSF Observing	–.011	.125	.061	.067	–.008	.076	—				
8. FFMQSF Describing	–.246**	.231**	.296**	.219*	.044	.239**	.396**	—			
9. FFMQSF Acting with awareness	–.508**	.327**	.381**	.475**	.245**	.426**	–.014	.130	—		
10. FFMQSF Non-Judging	–.280**	.346**	.406**	.371**	.320**	.426**	–.191*	–.005	.336**	—	
11. FFMQSF Non-reactivity	–.421**	.315**	.222*	.382**	.142	.320**	.442**	.365**	.056	–.072	—
12. FFMQSF Total	–.527**	.485**	.484**	.526**	.251**	.523**	.571**	.670**	.564**	.358**	.600**

* $p < .05$. ** $p < .01$. *** $p < .001$.

Intervention Effects

Two (Time: Pre-/Post-) x three (Group: Online MBI/Online Self-help MBI/Control) mixed-design ANOVAs were conducted separately for overall mindfulness, observing, describing, acting with awareness, non-judging of inner experience, and non-reactivity to inner experience, self-perceived stress, distress tolerance, distress appraisal, distress absorption, distress regulation, and overall distress tolerance. It was shown that the time by group interaction was found to be significant for overall mindfulness ($p < .001$), observing ($p = .001$), describing ($p = .037$), acting with awareness ($p = .028$), non-reactivity ($p = .001$), and self-perceived stress ($p = .021$). The interaction was marginally significant for distress appraisal ($p = .056$; Figure 3, both intervention groups showed an improvement trend, whereas the waitlist control group did not exhibit a positive change), but not for other outcomes ($ps > .05$). Further analysis showed that both intervention groups showed similar effects for all variables at post-test ($ps > .05$). Compared to pre-test, two intervention groups showed significant improvement at post-test in observing, describing, non-reactivity, and overall mindfulness. For acting with awareness and distress appraisal, the online intervention group showed significant increases whereas other groups did not. All three groups showed significant decreases in self-perceived stress and increases in non-judging from pre- to post-assessment (see Table 3 for details).

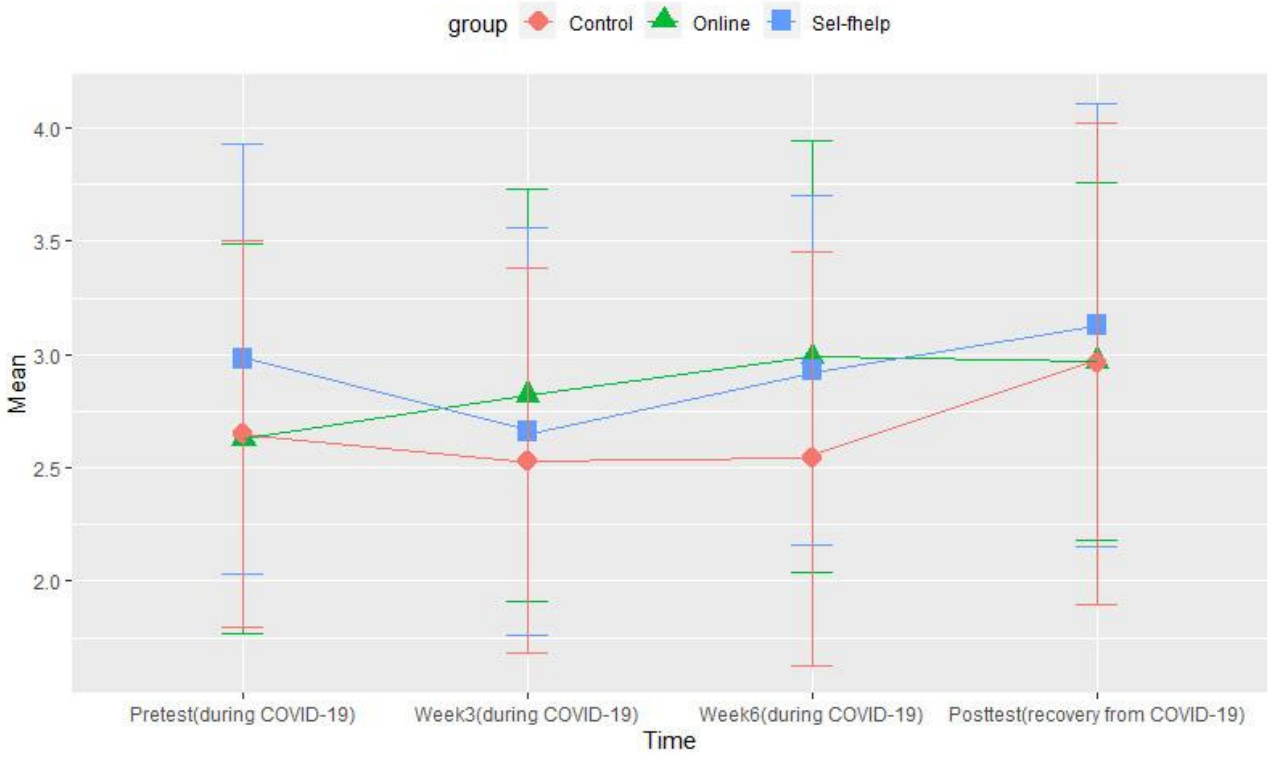

Figure 3. The Developmental trend of Distress Appraisal

Table 3. Baseline, week3, week6, post-intervention estimated means, standard deviations, ANOVA and effect sizes for outcome measures

	Pre			Week 3			Week 6			Post			Statistics	
Variable	Online MBI (*M*±*SD*)	Self-help MBI (*M*±*SD*)	Control (*M*±*SD*)	Online MBI (*M*±*SD*)	Self-help MBI (*M*±*SD*)	Control (*M*±*SD*)	Online MBI (*M*±*SD*)	Self-help MBI (*M*±*SD*)	Control (*M*±*SD*)	Online MBI (*M*±*SD*)	Self-help MBI (*M*±*SD*)	Control (*M*±*SD*)	Pre to Post within group (effect of time)	Pre to post between group (time by group interaction)
FFMQSF_Total	56.01± 6.92	58.84± 8.55	58.32± 9.08	59.68± 8.74	59.90± 7.73	58.68± 7.74	63.13± 7.97	63.38± 7.60	59.09±8 .41	65.09± 6.97	66.31± 7.13	59.02±7 .38	$F_{(1, 126)}$ = 82.83***, η_p^2 = .40	$F_{(2, 126)}$ = 16.53***, η_p^2 = .21
FFMQSF_Observing	11.01± 2.64	12.12± 3.05	12.58± 3.21	12.25± 2.59	12.34± 2.74	12.24± 3.31	13.00± 2.55	13.45± 2.99	12.39±2 .93	12.93± 2.63	13.88± 3.21	12.56±3 .01	$F_{(1, 126)}$ = 28.23***, η_p^2 = .18	$F_{(2, 126)}$ = 7.36***, η_p^2 = .11
FFMQSF_Describing	11.76± 2.80	12.04± 3.06	12.28± 3.17	11.95± 2.94	12.51± 2.43	12.38± 2.73	12.45± 2.59	13.02± 2.39	12.36±2 .62	12.79± 2.70	13.16± 2.39	12.00±2 .86	$F_{(1, 126)}$ = 6.39*, η_p^2 = .05	$F_{(2, 126)}$ = 3.40*, η_p^2 = .05
FFMQSF_Acting with awareness	11.30± 3.06	11.97± 2.97	11.20± 3.89	11.96± 2.71	11.74± 3.20	11.14± 3.24	12.67± 2.70	11.35± 3.04	11.02±3 .45	13.09± 2.72	12.72± 2.48	11.05±3 .49	$F_{(1, 126)}$ = 7.47**, η_p^2 = .06	$F_{(2, 126)}$ = 3.69*, η_p^2 = .06
FFMQSF_Non-Judging	12.12± 2.22	12.90± 2.64	11.74± 3.02	13.16± 2.51	12.65± 3.14	12.18± 2.60	13.10± 2.93	13.24± 2.98	12.12±2 .83	14.14± 2.23	14.33± 2.60	12.71±2 .51	$F_{(1, 126)}$ = 36.82***, η_p^2 = .23	$F_{(2, 126)}$ = 1.57, η_p^2 = .02
FFMQSF_Non-reactivity	9.97± 2.35	9.90± 2.57	10.40± 3.13	10.60± 2.29	10.88± 2.24	11.07± 2.35	11.79± 2.10	12.32± 2.09	11.22±2 .60	11.93± 2.18	12.29± 2.00	10.54±2 .22	$F_{(1, 126)}$ = 33.80***, η_p^2 = .21	$F_{(2, 126)}$ = 7.12**, η_p^2 = .10
CPSS Perceived Stress	33.00± 7.27	33.28± 8.19	32.77± 7.44	29.59± 7.64	30.58± 8.29	32.12± 6.82	29.20± 8.17	27.93± 7.55	31.25±6 .95	26.61± 6.14	27.54± 7.27	30.29±7 .03	$F_{(1, 126)}$ = 64.26***, η_p^2 = .34	$F_{(2, 126)}$ = 3.96*, η_p^2 = .06
Distress Tolerance	2.76± 0.88	2.91± 0.89	2.63± 0.95	2.90± 0.91	2.85± 0.9	2.77± 0.85	3.15± 0.88	3.17± 0.93	2.75± 1.06	3.24± 0.88	3.32± 0.89	3.03± 1.1	$F_{(1, 126)}$ = 21.85***, η_p^2 = .15	$F_{(2, 126)}$ = .07, η_p^2 = .00
Distress Absorption	2.93± 0.88	3.04± 0.79	2.94± 0.9	3.04± 0.8	3.09± 0.7	2.80± 0.73	3.16± 0.75	3.22± 0.7	2.81± 0.92	3.51± 0.71	3.25± 0.72	3.10± 0.89	$F_{(1, 126)}$ = 10.32**, η_p^2 = .08	$F_{(2, 126)}$ = .51, η_p^2 = .01

	Pre			Week 3			Week 6			Post			Statistics	
Variable	Online MBI (*M*±*SD*)	Self-help MBI (*M*±*SD*)	Control (*M*±*SD*)	Online MBI (*M*±*SD*)	Self-help MBI (*M*±*SD*)	Control (*M*±*SD*)	Online MBI (*M*±*SD*)	Self-help MBI (*M*±*SD*)	Control (*M*±*SD*)	Online MBI (*M*±*SD*)	Self-help MBI (*M*±*SD*)	Control (*M*±*SD*)	Pre to Post within group (effect of time)	Pre to post between group (time by group interaction)
Distress Appraisal	2.63± 0.86	2.98± 0.95	2.65± 0.85	2.82± 0.91	2.66± 0.9	2.53± 0.85	2.99± 0.95	2.93± 0.77	2.54± 0.91	2.97± 0.79	3.13± 0.98	2.96± 1.06	$F_{(1, 126)} = 16.63$***, $\eta_p^2 = .12$	$F_{(2, 126)} =$ .2.95, $\eta_p^2 =$ .05
Distress Regulation	2.91± 0.73	3.09± 0.81	2.99± 0.72	3.01± 0.58	2.94± 0.78	2.80± 0.67	3.07± 0.65	2.91± 0.69	2.89± 0.69	3.15± 0.64	3.04± 0.72	3.14± 0.77	$F_{(1, 126)} = 2.32$*, $\eta_p^2 = .02$	$F_{(2, 126)} = 1.17$, $\eta_p^2 = .02$
Overall Distress Tolerance	2.81± 0.71	3.00± 0.74	2.80± 0.71	2.94± 0.69	2.88± 0.67	2.72± 0.58	3.09± 0.62	3.06± 0.61	2.75± 0.75	3.18± 0.66	3.13± 0.72	3.16± 0.72	$F_{(1, 126)} = 9.53$**, $\eta_p^2 = .07$	$F_{(2, 126)} = .74$, $\eta_p^2 = .01$

* $p < .05$. ** $p < .01$. *** $p < .001$.

Changes Throughout the Intervention

Growth over pre-week 3, growth over pre-week 6, and growth over pre-post were examined for investigating changes induced by mindfulness training. For pre-week 3, we regressed changes between week 3 and the pre-test on the factor intervention (dummy codes representing conditions: 1 = with mindfulness, 0 = without mindfulness). For pre-week 6 and pre-post, we regressed the latent variable slope from the LGCM on the factor intervention.

For pre-week 3, general linear models showed that the factor intervention significantly predicted the changes in observing and self-perceived stress (Table 4). For pre-week 6, the linear univariate LGCM fits the data well for all outcomes except self-perceived stress (Table 5). The factor intervention significantly predicted the rates of changes over time for observing, non-reactivity to inner experiences, overall mindfulness, self-perceived stress, and distress appraisal, but not for other outcomes (Table 4). For pre-post, fits measures indicated that the linear LGCM fits the data well for observing, describing, acting with awareness, distress tolerance, distress appraisal, and distress regulation (Table 5). The factor intervention significantly predicted the rates of change over time for observing, describing, acting with awareness, non-reactivity, overall mindfulness, and self-perceived stress, but not for other outcomes (Table 4).

Mechanism Exploration via Bivariate LGCMs

To further address the potential mechanism underlying MBI, we investigated the relationship between the rates of change in distress appraisal and mindfulness skills. Since univariate LGCMs showed that the factor intervention could predict the slopes of distress appraisal during the first six weeks, we separately conducted bivariate LGCMs for each pair on two subgroups: participants who did and did not receive the mindfulness intervention.

For those who have received the intervention, results of model fit measures indicated that only models for the observing – distress appraisal pair and non-reactivity – distress appraisal pair fit the data well (Table 5). There were significant correlations between the slope of non-reactivity and the slope of distress appraisal (r = .828, p = .012, power = .050), the slope of non-reactivity and self-perceived stress (r = –.588, p = .001, power = .678), the slope of overall mindfulness and distress appraisal (r = 1.260, p = .001, power = .769), the slope of overall mindfulness and self-perceived stress (r = –.762, p < .001, power = .898), and the slope of distress appraisal and self-perceived stress (r = –.607, p = .001, power = .802), whereas the correlation for observing – distress appraisal, observing – self-perceived stress was not significant (ps > .05, power = .222 and .796, respectively).

For those who did not receive the training, fit indices suggested a good or acceptable fit of all models except for the overall mindfulness – self-perceived stress pair (Table 5). Unlike participants who have been provided with MBI, the correlation between the slope of non-reactivity and distress appraisal (r = –.141, p = .526, power = .050) and that between the slope of non-reactivity and self-perceived stress (r = –.361, p = .213, power = .050) were not significant among those without MBI. Like participants who received MBI, there were significant correlations between the slope of overall mindfulness and distress appraisal (r = .729, p = .023, power = .059), the slope of overall mindfulness and self-perceived stress (r = –1.010, p = .002, power = .167), and the slope of distress appraisal and self-perceived stress (r = –.490, p = .031, power = .133), whereas the correlation for observing – distress appraisal, and observing – self-perceived stress was not significant (ps > .05, power = .106 and .050, respectively) among those who did not receive a mindfulness training.

Table 4. Changes in mindfulness skills, self-perceived stress, and distress tolerance throughout the MBI

Variable	Pre–Week 3			Pre–Week 3–Week 6			Pre–Week 3–Week 6–Post		
	β [95% CI]	*p*	Statistical power (by Δ slope)	β [95% CI]	*p*	Statistical power (by RMSEA)	β [95% CI]	*p*	Statistical power (by RMSEA)
Observing	0.193 [0.020, 0.365]	0.038	0.416	0.359 [0.159, 5.48]	<.001	0.050	0.694 [0.325, 5.651]	<.001	0.220
Describing	0.042 [–0.134, 0.217]	0.677	0.065	0.248 [–0.029, 3.714]	0.079	0.050	0.72 [0.3, 5.317]	0.001	0.050
Acting with awareness	0.05 [–0.126, 0.225]	0.567	0.077	0.112 [–0.115, 2.926]	0.334	0.050	0.291 [0.056, 4.39]	0.015	0.187
Non-Judging	-0.008 [–0.184, 0.167]	0.929	0.051	0.066 [–0.161, 2.53]	0.569	0.050	0.215 [–0.031, 3.671]	0.087	0.296
Non-reactivity	0.026 [–0.149, 0.202]	0.785	0.054	0.357 [0.134, 5.091]	0.002	0.050	0.591 [0.346, 6.682]	<.001	0.638
Overall mindfulness	0.135 [–0.039, 0.309]	0.111	0.914	0.443 [0.222, 5.88]	<.001	0.050	0.595 [0.396, 7.829]	<.001	0.412
CPSS Perceived Stress	–0.208 [–0.380, –0.036]	0.012	0.997	–0.197 [–0.016, –4.099]	0.032	0.765	–0.227 [–0.026, –4.178]	0.027	0.433
Distress Tolerance	–0.056 [–0.232, 0.119]	0.521	0.053	0.17 [–0.145, 3.018]	0.29	0.068	0.084 [–0.17, 2.608]	0.517	0.050
Distress Appraisal	0.136 [–0.038, 0.310]	0.142	0.063	1.024 [0.026, 3.971]	0.044	0.050	0.217 [–0.107, 3.274]	0.189	0.066

Variable	Pre–Week 3			Pre–Week 3–Week 6			Pre–Week 3–Week 6–Post		
	β [95% CI]	*p*	Statistical power (by Δ slope)	β [95% CI]	*p*	Statistical power (by RMSEA)	β [95% CI]	*p*	Statistical power (by RMSEA)
Distress Absorption	0.036 [–0.140, 0.211]	0.687	0.051	0.237 [–0.061, 3.519]	0.119	0.218	0.027 [–0.53, 2.055]	0.924	0.245
Distress Regulation	0.108 [–0.066, 0.283]	0.235	0.056	0.098 [–0.31, 2.431]	0.637	0.161	–0.1 [0.195, –2.624]	0.507	0.174
Overall Distress Tolerance	0.078 [–0.097, 0.253]	0.358	0.053	0.222 [–0.033, 3.669]	0.087	0.100	0.025 [-0.244, 2.142]	0.856	0.692

Note. RMSEA = root-mean-square error of approximation; CI = confidence interval.

Table 5. Model Fit Measures for Linear Latent Growth Curve Models.

Variable	Time points	χ^2	df	χ^2/df	RMSEA	CFI	TLI
FFMQSF Observing	Pre–Week3–Week6	.853	2	.427	<.001	1.000	1.021
FFMQSF Observing	Pre–Week3–Week6–Post	12.564	7	1.795	.078	.981	.973
FFMQSF Describing	Pre–Week3–Week6	.044	2	.022	<.001	1.000	1.043
FFMQSF Describing	Pre–Week3–Week6–Post	4.270	7	.610	<.001	1.000	1.015
FFMQSF Acting with awareness	Pre–Week3–Week6	.099	2	.050	<.001	1.000	1.033
FFMQSF Acting with awareness	Pre–Week3–Week6–Post	11.543	7	1.649	.071	.983	.976
FFMQSF Non-Judging	Pre–Week3–Week6	1.091	2	.546	<.001	1.000	1.028
FFMQSF Non-Judging	Pre–Week3–Week6–Post	14.677	7	2.097	.092	.956	.937
FFMQSF Non-reactivity	Pre–Week3–Week6	1.606	2	.803	<.001	1.000	1.011
FFMQSF Non-reactivity	Pre–Week3–Week6–Post	25.261	7	3.609	.142	.888	.840
FFMQSF Total	Pre–Week3–Week6	.007	2	.004	<.001	1.000	1.034
FFMQSF Total	Pre–Week3–Week6–Post	17.872	7	2.553	.110	.967	.953
CPSS Perceived Stress	Pre–Week3–Week6	7.548	2	3.774	.147	.975	.924·
CPSS Perceived Stress	Pre–Week3–Week6–Post	18.632	7	2.662	.113	.968	.954
Distress Tolerance	Pre–Week3–Week6	2.172	2	1.086	.026	.998	.995
Distress Tolerance	Pre–Week3–Week6–Post	5.326	7	.761	<.001	1.000	1.016
Distress Appraisal	Pre–Week3–Week6	.827	2	.414	<.001	1.000	1.041
Distress Appraisal	Pre–Week3–Week6–Post	7.594	7	1.085	.026	.996	.994
Distress Absorption	Pre–Week3–Week6	3.354	2	1.677	.072	.986	.958
Distress Absorption	Pre–Week3–Week6–Post	13.220	7	1.889	.083	.957	.939
Distress Regulation	Pre–Week3–Week6	2.915	2	1.458	.060	.985	.954
Distress Regulation	Pre–Week3–Week6–Post	11.154	7	1.593	.068	.953	.933
Overall Distress Tolerance	Pre–Week3–Week6	2.450	2	1.225	.042	.997	.991
Overall Distress Tolerance	Pre–Week3–Week6–Post	27.413	7	3.916	.150	.857	.796

	Subgroups	χ^2	df	χ^2/df	RMSEA	CFI	TLI
FFMQSF Observing - Distress Appraisal	With mindfulness	10.319	7	1.474	.074	.980	.957
FFMQSF Observing - Distress Appraisal	Without mindfulness	8.316	7	1.188	.066	.985	.968
FFMQSF Non-reactivity - Distress Appraisal	With mindfulness	2.913	7	.416	<.001	1.000	1.061
FFMQSF Non-reactivity - Distress Appraisal	Without mindfulness	3.976	7	.568	<.001	1.000	1.102
FFMQSF Total - Distress Appraisal	With mindfulness	19.440	7	2.777	.144	.937	.866

	Subgroups	χ^2	df	χ^2/df	RMSEA	CFI	TLI
FFMQSF Total - Distress Appraisal	Without mindfulness	7.251	7	1.036	.029	.998	.996
FFMQSF Observing - CPSS Perceived Stress	With mindfulness	20.123	7	2.875	.148	.951	.894
FFMQSF Observing - CPSS Perceived Stress	Without mindfulness	4.451	7	.636	<.001	1.000	1.044
FFMQSF Non-reactivity - CPSS Perceived Stress	With mindfulness	17.481	7	2.497	.132	.960	.915
FFMQSF Non-reactivity - CPSS Perceived Stress	Without mindfulness	2.309	7	.330	<.001	1.000	1.087
FFMQSF Total - CPSS Perceived Stress	With mindfulness	23.764	7	3.395	.167	.941	.874
FFMQSF Total - CPSS Perceived Stress	Without mindfulness	9.414	7	1.345	.090	.988	.973
Distress Appraisal - CPSS Perceived Stress	With mindfulness	20.409	7	2.916	.149	.943	.877
Distress Appraisal - CPSS Perceived Stress	Without mindfulness	8.812	7	1.259	.078	.987	.972

Note. RMSEA = root-mean-square error of approximation; CFI = comparative fit index; TLI = Tucker-Lewis index.

Mechanism Exploration via Mediation Models

Mediation models were initially planned to be performed by separately regressing post-test measures on the factor intervention (1/0) and entering week 3 and week 6 measures as potential mediators (Table 5). Variables that were demonstrated to be significantly predicted by the intervention in the univariate LGCMs would have been considered potential mediators. Accordingly, we could not conduct serial mediation analyses because none of the latent variable slopes for distress tolerance-relevant outcomes could be predicted by the factor intervention in the four-time-points univariate LGCMs.

We explored the relationship between mindfulness skills and distress tolerance by performing another set of simple mediation analyses based on the pre-test, week 3, and week 6 measures, consistent with the time points involved in the bivariate LGCMs. In total, fourteen mediation models were constructed for exploring all possible paths during the first six weeks of the intervention (Table 6). Results showed that the mediating effect of distress appraisal on the relationship between receiving or not mindfulness intervention and non-reactivity to inner experiences was significant (effect = .269, 95%CI [.024, .702]) and that on the relationship between receiving or not receiving mindfulness intervention and self-perceived stress was significant (effect = –.871, 95% CI [–1.701, –.197]). The ratio of indirect to total effect was 32.22% and 32.42%, respectively. Results of other mediation models showed that the indirect effects of corresponding potential mediators were not significant. Thus, the impact of MBI on non-reactivity to inner

experiences and self-perceived stress could be explained through distress appraisal (Figure 4).

We also explored whether sex could moderate the uncovered mediation effects. For the mediator variable model, the outcome variable was distress appraisal at week 3, the predictive variable was the factor intervention (1/0), and the moderator variable was sex (1/0, 1 = female, 0 = male). The effect of sex on distress appraisal was not significant (effect = .241, p = .391), neither was the interaction term (effect = –.404, p = .391). For the dependent variable models, the outcome variable was self-perceived stress at week 6 or non-reactivity at week 6; the mediator variable was distress appraisal at week 3; the predictive variable was the factor intervention (1/0), and the moderator variable was sex (1/0). Results indicated that the effect of sex on self-perceived stress at week 6 (effect = 3.639, p = .588) or non-reactivity at week 6 (effect = 1.069, p = .607) was not significant. Sex did not significantly moderate the mediation effects of distress appraisal on self-perceived stress at week 6 (intervention x sex: effect = 3.261, p = .355; sex x distress appraisal: effect = –3.208, p = .170) or non-reactivity at week 6 (intervention x sex: effect = .576, p = .597; sex x distress appraisal: effect = –.416, p = .564).

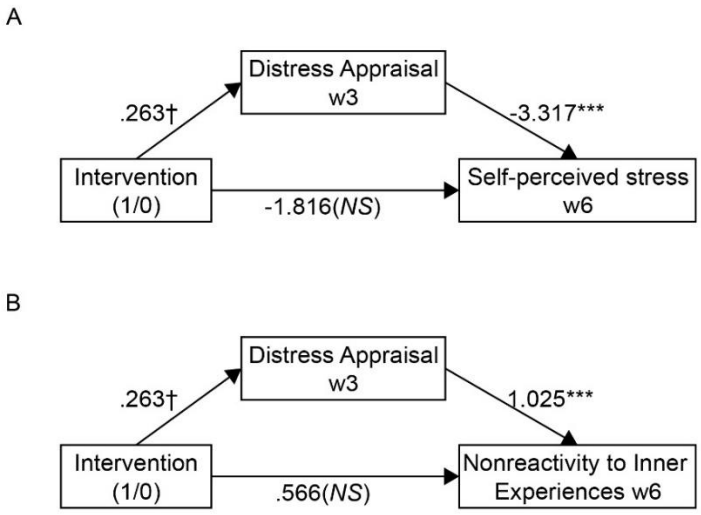

Figure 4. Mechanisms unveiled through mediation analyses. *Note.* Panel A, week 3 distress appraisal mediated the effect of the mindfulness intervention on week 6 self-perceived stress. Panel B, week 3 distress appraisal mediated the effect of the mindfulness intervention on week 6 non-reactivity to inner experiences**.**

†p < .10, * p < .05. ** p < .01. *** p < .001.

Table 6. Results of mediation analyses.

Model	Path	Indirect effect	Direct effect	Proportion of mediation (%)	Statistical power (by Indirect Effect)
Model 1	group-w3DTappraisal-w6OBS	.153 [–.045, .463]	.683 [–.340, 1.895]	18.30	0.856
Model 2	group-w3DTappraisal-w6NR	.269 [.024, .702]	.566 [–.227, 1.604]	32.22	0.842
Model 3	group-w3DTappraisal-w6TOTAL	1.207 [–.019, 3.149]	2.955 [.132, 5.725]	29.00	0.852
Model 4	group -w3OBS-w6DTappraisal	.002 [–.069, .068]	.373 [.073, .614]	.53	0.016
Model 5	group -w3NR -w6DTappraisal	–.031 [–.115, .030]	.406 [.077, .737]	-8.27	0.198
Model 6	group -w3TOTAL-w6DTappraisal	.044 [-.061, .160]	.331 [.061, .551]	11.73	0.092
Model 7	group -w3OBS-w6CPSS	–.025 [–.704, .491]	–2.662 [–5.108, –.368]	.93	0.086
Model 8	group -w3NR - w6CPSS	.375 [–.349, 1.173]	–3.062 [–5.800, –.711]	-13.96	0.952
Model 9	group -w3TOTAL-w6CPSS	–.495 [–1.543, .782]	–2.193 [–4.157, .318]	18.42	1.000
Model 10	group- w3CPSS -w6OBS	.205 [–.017, .549]	.631 [–.259, 1.601]	24.52	0.242
Model 11	group- w3CPSS -w6NR	.253 [–.003, .591]	.583 [–.118, 1.248]	3.30	0.294
Model 12	group- w3CPSS -w6TOTAL	1.108 [–.400, 2.421]	3.054 [.936, 5.101]	26.62	1.000
Model 13	group-w3DTappraisal-w6CPSS	–.871 [–1.701, –.197]	–1.816 [–4.049, .266]	32.42	0.852
Model 14	group -w3CPSS-w6DTappraisal	.098 [–.028, .214]	.277 [.032, .557]	26.13	0.078

Post hoc Power Analysis

For all growth curve models, power analyses were performed to compare each of the hypothesized models against the corresponding saturated model. The probability to identify the actual effect with our present sample size was illustrated in Table 4. For all simple mediation models, the statistical powers were displayed in Table 6.

Discussion

The current study explored the role of distress tolerance in an 8-week MBI among individuals with high emotional distress. Firstly, cross-sectional correlations showed that all facets of distress tolerance are negatively correlated to self-perceived stress and positively correlated to most facets of mindfulness skills. Secondly, our findings showed that the MBI program significantly reduced participants' self-perceived stress, and meanwhile, improved their mindfulness skills. The MBI also

showed a beneficial effect on cultivating one's ability to accept distress, i.e., distress appraisal. Thirdly, results of growth trajectories indicated that whether participants received or not mindfulness training did not predict the growth rate of distress tolerance throughout the whole intervention. However, univariate LGCMs showed that during the first six weeks of the intervention, being involved or not in an MBI significantly predicted the growth rate on distress appraisal, as well as observing, non-reactivity to inner experiences, overall mindfulness, and self-perceived stress. More specifically, for those who received MBI, an increase in distress appraisal is significantly positively associated with an increase in non-reactivity. This association was not observed among those who did not receive an MBI. Among these individuals, the growth rate of distress appraisal was found to be positively related to that of overall mindfulness and negatively associated with a decrease in self-perceived stress during the epidemic. Fourthly, mediation analyses further proved that, during the first six weeks of the intervention, the effect of MBI on self-perceived stress was fully mediated via distress appraisal. Distress appraisal significantly fully mediated MBI's effect on non-reactivity as well. Finally, these mediating effects did not differ by sex.

Cross-sectionally, bivariate correlations revealed that describing, acting with awareness, non-judging to the inner experiences, and non-reactivity were positively correlated to the overall distress tolerance. The observing skill was found to be not significantly correlated with any of the facets of distress tolerance. Our results and findings are consistent with previous literature, where distress tolerance and mindfulness skills (except for the observing) were found to be interrelated with each other among healthy individuals, people with behaviors of problematic smoking, alcohol and other drug use, smartphone use, or gambling, clinically elevated levels of health anxiety, and symptoms of substance use disorder or obsessive-compulsive disorder (Arnaudova & Amaro, 2020; Bravo, Boothe, & Pearson, 2016; Brem et al., 2019; Cano et al., 2020; de Lisle et al., 2014; Elhai, Levine, O'Brien, & Armour, 2018; Hsu, Collins, & Marlatt, 2013; Kim, Li, Broyles, Musoka, & Correa-Fernandez, 2021; Leeuwerik, Cavanagh, & Strauss, 2020; Luberto et al., 2014; Luberto & McLeish, 2018; Nila, Holt, Ditzen, & Aguilar-Raab, 2016; O'Bryan, Luberto, Kraemer, & McLeish, 2018; Pearson, Lawless, Brown, & Bravo, 2015; Vujanovic, Bonn-Miller, Bernstein, McKee, & Zvolensky, 2010).

Throughout the first six weeks of the intervention, our results showed that, compared to participants who did not receive any intervention, those who had received mindfulness training experienced significantly greater increases in observing, non-reactivity, overall mindfulness, and distress appraisal, as well as a larger reduction in self-perceived stress than those who did not. However, across the whole intervention, the growth rate of distress tolerance could not be predicted by the factor intervention as we expected. We considered two possible leading causes. Firstly, a national epidemic-relevant policy was published at post-test (i.e., people were able to return to work instead of being isolated at home), so the environmental

factors might have had a larger effect on post-test measures than the intervention per se (Wang et al., 2022). Secondly, the level of a certain mechanism variable might show a fluctuation during the intervention. For instance, negative cognitive bias has long been associated with the maintenance of depressive symptoms (Drozd, Rychlik, Fijalkowska, & Rygula, 2018). Interventions targeting reducing negative bias might evoke changes in the cognitive processing system, manifesting as a change in negatively biased processing as well as an elevated flexibility of cognitive processing (Steinman et al., 2020). A higher level of flexibility might, however, retrospectively promote the negatively biased processing because it is appropriate to certain situations (Parsons, Kruijt, & Fox, 2016). No previous study has investigated the developmental trajectories of distress tolerance during the MBI. Further studies were warranted to investigate the role of distress tolerance displayed throughout different periods across the MBI.

Furthermore, results of bivariate LGCMs found a significant correlation between the increase in non-reactivity and the increase in distress appraisal only in individuals receiving mindfulness training. It suggested that MBI has a specific impact on the relation between non-reactivity and distress appraisal throughout the first six weeks of the intervention. It is plausible that, during the intervention, individuals with high emotional distress gradually learned to feel less ashamed or unaccepting of their own aversive emotional experiences. At the same time, they learned to not have to react immediately to unwanted experiences and became capable of not using their habitual maladaptive emotion regulation strategies (Barlow et al., 2010). The strong associations also suggested the potential existence of a causal relationship between these two learning processes throughout the intervention.

Simple mediation analyses further examined the potential causal relationships throughout the first six weeks of the MBI. Our findings revealed two paths: Distress appraisal explained how and why MBI works to (a) reduce one's level of self-perceived stress and (b) enhance one's ability of non-reactivity to inner experiences. In addition, moderated mediation analyses indicated that sex did not significantly moderate these two paths. The current findings provided empirical evidence for supporting the transdiagnostic pathology theories where cognitive reappraisal and maladaptive emotion-driven/avoidance behaviors were considered as three core elements for multiple emotional disorders (Campbell-Sills & Barlow, 2007). The first path we found indicated that participants learned to reappraise the aversive emotions as acceptable, which directly led to relief from stress in the first 6 weeks of the intervention. The second path indicated that individuals with high emotional distress first gradually learned to change their appraisal of unwanted emotional experiences and refrain from the secondary emotions triggered by the primary emotions (Linehan, 2014). As a result, they developed the ability to pause between the perception of an emotional reaction and the subsequent regulatory tendencies or overt behaviors. We might infer that this elevated ability to let go could

further contribute to stress reduction in a longer term (Creswell & Lindsay, 2014). Future studies were warranted to investigate whether the present causal chains could be established in different clinical conditions.

Several limitations need to be considered when interpreting the current findings. Participants were recruited from the WeChat public page of the mindfulness lab. They showed more interest in participating in MBI, which might impact the generalizability of our findings. The sample size was relatively small, which led to limited statistical power in certain models. A further examination of a larger population is needed. Secondly, an epidemic-relevant covariate might contribute to interpreting some unexpected results of the current study. For instance, the control group showed a significant reduction in self-perceived stress and increases in non-judging, distress tolerance, and distress absorption from baseline to post-test. Similarly, bivariate latent growth curve models conducted on people who did not receive the mindfulness intervention revealed a temporal synergistic relationship between distress appraisal and overall mindfulness, as well as an antagonistic relationship between distress appraisal and self-perceived stress. Although we were unable to pre-include epidemic-relevant factors, further investigations might consider adding environmental factors as covariates for causal interference in an intervention setting (Allen, Evans, & Wyka, 2021). Thirdly, in the current study, we found significant mediating effects of distress appraisal. The measure items were suggested by some researchers to reflect a more general self-criticism (Leeuwerik et al., 2020). Objective measures or disaggregation of this construct would be desired in future studies to clarify the mechanism of change underlying MBI (H. C. Kraemer, Stice, Kazdin, Offord, & Kupfer, 2001).

Conclusions

The current study revealed the role of distress appraisal (i.e., one facet of an individual's ability to withstand negative emotions) as a core mechanism variable in an 8-week MBI among individuals at high risk of developing multiple emotional disorders. Our findings provide empirical evidence for two paths: Distress appraisal cultivated in MBI could (a) directly lead to a reduction in self-perceived stress in the first six weeks of the intervention, or (b) result in elevation of non-reactivity to inner experiences, which might contribute to more beneficial interventional effects in the long term. Future clinical practitioners could emphasize the content relevant to the attitude people hold towards unwanted experiences or encourage individuals to face unpleasant feelings to improve the effectiveness and efficiency of MBI in today's fast-paced modern society.

Authors' note

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PROCRASTINATION AMONG ADULTS: THE ROLE OF SELF-DOUBT, FEAR OF THE NEGATIVE EVALUATION, AND IRRATIONAL/RATIONAL BELIEFS

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Abstract

Procrastination is often associated with negative outcomes such as poor performance and well-being. Theoretical models suggest that individuals with an uncertain self-concept may be more prone to procrastination due to their fear of failing to meet the required standard. To investigate this issue from a cognitive perspective, a cross-sectional study was conducted to examine the relationships among self-doubt, fear of negative evaluation, procrastination, and rational/irrational beliefs. The study involved 344 highly educated adults (65.4% female, *M*= 37.51 years, *SD* = 8.53, range 21-63). Participants completed a questionnaire booklet that included several measures, including the Self-doubt Scale, the Procrastination Scale, the Fear of Negative Evaluation Scale, and the Irrational/Rational Beliefs Scale. The findings from the mediation analysis indicate that the influence of self-doubt on procrastination is partially mediated by fear of negative evaluation. Furthermore, the indirect effect of self-doubt on procrastination through the mediation of fear of negative evaluation is contingent upon the level of irrational beliefs. These results suggest that irrational beliefs may exacerbate the detrimental impact of self-doubt on procrastination by amplifying the role of fear of negative evaluation. Furthermore, the strength of the direct effect of self-doubt on procrastination depends on the level of rational belief, indicating that rational belief may serve as a protective variable in the relationship between self-doubt and procrastination. The present findings underline interventions to strengthen individuals' rational beliefs and modify their irrational beliefs, which can play a fundamental role in overcoming procrastination in the adult population.

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Procrastination has attracted attention as a research topic in many fields due to its negative effect on the psychological health and performance of the individual. Procrastination, which includes actions and behaviors that negatively affect productivity, can be seen frequently in the normal and student population. For example, Harriott and Ferrari (1996) reported that 15-20% of adults feel uncomfortable because of their procrastination. Hen and Goroshit (2018), on the other hand, found that 25% of respondents (their age ranged from 26 to 70) reported high procrastination in four or more life domains and 40% in one to three life domains. Previous studies have shown that procrastination is associated with stress (Sirois, 2007, 2014), maladaptive coping style, acute health problems, lack of health-supportive behaviors (Sirois, 2007, 2015), low overall health satisfaction (Codinaet al.,2020), time orientation (Ferrari & Díaz-Morales, 2007) as well as sleep disturbance, insomnia, depression, tension and fatigue (Hairston & Shpiltalni, 2016).

Although there have been numerous studies examining procrastination among university students (Steel, 2007), there is a relative dearth of research on this topic in adult populations. Steel's (2007) meta-analytic and theoretical review of procrastination aimed to provide a comprehensive overview of the literature on this behavior, focusing on identifying key factors associated with procrastination. The study analyzed over 691 studies, examining a wide range of variables, including personality traits, motivational factors, and cognitive and affective processes. While Steel (2007) did analyze the effect of age on procrastination at the group level, the results were not statistically significant, likely due to range restriction, as the sample had an average age of 21.8 with a standard deviation of 4.6, suggesting a homogeneity of age that may have hindered the detection of age-related differences in procrastination. Therefore, there is a pressing need for further research on procrastination in adult populations beyond the university context. Although some studies have investigated the prevalence and types of procrastination behaviors in adult samples (Díaz-Morales et al., 2006; Ferrari, O' Callaghan, & Newbegin, 2005; Ferrari et al., 2009; Przepiorka et al., 2019), as well as the activities commonly postponed (Hen & Goroshit, 2018) and certain demographic variables (Steel & Ferrari, 2013), the underlying factors contributing to procrastination behavior in adults require further investigation. Understanding these factors and the mechanisms involved can provide valuable insights into the nature of procrastination behavior and aid clinicians in helping adults who struggle with procrastination. Hence, this study aims to explore the cognitive and behavioral variables that may contribute to

procrastination in adults from a cognitive-behavioral perspective, building on previous research conducted on procrastination in university samples.

The initial explanations for the occurrence of procrastination were made by clinicians based on their clinical observations (Ferrari et al., 1995). For example, Burka and Yuen (2008) explained the occurrence of procrastination behavior by basing it on parents' faulty parenting practices. Children who grow up with faulty parenting practices struggle to gain the appreciation of others. Over time, this need for approval can become entrenched and easily turn into a fear of failure. However, based on their clinical observations, Burka and Yuen (2008) also explained the occurrence of procrastination based on self-concept. According to Burka and Yuen (2008), individuals with a high level of procrastination base their self-worth on experiences of success and failure. These individuals believe that their sense of worthiness is a reflection of their ability to complete a task successfully. When they fail at something, they do not only think they have failed at that work, they also see themselves as unsuccessful individuals. These people have a strong fear of being perceived as inadequate by others or feeling inadequate (Burka & Yuen, 2008). As a natural consequence of these and similar considerations, individuals who doubt their abilities and performance to accomplish a task experience an intense fear of failure. Herein, procrastination has a protective function for these individuals in order not to damage their belief that they are successful. Similarly, Ferrari et al. (1995) state that if a person has doubts about his or her ability to accomplish a task, this doubt may increase the likelihood of experiencing a fear of failure, which increases the risk of injury to the ego. Therefore, the individual may delay fulfilling the required duties and responsibilities to protect his/her self from being hurt.

A number of studies have been conducted to test the afore-mentioned explanations based on clinical observations that have shown that procrastination is positively associated with fear of failure (Haghbin et al., 2012; Onwuegbuzie & Collins, 2001; Özer et al., 2009; Schouwenburg, 1992; Solomon & Rothblum, 1984; Steel, 2007) and negatively correlated with self-worth (Dinnel et al., 2002; Feick & Rhodewalt, 1997; Ferrari, 2000; Ferrari & Diaz-Morales, 2007; Pychyl et al., 2002). For example, Feick and Rhodewalt (1997) stated that individuals who avoided facing an unsuccessful situation by exhibiting procrastination behavior in situations where there was a possibility of failure had higher self-esteem than those who did not use any self-handicapping strategy. In another study, Duru and Balkis (2014) reported that the undergraduates who had self-doubt postponed their academic duties and responsibilities. Finally, Balkis and Duru (2019) found that the relationship between self-doubt and procrastination was partially mediated by fear of failure.

In sum, existing research and theoretical explanations agree that self-evaluation and fear of failure play a critical role in the occurrence of procrastination. However, previous studies examined the direct predictive power of self-evaluation and fear of failure on procrastination separately, and the functioning of these two

variables in procrastination was not sufficiently tested together. To the best knowledge of the researchers, there is only one study in the existing literature investigating the association between procrastination, self-doubt and fear of failure, and this study was conducted only on university students (Balkis & Duru, 2019). Therefore, it remains unclear whether the theoretical explanations for the formation and functioning of procrastination also apply to the adult sample. Another important point to be clarified is the relationship between procrastination and the main source of the fear of failure. In the current literature, some authors have emphasized that the fear of failure is fed by the fear of negative evaluation (Burkan and Yuen, 2008; Saddler and Buley, 1999; Steel, 2007). For example, Burka and Yuen (2008) state that procrastination stems from the fear of being judged based on one's performance. Similar to this explanation, Saddler and Buley (1999) argue that negative evaluation anxieties form the basis of fear of failure. In the light of these explanations, one might expect that the fear of negative evaluation plays a role in the relationship between self-doubt and procrastination. Indeed, previous studies have suggested that procrastination is associated with the fear of negative evaluation (Bui, 2007; Steel, 2007). In order to clarify this uncertainty, the association of procrastination with self-doubt and the fear of negative evaluation will be tested in an adult sample in this study.

Rational Emotional Behavior Therapy (REBT) and Procrastination

According to REBT, people are born with the potential for rational and irrational beliefs. Rational beliefs include ways of thinking that help achieve the goals chosen for happiness and sustaining life while irrational beliefs include thoughts that interfere with achieving goals and confusing work. REBT assumes that our beliefs mediate the relationship between the events we experience and our emotions and behaviors (Davit et al., 2010). It also conceptualizes irrational beliefs as a cognitive fragility factor and rational beliefs as a resilience factor. Addressing procrastination in the REBT perspective, Ellis and Knaus (1977) stated that irrational beliefs played a key role in the occurrence of procrastination. They stated that self-downing, low frustration tolerance, and hostility beliefs played an important part in the occurrence of procrastination. They also reported that the absolute demandingness of individuals with procrastination to do everything well prevented them from doing their duties or responsibilities on time. In this vein, REBT proposes that the core irrational belief that drives procrastination is the belief that "I must do well" to prove that "I am a worthwhile person" (Beswick et al., 1988, p. 208).

Regarding the function of procrastination, Ellis and Knaus (1977) state that procrastination has a defensive behavior. As a defensive behavior, procrastination reflects the fear of failure and serves as a protective function so that the individual does not face the fear. In this context, Rorer (1983) states that the irrational belief leading to procrastination is that "you must do well, and that if you don't, you're no

good, it is better to procrastinate than to risk the possibility of finding out that you are worthless" (p. 1). Also, there are a great number of studies attempted to investigate the association between procrastination and irrational beliefs (Balkis & Duru 2018, 2019; Beswick et al. 1988; Bridges & Roig 1997; Ferrari & Emmons 1994; Harrington 2005; Steel 2007). The common finding of these studies is that procrastination is positively related to irrational beliefs. For example, Balkis and Duru (2019) examined the relationship between self-doubt, rational and irrational beliefs, fear of failure, and procrastination among Turkish undergraduate students. The findings indicate that that irrational beliefs moderated the indirect predictive power of self-doubt on procrastination via fear of failure.

In the existing literature, many studies have examined the relationship between procrastination and irrational beliefs in the literature, the relationship between rational beliefs and procrastination has not been adequately addressed. In addition, REBT conceptualizes rational beliefs as a cognitive resilience factor (David et al., 2010). Previous findings, in the college sample, have shown that rational beliefs play a moderating role in the relationship between procrastination and academic satisfaction (Balkis, 2015), self-downing (Balkis & Duru, 2018), and fear of failure (Balkis & Duru, 2019). However, whether rational beliefs play a similar role in the adult population remains unclear. Therefore, clarification of this ambiguity may contribute to the theoretical explanations of REBT procrastination and, at the same time, provide clinicians with important data in the process of helping adults suffering from procrastination.

Current Study

This study aims to achieve two main objectives. Firstly, we will examine the role of fear of negative evaluation in the relationship between self-doubt and procrastination. Therefore, our study aims to provide additional evidence for the theoretical explanations of Burka and Yuen (2008) and Ferrari et al. (1995), who argue that individuals who doubt their abilities and performance in completing a task experience intense fear of failure, which leads them to postpone required tasks and responsibilities. Previous studies in the existing literature have shown that procrastination is associated with fear of failure (Haghbin et al., 2012; Özer et al., 2009; Steel, 2007) and self-doubt (Duru & Balkis, 2014; Balkis & Duru, 2018, 2019). However, Balkis and Duru (2019) reported that fear of failure plays a partial mediating role in the association between self-doubt and procrastination in university samples. Although Burka and Yuen (2008) and Ferrari et al. (1995) emphasized the role of fear of failure in the association between both variables, Saddler and Buley (1999) argued that negative evaluation anxieties formed the basis of fear of failure. Similarly, Steel (2007) explained that fear of failure was related to the anxiety of negative evaluation, while Burka and Yuen (2008) stated that procrastination stemmed from the fear of being judged on one's performance. Nevertheless, previous

findings in the literature indicated that procrastination was associated with the fear of negative evaluation (Çelik & Odacı, 2015; Bui, 2007; Sadler & Buley, 1999). Based on these theoretical explanations and research findings, our first hypothesis is that self-doubt is associated with fear of negative evaluation and, in turn, fear of negative evaluation is associated with procrastination.

Secondly, we aimed to examine whether the indirect predictive power of self-doubt on procrastination via the fear of negative evaluation varies based on the level of rational and irrational beliefs. Previous studies have shown that self-doubt and procrastination are positively associated with irrational beliefs (Ferrari & Emmons, 1994; Harrington, 2005; Steel, 2007) and negatively associated with rational beliefs (Balkis, 2015; Balkis & Duru, 2018, 2019, 2021). However, these findings have shown that the indirect predictive power of self-doubt on procrastination through fear of failure varies depending on the level of rational and irrational belief. Drawing on previous research, it is plausible to expect that both rational and irrational beliefs have a significant impact on the relationship between self-doubt, the fear of negative evaluation, and procrastination. Therefore, the second hypothesis of this study posits that the indirect effect of self-doubt on procrastination via the fear of negative evaluation will be more pronounced when irrational beliefs are high. Finally, the third hypothesis predicts that the indirect effect of self-doubt on procrastination via the fear of negative evaluation will be weaker in situations where rational beliefs are high..

Method

Participants

The current study consists of 344 adults. Among the participants, 119 were men (34.6 %), and 225 were women (65.4%). The mean age was 37.51 years (*SD* = 8.53, range 21-63); 73.9% were married, and 26.1 % were single. Regarding education level, 68.3 % of the participants had a bachelor's degree, 24.7 % had a master's degree, and 7% had a doctorate degree. We recruited these highly educated participants through professional forums. We posted research-related announcements in the professional forums (Accountants, dentists, engineers, physicians, social workers, and teachers) through personal contact. The participants interested in the study contacted the researchers via email and received a link to the survey. The survey contains the informed consent form, demographic information, Turkish version of the questionnaires used in the current study. We declared that participation in this study was completely voluntary and they could withdraw from the study at any time.

Instruments

A personal information form was prepared to determine the participants' personal information such as gender, age, marital status, and education level.

The levels of procrastination among participants were assessed using the Pure Procrastination Scale (PPS) developed by Steel (2010). The PPS consists of 12 items and is rated on a five-point Likert-type scale ranging from 1 (Disagree) to 5 (Agree). An example item from the scale is "Even tasks that only require sitting down and doing them tend to remain undone for days." The psychometric properties of the PPS have been examined previously for a Turkish sample by Balkis and Duru (2019), who reported a high level of internal consistency (α=.92). In the present study, the internal consistency coefficient for the self-doubt scale was α=.89.

The levels of self-doubt among participants were measured using the Self-Doubt subscale of the Subjective Overachievement Scale (Oleson et al., 2000) in the present study. This eight-item scale is rated on a six-point Likert-type scale, ranging from 1 (*Disagree very much*) to 6 (*Agree very much*). An example item is "I sometimes find myself wondering if I have the ability to succeed at important activities." Duru and Balkis (2014) evaluated the psychometric properties of the Self-Doubt scale for a Turkish sample, reporting an acceptable level of internal consistency with a Cronbach's alpha of 0.78. For the current sample, Cronbach's alpha coefficient for the self-doubt scale was α = .86.

The levels of irrational and rational beliefs among participants were measured using the Abbreviated Version of the Attitude and Belief Scale 2 (AV-ABS 2; Hyland et al., 2014). The AV-ABS 2 includes 24 items that assess both irrational and rational beliefs, measuring all four irrational belief processes (DEM, AWF, LFT, and GES) and four rational belief processes (PRE, N-AWF, HFT, and UA). Participants rated their agreement with each statement on a 5-point Likert-type scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Duru and Balkis (2021) tested the psychometric properties of the AV-ABS 2 for the Turkish sample and reported acceptable internal consistency coefficients for the total irrational beliefs scale (α = .84) and total rational beliefs scale (α = .85). For the current sample, the Cronbach's alpha coefficients for the full irrational beliefs scale were α = .82, and α = .83 for the full rational beliefs scale.

The levels of fear of negative evaluation among participants were assessed using the Brief Fear of Negative Evaluation Scale (BFNE; Leary, 1983). The BFNE consists of 12 items rated on a five-point Likert scale ranging from 1 (*Disagree*) to 5 (*Agree*). Çetin, Doğan, and Sapmaz (2010) evaluated the psychometric properties of the BFNE for Turkish samples and reported that confirmatory factor analyses confirmed a single factor structure of the BFNE with 11 items. A sample item is "When I am talking to someone, I worry about what they may be thinking about me."

Cronbach's alpha coefficients for the BFNE were α = .84, and the test-retest reliability coefficient for the BFNE was .82 (Çetin et al., 2010). In the present sample, Cronbach's alpha coefficient for the BFNE was α = .92.

Statistical Analyses

We analyzed data in four steps using SPSS 22.0 and Hayes's (2013) SPSS macro-PROCESS. In the first step, we conducted correlational analyses to test the link between self-doubt, fear of negative evaluation, irrational and rational beliefs, and procrastination. In the second step, we tested whether the fear of negative evaluation mediated the relations between self-doubt and procrastination by using Hayes's (2013) SPSS macro-PROCESS (Model 4). In the third and fourth steps, we tested whether the indirect predictive power of self-doubt on procrastination via fear of negative evaluation is dependent on a level of irrational (Model 7) and rational beliefs (Model 1) using Hayes's (2013) SPSS macro-PROCESS. Finally, we utilized a bootstrapped confidence interval (CI) to test whether the indirect effects of self-doubt on procrastination were significant via fear of negative evaluation at specific values of irrational and rational beliefs. We used R^2_{med} to assess mediating effect size (Fairchild et al., 2009). Finally, the variance inflation factor (VIF) and tolerance scores were examined to assess the independence of errors and multicollinearity (VIF scores <5 and tolerance scores > .20 = acceptable; Hair et al., 2010).

Results

Preliminary Analyses

A post hoc power analysis was conducted using G*Power 3 (Faul et al., 2007) to estimate statistical power. The results showed that with a sample size of 344, the study had a statistical power of .85, .99, and 1.0 for detecting small, medium, and large effect sizes, respectively.

Next, we conducted correlational analyses to test whether procrastination is related to self-doubt, fear of negative evaluation, and irrational and rational beliefs. The findings indicated that procrastination was positively correlated with self-doubt, fear of negative evaluation, and irrational beliefs while it was negatively associated with rational beliefs. Self-doubt was positively related to fear of negative evaluation and irrational beliefs whereas it was negatively correlated with rational beliefs. Also, the fear of negative evaluation was positively associated with irrational beliefs and negatively related to rational beliefs. Finally, correlational analyses demonstrated that irrational beliefs were adversely related to rational beliefs (Table-1).

Table 1. Descriptive statistics, collinearity statistics, and correlational analysis (N = 344)

	1	2	3	4	5
1-Procrastination	-	.62**	.43**	.25**	-.31**
2-Self-Doubt		-	.56**	.34**	-.27**
3-Fear of Negative Evaluation			-	.49**	-.33**
4-Irrational Beliefs				-	-.25**
5-Rational Beliefs					-
Mean	27.24	19.38	29.45	34.74	46.95
Standard Deviation	9.71	6.60	9.37	7.47	6.77
Skewness	.760	.444	.330	-.001	-.395
Kurtosis	.433	-.261	-.228	-.402	.136
Tolerance		.675	.569	.743	.872
VIF		1.481	1.759	1.345	1.147

**p<.001

Mediation Model

We utilized Hayes's (2013) SPSS macro-PROCESS (model 4, Table 2, Figure 1) to test the mediation role of the fear of negative evaluation in the relationship between self-doubt and procrastination. The findings of the mediation analyses indicated that (a) self-doubt directly predicted the fear of negative evaluation (B = .78, p<.001) and procrastination (B= .81, p<.001), (b) the fear of negative evaluation directly predicted procrastination (B = .13, p = .014), and self-doubt indirectly predicted procrastination (ab=.10, SE=.05, 95% confidence interval [CI]=.01, .20) via fear of negative evaluation. The point estimate of R^2_{med} was .18 (95%CI = .11, .25), suggesting that the value of R^2_{med} was larger than 18 % of the variance in procrastination, which was attributable to the indirect predictive effect of self-doubt through the fear of negative evaluation. The point estimate of R^2_{med} was considered as a medium effect size. Further, the 95% confidence interval of R^2_{med} revealed that at least 11 % of the variance of procrastination was attributable to self-doubt mediated via the fear of negative evaluation, and up to 25.4 % of the variance in procrastination was explained by the mediating effect. These findings briefly indicated that the fear of negative evaluation partly mediated the relationship between self-doubt and procrastination, with an effect size from medium to large.

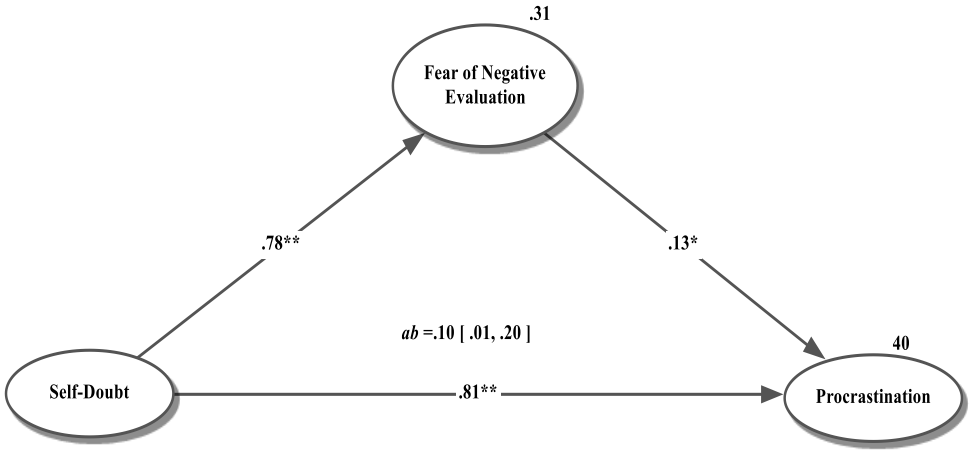

Figure 1. The mediating role of fear of negative evaluation

Table 2. Moderated mediation statistics (N = 344)

			Outcome: Fear of Negative Evaluation (Model 4)		
Predictor variables	*B*	*95 % CI*	*SE*	*t*	Model R^2
Self-Doubt	.78	[.66 - .91]	.06	11.02***	.31***
			Outcome: Procrastination		
Self-Doubt	.81	[.66 .95]	.07	10.99***	.40***
Fear of Negative Evaluation	.13	[.02 .23]	.05	2.46*	
			Outcome: Fear of Negative Evaluation (Model 7 and Model 8)		
Self-Doubt	.59	[.47 .72]	.06	9.35***	.42***
Irrational Beliefs	.43	[.32 .54]	.06	7.79***	
Self-Doubt x Irrational Beliefs	.02	[.001 .03]	.01	2.05*	
Self-Doubt	.71	[.58 .84]	.06	10.96***	.35**
Rational Beliefs	-.27	[- .39 -.14]	.06	-4.21***	
Self-Doubt x Rational Beliefs	001	[- .01 .02]	.01	.16^{ns}	
Conditional indirect effect analysis			*Outcome: Procrastination*		
Irrational Beliefs		*ab*	Boot *SE*	Boot*LLCI*	Boot*ULCI*
Low		.06	.03	.01	.13
Med		.08	.04	.01	.15
High		.09	.04	.01	.18

*^{ns}p> .05, *p<.05, ***p<.001*

Moderated Mediation Model

We performed moderated mediation analysis to test whether self-doubt had an indirect effect on procrastination via fear of negative evaluation and this indirect effect was subject to moderation of irrational and rational beliefs. We tested the moderation role of irrational beliefs using Hayes' (2013) PROCESS macro (Model 7) as a single instance of moderated mediation.

Initially, we tested the moderation role of irrational beliefs as a single instance of moderated mediation using Hayes's (2013) PROCESS macro (Model 7). The findings of the moderated mediation analyses demonstrated that self-doubt (*B* = .59, *p* < .001), irrational beliefs (*B* = .43, *p* < .001), and the interaction of self-doubt and irrational beliefs (*B* = .02, *p* = .041) predicted the fear of negative evaluation. Additionally, procrastination was predicted by self-doubt (*B*= .81, *p*<.001) and the fear of negative evaluation (*B* = .13, *p* = .014). Also, we tested whether the indirect predictive effect of self-doubt on procrastination through fear of negative evaluation depended on irrational beliefs using the bootstrap procedure (5000). The results indicated that the indirect predictive effect of self-doubt on procrastination via fear of negative evaluation was more powerful when the level of irrational beliefs was higher (*ab* =.09, *SE* = .04, 95%of *CI* = .01, .19) rather than medium (*ab* =.08, *SE* = .04, 95%of *CI* = .01, .15) or low (*ab* =.06, *SE* = .03, 95%of *CI* = .01, .13). These results support the claim that irrational beliefs play a vulnerability factor in the relationship between self-doubt and procrastination (Table-3).

Table 3. Moderation statistics (*N* =344)

		Outcome: Procrastination (Model 1)			
Self-Doubt	.83	[.70 .95]	.06	13.09***	.42***
Rational Beliefs	-.20	[-.33 -.08]	.06	-3.32**	
Self-Doubt x Rational Beliefs	-.02	[-.03 -.003]	.01	-2.41*	
Conditional direct effect analysis		*Outcome: Procrastination*			
Rational Beliefs	*b*	Boot *SE*	Boot*LLCI*	Boot*ULCI*	
Low	.95	.07	.80	1.09	
Med	.83	.06	.70	.95	
High	.71	.09	.54	.88	

**p< .05, **p<.01, ***p<.001*

Next, we tested the moderation role of rational beliefs as a single instance of moderated mediation using Hayes's (2013) PROCESS macro (Model 7 and 8, Table 2). The findings of the moderated mediation analyses showed that the indirect predictive power of self-doubt on procrastination via fear of negative evaluation did not differ across the level of rational beliefs. Then, we conducted moderation analyses using Hayes's (2013) PROCESS macro (Model 1) to examine whether the rational beliefs acted as a moderator variable in the relationship between self-doubt and procrastination. The findings of the moderation analysis indicated that procrastination was predicted by self-doubt (*B*= .83, *p*<.001), rational belief (*B*= -.20, *p* = .001), and the interaction of self-doubt and rational beliefs (*B* = -.02, *SE* = 01. ΔR^2 = .01, *p* = 016). In addition, simple slope analysis demonstrated that the association between self-doubt and procrastination was stronger when the level of rational belief was at a low level (*b* = .95, *p* <.001) rather than a medium level (*b* = .83, *p* <.001) or a high level (*b* = .71, *p* <.001). These findings suggest that the direct

predictive effect of self-doubt on procrastination increases or decreases depending on the level of rational belief (Table 3, Figure 2).

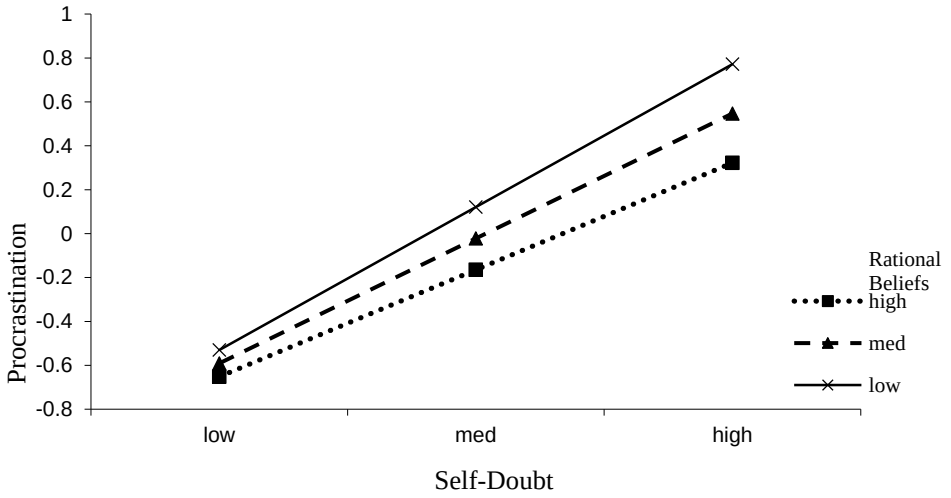

Figure 2. The moderating role of rational beliefs

Discussion

We conducted a cross-sectional study to ascertain the mechanisms underlying the relationship between self-doubt and procrastination. The present findings revealed that the fear of negative evaluation might have a mediating function in the relationship between self-doubt and procrastination. Also, the moderated mediation model revealed that the indirect predictive effect of self-doubt on procrastination via fear of negative evaluation varied depending on different irrational/rational belief levels.

Regarding the first hypothesis, mediation analysis indicates that self-doubt has a significant direct effect on procrastination, but this effect is partially mediated by fear of negative evaluation. Specifically, higher levels of self-doubt are associated with more procrastination, and this relationship is partially explained by increased fear of negative evaluation. The current finding suggested that the fear of negative evaluation was a crucial factor that mediated the relationship between self-doubt and procrastination. In this sense, the present findings support previous evidence in that procrastination is associated with self-doubt (Duru & Balkis, 2014; Balkis & Duru, 2018, 2019) and the fear of negative evaluation (Bui, 2007; Sadler & Buley, 1999). In addition, Senecal, Lavoie, and Koestner (1997) stated that the expectation of being

evaluated on a task, compared to not expecting to be evaluated on a task, was more likely to delay starting or completing the task. In this vein, Burka and Yuen (2008) suggested that people with a high level of procrastination tended to be afraid of being judged according to their performance. They believe their self-worth will suffer if they do not complete their tasks satisfactorily. The current findings suggested that self-doubt affected the fear of negative evaluation and in turn, the fear of negative evaluation influenced procrastination. In other words, if an individual has doubts about his or her competence in completing a task, this may activate the fear of negative evaluation and increased fear of negative evaluation may contribute to delaying the current task.

Consistent with the second hypothesis, the findings of the moderated mediation indicated that the strength of the indirect effect of self-doubt on procrastination, via fear of negative evaluation, varies depending on the level of irrational beliefs. Specifically, when individuals have higher levels of irrational beliefs, the indirect effect of self-doubt on procrastination through fear of negative evaluation is stronger, suggesting that irrational beliefs may amplify the negative impact of self-doubt on procrastination through fear of negative evaluation. The study suggests that individuals who doubt their ability to successfully complete a task may experience increased fear of negative evaluation, leading to a greater likelihood of procrastination. This is especially true when the individual perceives the situation as catastrophic, intolerable, and an indicator of their self-worth. These findings are consistent with previous research linking procrastination to irrational beliefs (Balkis & Duru, 2018, 2019; Steel, 2007), self-doubt, and fear of failure (Balkis & Duru, 2018, 2019). Specifically, irrational beliefs were found to moderate the direct effect of self-doubt on fear of failure, as well as the indirect effect of self-doubt on procrastination through fear of failure (Balkis & Duru, 2019). These findings support the Rational Emotive Behavior Therapy (REBT) theory, which suggests that irrational beliefs serve as vulnerability factors that contribute to maladaptive emotions (such as fear of negative evaluation) and behaviors (such as procrastination).

Finally, the moderated mediation model indicated that the strength of the direct effect of self-doubt on procrastination varies depending on the level of rational belief. When individuals have higher levels of rational belief, the direct effect of self-doubt on procrastination weakens, suggesting that rational belief may serve as a protective variable in the relationship between self-doubt and procrastination. In other words, when an individual experiences self-doubt about their ability to complete a task successfully, it is less likely that they will postpone starting or completing the task if they (a) realistically evaluate the situation, (b) perceive it as tolerable, and (c) still maintain a sense of self-worth and self-love. These findings provide further support for the Rational Emotive Behavior Therapy (REBT) theory, which suggests that rational beliefs function as cognitive resilience factors and lead to adaptive behaviors (Davit et al., 2010). The study also aligns with recent research

that indicates rational beliefs are negatively associated with self-doubt and procrastination (Balkis & Duru, 2018, 2019). In essence, the study suggests that having rational beliefs can increase an individual's resilience and enable them to engage in adaptive behaviors, such as being less likely to delay, in the face of a stressful situation, such as self-doubt.

Conclusion

To sum up, this study highlights two mechanisms that elucidate the link between self-doubt and procrastination among well-educated adults. Firstly, consistent with Ferrari et al.'s (1995) proposal that the fear of failure mediates the link between self-doubt and procrastination, the present findings suggest that self-doubt leads to a fear of negative evaluation, which predicts procrastination. Secondly, the study supports REBT's assumptions regarding the roles of rational and irrational beliefs. According to REBT, irrational beliefs act as cognitive vulnerability factors that result in maladaptive emotions and behaviors, while rational beliefs serve as cognitive protective factors that promote adaptive behaviors. In this context, the predictive effect of self-doubt on the fear of negative evaluation and the indirect effect of self-doubt on procrastination via the fear of negative evaluation increase when levels of irrational beliefs are high, whereas high levels of rational beliefs serve as a protective factor against the predictive effect of self-doubt on procrastination.

Theoretical and Practical Implication

All in all, this study adds to the existing literature on procrastination by shedding light on how and when self-doubt affects procrastination in adult individuals. The study contributes to the literature by highlighting the mediating role of the fear of negative evaluation in the relationship between self-doubt and procrastination. The findings also support the REBT framework by demonstrating the protective role of rational beliefs against procrastination and the negative effects of self-doubt. This study provides a better understanding of the underlying mechanisms of procrastination, which can inform future research on this topic.

In terms of practical implications, the findings suggest that self-doubt influences procrastination through the fear of negative evaluation, especially when levels of irrational beliefs are high. Additionally, the study suggests that the direct effect of self-doubt on procrastination may be weakened when levels of rational beliefs are high. Therefore, interventions aimed at reducing procrastination should focus on addressing self-doubt and irrational beliefs. Helping individuals to develop more rational and adaptive beliefs may lead to a decrease in procrastination behaviors. Thus, clinicians should focus on challenging evaluative irrational beliefs and encouraging rational beliefs to cope with procrastination stemming from self-

doubt. Through this process, they can teach their clients to evaluate self-efficacy, tolerance, and acceptance logically.

The present study has several limitations that should be taken into consideration. Firstly, the use of a cross-sectional design precludes the establishment of causal relationships between the variables. Future longitudinal studies are recommended to gain a deeper understanding of the contributions of fear of negative evaluation, irrational/rational beliefs, and self-doubt to the development of procrastination. Additionally, the measurements employed in this study, namely self-report questionnaires, are susceptible to biases such as social desirability or recall bias. These limitations could have influenced the reported associations among the variables. To address this, validated scales were utilized, and measures were taken to ensure confidentiality and anonymity, fostering more candid responses. Nevertheless, caution is advised when interpreting the results.

Secondly, the study sample exhibited limited diversity, with only 34.6% male participants and a high level of education, potentially restricting the generalizability of the findings. Therefore, it is important for future research to replicate these findings with samples encompassing varying education levels to enhance the generalizability of the results. Moreover, considering the specific characteristics of the sample, it is crucial to recognize that different populations may manifest differing levels of self-doubt, fear of negative evaluation, and irrational beliefs. Replication studies involving diverse samples are warranted to enhance the external validity of the findings. Finally, given the cross-sectional nature of our study, it is imperative to acknowledge the possibility of reverse causality as a plausible explanation for the observed relationships. Although we have investigated the associations among self-doubt, fear of negative evaluation, rational and irrational beliefs, and procrastination, it is conceivable that alternative explanations or feedback loops may exist. Hence, conducting further longitudinal or experimental research could aid in disentangling the direction of causality and providing a more comprehensive understanding of these relationships.

Authors' note

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PSYCHOMETRIC EVALUATION OF THE TURKISH VERSION OF THE THREE-DOMAIN DISGUST SCALE IN OBSESSIVE COMPULSIVE DISORDER AND NON-CLINICAL SAMPLES

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Abstract

The Three-Domain Disgust Scale (TDDS) contains three subscales assessing disgust sensitivity that may contribute to research on developing and maintaining psychopathology and treating psychopathologies related to disgust. This study aimed to adapt and evaluate the psychometric properties of the TDDS Turkish version. Two hundred and thirty-six participants responded to the scale consisting of 131 individuals with Obsessive Compulsive Disorder (OCD) and consisting of 105 non-clinical samples. Confirmatory Factor Analyses (CFAs) and multigroup CFAs were performed to evaluate the factor structure and the measurement invariance across clinically disordered TDDS. Reliability analyses were calculated with Cronbach's alpha and a one-month retest. Besides, the convergent and discriminant validity of the TDDS were examined with the Beck Depression Inventory, Disgust Scale-Revised, Guilt Inventory, and State-Trait Anxiety Inventory. The study found that the three-factor structure of the TDDS was the best fit for the data, with high item-factor loadings, which proved invariant across clinically disordered. Convergent and discriminative validity of the TDDS was provided, and the reliability analysis results were satisfactory (all ≥ 0.70) in two samples. The TDDS presented high cross-

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language replicability and seemed an effective instrument for research in Turkish adults.

Keywords: disgust sensitivity, TDDS, validation, reliability, invariance.

Disgust is a basic protective emotion and characterized by its specific facial expression, behavioral responses, physiological sensations, and affective states elicited by noxious, offensive, or unpleasant stimuli (Ekman et al., 2002; Rozin et al., 2008). The understanding of disgust has expanded beyond food-related elicitors to include interpersonal contamination and sociomoral violation as repugnant stimuli in various cultures (Haidt et al., 1997). Disgust is classified into four categories: core, interpersonal, animal-reminder, and moral disgust (Rozin & Fallon, 1987). This classification system was developed and widely used to understand better the emotion of disgust and its different elicitors (Rozin et al., 2008). Core disgust is elicited by foods, body products, and animals and protects the body from disease or infections with an actual or perceived threat of oral intake of infections. Animal reminder disgust is related to death, hygiene, envelope violations, sex (e.g., particular sexual practice, injury), and violations to the body and outer envelope, and protects body and soul with deny of mortality. Interpersonal disgust is evoked by contact with a stranger who is unknown, diseased, and misfortuned and saves the soul and social order. Moral disgust is elicited by moral offenses, which suggest that an individual lacks typical human motives, protects social order, or is morally sick. There are some distinctions among disgust dimensions other than elicitors, such as core disgust is early gained in development, but other disgust dimensions are later achieved (Stevenson et al., 2010).

Rozin and colleagues (1994) developed the Disgust Scale (DS) as a classification system to measure disgust in eight domains using 32 items. The DS measures the affective, cognitive, and physical dimensions of disgust elicited by animals, food, body-envelope violations, hygiene, bodily products, death, sex, and sympathetic magic (Haidt et al., 1994). DS is considered the gold standard for evaluating disgust, but its usage has diminished due to a lack of internal consistency in its eight subscales (Olatunji & Sawchuk, 2005). The DS was revised as the Disgust Scale-Revised (DS-R) to address disgust sensitivity and improve its psychometric properties. The DS-R has 25-item and has three parts: core disgust (DSR-core), animal reminder disgust (DSR-AR), and contamination (DSR-C) (Olatunji et al., 2008; Olatunji et al., 2007). Disgust proneness is another concept relevant to individual differences, which depend on an individual's disgust propensity and sensitivity. Disgust sensitivity is how displeasing the experience of disgust is perceived and disgust propensity is how someone easily is disgusted (Fergus & Valentiner, 2009). To assess sensitivities for sexual and moral disgust, the Three-Domain Disgust Scale (TDDS) was designed as a measurement of disgust sensitivity

in three domains: pathogen disgust (TDDS-P) which drives the avoidance of infectious microbes, sexual disgust (TDDS-S) which drives avoidance of sexual acts which could venture individuals' reproduction, and moral disgust (TDDS-M) which drives the avoidance of social norm violator (Tybur et al., 2009).

Factorial invariance is a statistical method used to assess the equivalence of measurement items between different groups (Bowen & Masa, 2015; Brown, 2015). It is used to determine if there are any inherent differences between the groups being compared (in this case, OCD and non-clinical samples) in the evaluated measure. If factorial invariance is established, it can be concluded that any observed differences between the groups are due to inherent differences. However, if there is a lack of invariance, there may be measurement bias in groups, which can jeopardize the research results (Byrne & Van de Vijver, 2010). Research suggests that cognitive processing plays a role in how individuals respond differently to disgust-relevant cues in memory, attention, and interpretation, both in non-clinical individuals and individuals with anxiety and OCD (Armstrong et al., 2014; Chapman et al., 2013; Ferré et al., 2018; Liu et al., 2015; Van Hooff et al., 2013; Whitton et al., 2013). An interbehavioral theory proposes that there is an interaction between the stimulus (measure items) and the participant's response (response function) (Kantor & Smith, 1975). To evaluate the comparability of TDDS, it is critical to demonstrate that it is psychometrically equivalent in terms of response across clinically disordered.

A few studies have evaluated the validity and reliability of the original TDDS. Tybur et al. (2009) evaluated TDDS's psychometric properties with undergraduate psychology students. They demonstrated good Cronbach's alphas for all three domains (TDDS-P= 0.84, TDDS-S= 0.87, TDDS-M= 0.84) with no test-retest reliability. Factor analyses established that disgust sensitivity of individual differences might be classified across three dimensions. TDDS-P score was correlated with the core, animal reminder, and contamination disgust (r= 0.92, 0.61, and 0.66, respectively), while TDDS-S score moderately correlated (r= 0.49, 0.29, and 0.45, respectively), and TDDS-M score unrelated (r=0 .13, –0.01, and 0.19, respectively) (Tybur et al., 2009). In another study, Olatunji et. al (2012) found adequate internal consistency (TDDS-P= 0.85, TDDS-S= 0.90, TDDS-M= 0.88) with good stability for TDDS-P and TDDS-S over the interval of 12 weeks (>0.70). They demonstrated a three-factor model of the TDDS rather than a single-factor one, which was not acceptable to data via CFA. TDDS-P score significantly correlated with all three dimensions of DS-R: a core, animal reminder, and contamination disgust (r= 0.75, 0.51, and 0.51, respectively). Still, TDDS-S was only associated with the animal reminder subscale (r= 0.37), and the TDDS-M score did not associate with any DS-R subscales (Olatunji et al., 2012). Individuals with OCD often encounter situations that challenge their self-perception of moral integrity, even if only imaginative, and many experience intense guilt, anxiety and self-disgust (Rachman et al., 2012). Within this context, guilt has been conceptualized as a self-conscious moral emotion that acts as a signal for anticipatory and consequential

responses directed towards oneself (Tangney et al., 2007). Furthermore, concurrent validation involved assessing correlations with Guilt Inventory (GI), which revealed significant associations with TDDS-P, TDDS-S, and TDDS-M scores (r= 0.26, 0.23, and 0.22, respectively) and Depression Anxiety Stress Scales (DASS)-anxiety, which is established significant correlations with TDDS-P and TDDS-S scores (r= 0.18 and 0.15) (Poli et al., 2019). Previous studies proposed that the original English version of TDDS has good internal consistency and concurrent validity, strong test-retest reliability with three factors (Olatunji et al., 2012; Poli et al., 2019; Rokvic & Jovović, 2022; Tybur et al., 2009; Xiang et al., 2021).

In light of the literature, findings beyond disgust, disgust sensitivity with moral disgust is the essential component and their measurement that should be considered to understand the etiology and treatment of OCD better. Differences in cognitive processing can affect how individuals respond to measure items, and this interaction may differ between OCD patients and non-clinical individuals. TDDS was developed to evaluate disgust sensitivity, but its validity and reliability have yet to be examined in Turkiye. This study aims to adapt the TDDS to Turkish and examine its psychometric properties in OCD patients and non-clinical individuals by examining test-retest reliability, confirmatory factor analysis (CFA), and relations to other scales, as well as performing multi-group CFA to assess factorial invariance. This study might contribute to understanding disgust sensitivity and its role in OCD research further.

Method

Participants and procedure

Our clinical sample consisted of 131 individuals with OCD, and the non-clinical sample (NCS) consisted of 105 individuals. The OCD sample included 88 females (67.2%), and NCS had 76 females (72.4%). The participants range in age 18-64 in the OCD group (M= 31.26, SD= 11.66) and NCS (M= 33.16, SD= 11.69). The mean years of education were 12.50 years (SD = 3.77) in the OCD group and 12.31 years in NCS (SD= 3.16). Regarding treatment status, 64.1% of OCD (N = 84) were currently received psychiatric treatment, and 71% of OCD (N = 93) in the past. Besides, 89.4% (N = 93) of the NCS had received no psychiatric treatment. The sociodemographic and obsessive compulsive symptom characteristics showed in Table 1.

Table 1: Sociodemographic data of OCD and NCS.

		OCD (*N*=131)	NCS (*N*=105)	*p*
Age; year *M (SD)*		31.26 (11.66)	33,16 (11.69)	0.215
Years of education; year *M (SD)*		12.50 (3.77)	12,31 (3.16)	0.693
Sex	Female	88 (67.2 %)	76 (72.4 %)	0.398
	Male	43 (32.8 %)	29 (27.6 %)	
Marital status	Single	71 (54.2 %)	44 (41.9 %)	
	Married	53 (40.5 %)	56 (53.3 %)	
	Other	7 (5.3 %)	5 (4.8 %)	
Current treatment	Yes	84 (64.1 %)	0 (0 %)	
	No	47 (35.9%)	105 (100 %)	
Past treatment	Yes	93 (71 %)	11 (10.6 %)	
	No	38 (29 %)	93 (89.4 %)	
YBOCS-obsession *M (SD)*		11.18 (4.70)	1.77 (2.10)	0.00
YBOCS-compulsion *M (SD)*		10.79 (4.95)	1.35 (2.01)	0.00

Note: YBOCS= Yale-Brown Obsessive Compulsive Scale

Patients were obtained from hospital psychiatry outpatient polyclinics. After routine outpatient admittance, individuals diagnosed with OCD were further evaluated by one of the researchers via a Structured Clinical Interview for DSM 5-Clinician Version (SCID 5-CV) assessment for one month (Elbir et al., 2019). Inclusion criteria were the presence of a DSM-5 OCD diagnosis based on a structured diagnostic interview and written informed consent. Individuals with OCD had comorbid disorders such as anxiety disorders (26.7%), major depressive disorder (30.5%), eating disorders (3.8%), social phobia (13.7%), somatoform disorders (5.3%), specific phobia (22.9%), OCD-related disorder (20.6%). We excluded patients with substance use disorders, mental retardation, psychotic disorders, bipolar disorders, and neurological disorders according to DSM-5. NCS included hospital staff with no current psychiatric complaints and did not meet the diagnostic criteria for any psychiatric disorders after undergoing a psychiatric examination.

After obtaining the necessary permissions from the original developers of the TDDS, the questionnaire was translated into Turkish by two independent bilingual psychiatrists (one translator was a psychiatrist, while the other was a psychiatrist and an expert native speaker of the Turkish language). A single version was then developed from these two translations. It was back-translated into English by another psychiatrist who is an expert in English and a native speaker of the Turkish language (Brislin et al., 1973). After translating the questionnaire into Turkish, we administered it to a preliminary sample of 15 people to identify any ambiguous items. Based on the feedback we received, we made some slight changes to the translated scale. We created four sets of scales to control for order effects, each with a different order of items. Participants received one of these sets, which took approximately 20-25 minutes to complete. To assess the reliability of the questionnaire, we administered a second measurement of the TDDS to a smaller

subgroup of the first sample one month after the first measurement. This study was conducted according to the 2013 Helsinki Declaration with approval by the local ethics committee (Dec 13th, 2021, numbered 126/09).

Measures

Yale-Brown Obsessive Compulsive Scale (Y-BOCS; Goodman et al., 1989): The Y-BOCS is a widely used and validated measure of OCD symptoms via two parts related to obsessions and compulsions. It is a 19-item scale, with scores calculated by summing the first ten questions (Goodman et al., 1989). The Y-BOCS was adapted to Turkish by Karamustafalıoğlu et al. (1993), and the Turkish version of the scale has similar psychometric properties as the original version (Karamustafalıoğlu et al., 1993). In this study, Cronbach's alpha values of Y-BOCS for OCD and the NCS were calculated as 0.95 and 0.91, respectively.

Three-Domain Disgust Scale (TDDS; Tybur et al., 2009): The TDDS was developed to measure disgust sensitivity which contains a pathogen, sexual, and moral disgust.

State-Trait Anxiety Inventory (STAI; Spielberger et al., 1983): The STAI was developed to evaluate anxiety which contains state and trait anxiety with good validity and internal consistency (Spielberger et al., 1983). This 40-item scale was translated into Turkish by Oner and LeCompte (1985) in clinical and non-clinical groups (Öner & LeCompte, 1985). The item-remainder reliability for trait and state anxiety ranged from 0.34 to 0.72; and 0.42 to 0.85, respectively. The test-retest reliability for trait and state anxiety ranged from 0.71 to 0.86 and 0.26 to 0.68, respectively. In the current study, Cronbach's alpha values for the state and trait anxiety were calculated as 0.93, 0.90 for the OCD group and 0.90, 0.82 for the NCS.

Disgust Scale-Revised Form (DS-R; Haidt et al., 1994): The DS-R was developed to measure disgust with three dimensions: core, animal reminder, and contamination with a 27-item (Haidt et al., 1994). This self-reported scale's validity, factor structure, and reliability (all ≥ 0.70) of the adapted scale were found to be satisfactory (İnözü & Eremsoy, 2013). The Cronbach's alpha coefficient for the translated version of the DS-R was reported as 0.85 for the OCD group and 0.89 for the NCS in our study.

Beck Depression Inventory (BDI; Beck, 1961): The BDI was developed to measure depression symptoms with a 21-item and self-reported (Beck et al., 1961). Hisli et al. (1988) translated this scale into Turkish and found that the Turkish version's psychometric properties were comparable to the original questionnaire. The Cronbach alpha values of BDI, split-half, and test-retest were calculated as 0.80, 0.74, and 0.78, respectively (Hisli, 1988).

Guilt Inventory (GI; Kugler and Jones, 1992): The GI was developed to measure guilt which includes state, trait, and moral guilt feelings with 45-item (Kugler & Jones, 1992). GI was translated to Turkish by Altin (2009) with the original design of the questionnaire, high reliability (all ≥ 0.70), strong validity, and

comparable psychometric properties (Altin, 2009). In our study, Cronbach alpha coefficients of trait, state, and moral guilt were calculated as 0.90, 0.81, and 0.54 for the OCD sample and 0.85, 0.77, and 0.69 for the NCS, respectively.

Data Analysis

Preliminary analysis was conducted using SPSS software version 26.0. The sample size of the study was determined based on different guidelines for factor analysis. MacCallum et al. (1999) refer to Gorsuch (1983) and Kline (1979), who suggested that N should be at least 100 for factor analysis (MacCallum et al., 1999). However, some investigators proposed focusing on the N:p ratios, which indicate a ratio of 3 to 10 to provide an appropriate sample size (Bryman & Cramer, 2002; Cattell, 1978; Everitt, 1975; Gorsuch, 2014). This study's sample size was 131 for the OCD group and 105 for the NCS. Since the study used a 21-item scale, the sample size was sufficient for the statistical analyses.

Descriptive statistics were used to summarize participant sociodemographic features. CFAs were computed using LISREL 8.8 to test the TDDS factor structure further. All analyses were separately conducted for both samples. Convergent and discriminant validity analyses were also performed. Reliability and test-retest reliability was evaluted.

Before conducting CFAs, missing values were replaced using the Expectation Maximization (EM) algorithm. This method effectively estimates parameters and reduces bias when missing data is low if less than 5% of the responses are missing (Enders, 2013). The data did not contain extreme values, and the multivariate skewness (Zs) and kurtosis (Zk) values, $\chi 2$ value for multivariate skewness and kurtosis, and relative multivariate kurtosis (RMK) were calculated. Therefore, the test results did not support multivariate normality and robust maximum likelihood (MLR) was used for the analysis (Satorra & Bentler, 1994). Data analysis confirmed that there was no multicollinearity, linear relationships between the variables, and that the variables were not highly associated with each other (<0.80).

In the CFA, several fit indices were used to evaluate the model's goodness of fit: Satorra-Bentler (S-B) chi-square/standard deviation (sd) ratio, comparative fit index (CFI), goodness-of-fit index (GFI), normed fit index (NFI), non-normed fit index (NNFI), adjusted goodness-of-fit index (AGFI), root mean square error of approximation (RMSEA), and standard root mean square residual (SRMR). The chi-square value is sensitive to sample size, and as sample size increases, an S-B chi-square/sd ratio of 2, 3, or even 5 can indicate that the model is at an acceptable level. The CFI, GFI, AGFI, NFI, and NNFI values should be close to 0.95 for a good fit, with values between 0.90 and 0.95 indicating an acceptable fit. For the RMSEA, values less than 0.05 indicate a good fit, and values between 0.05 and 0.1 indicate an acceptable fit. For the SRMR, values between 0.05 and 0.1 indicate an acceptable fit, and values less than 0.05 suggest a good fit (Browne & Cudeck, 1992; Hu &

Bentler, 1999; Kline, 2005). We finally perform multigroup CFAs for factorial invariance analyses in a hierarchical manner using restrictive CFA models: configural, metric, scalar, and strict invariance (Byrne & Van de Vijver, 2010; Van de Schoot et al., 2012). The prerequisite reference model is configural invariance, which assesses whether the factorial structure is identical among the compared groups. Metric invariance examines the initial configural model with equal factorial loads by restricting the covariances among the items. Scalar invariance assesses a model with equal intercepts and factorial loads. Strict invariance tests a model in which residues, intercepts, and factorial loads are equal. For measurement invariance, invariance between the least and most restrictive models is verified through differences in CFI, with values equal to or less than 0.01, implying that the invariance hypothesis must be established (Cheung & Rensvold, 2002; Meredith, 1993).

Results

Descriptive Statistics

Means and standard deviations for all measurements of the OCD and NCSs are showed in Table 1.

Validation

To test the multivariate normal distribution assumption of the data set, Zs, Zk, $\chi 2$ values for multivariate skewness and kurtosis, and RMK values were examined. The results for the NCS were Zs = 16.55 (p = 0.000), Zk = 8.95 (p = 0.000), $\chi 2$ = 353.92 (p = 0.000), and RMK = 1.194. For the OCD group, the results were Zs = 23.70 (p = 0.000), Zk = 11.80 (p = 0.000), $\chi 2$ = 701.08 (p = 0.000), and RMK = 1.279. These values indicate that the data did not meet the criteria for a multivariate normal distribution (Field, 2009). So, our findings did not provide multivariate normality, and MLR was conducted for the analysis (Satorra & Bentler, 1994).

Confirmatory Factor Analysis

The three-factor solution provided an acceptable fit by examining the fit statistics and factor interpretability. The overall model fit the data adequately, except for GFI and AGFI values (S-B$\chi 2$/sd =1.25, AGFI= 0.76, GFI= 0.81, CFI= 0.99, NFI= 0.93, NNFI= 0.98, RMSEA = 0.043, SRMR= 0.067). However, because the data did not meet multivariate normality, it was suggested that CFI and NNFI indexes should be used instead of GFI and AGFI, which were low in our sample (Cheung & Rensvold, 2002).

The factor loadings and error variances ranged from 0.58 to 0.82 and 0.33 to 0.66 on one of the two factors for OCD, respectively (see Figure 1). The factor loading of each item was a score of 0.30 and above, and error variances of each item were a score of 0.90 and below, indicating that they fit the latent constructs (Kline, 2011). This factor structure was identical to the original version (Tybur et al., 2009). Additionally, local fit assessments were conducted. There were only low values of 10 and above in the modification indices, and the standardized residual values were less than 5%, which indicates that the model provided an adequate local fit. Based on these findings, we can conclude that empirical support for the construct validity of the TDDS for the OCD group.

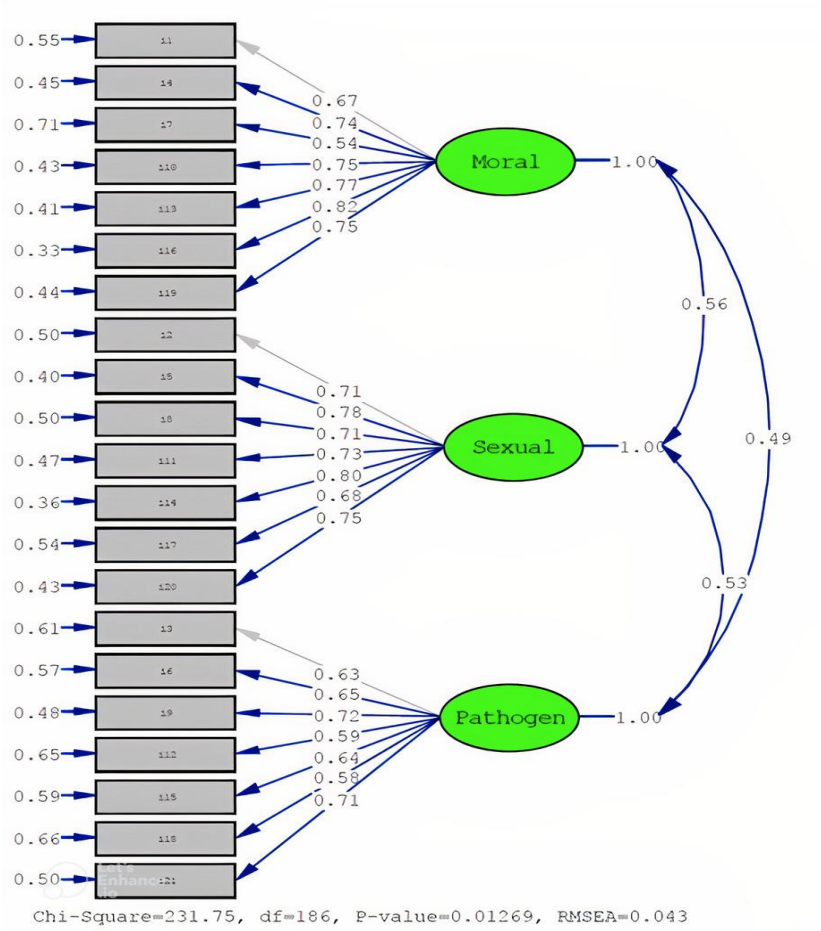

Figure 1. Factor loadings of the TDDS for the 21-factor model in the OCD group (Standardized path coefficients)

Note: RMSEA: Root Mean Square Error of Approximation; df: degrees of freedom.

CFA was also performed for the healthy group to determine the validity of the TDDS. A three-factor solution was found to fit NCS. The overall model provided an adequate fit except for the GFI, AGFI, and SRMR values (S-Bχ2/sd =1.54, AGFI= 0.68, GFI= 0.74, CFI= 0.97, NFI= 0.91, NNFI= 0.96, RMSEA = 0.072, SRMR= 0.078). As the data did not meet multivariate normality, the GFI and AGFI values were low.

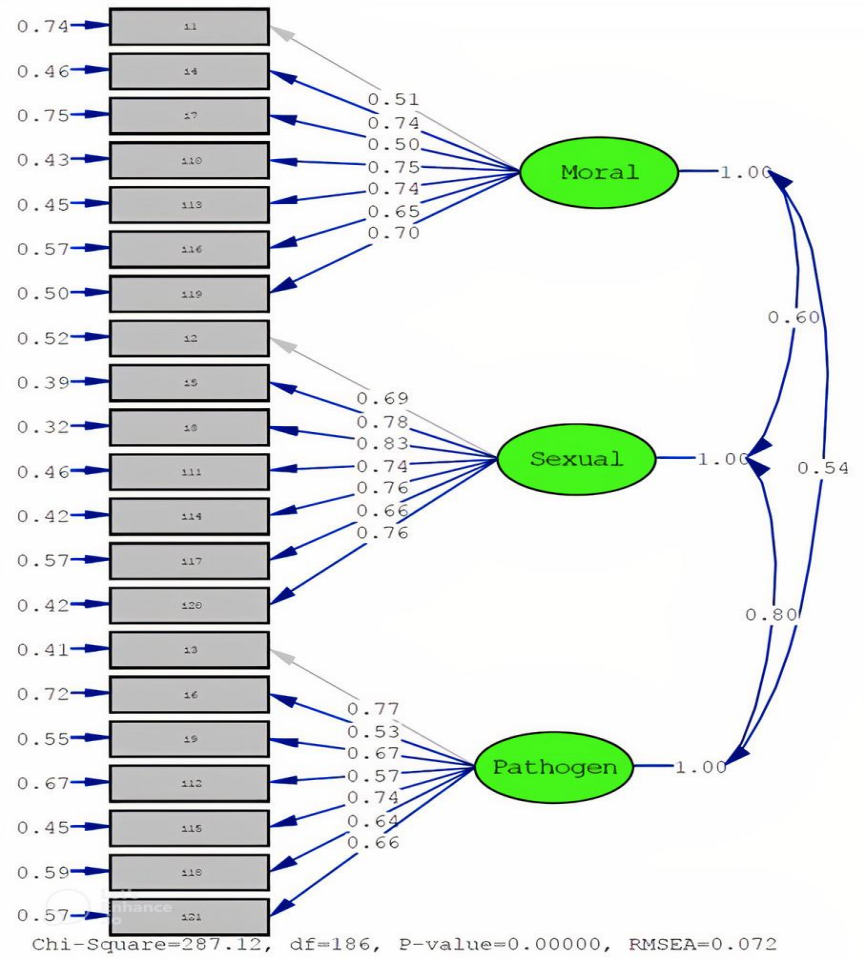

Figure 2. Factor loadings of the TDDS for the 21-factor model in the healthy group (Standardized path coefficients)

Note: RMSEA: Root Mean Square Error of Approximation; df: degrees of freedom.

The factor loadings and error variances ranged from 0.50 to 0.83 and 0.32 to 0.75, respectively (see Figure 2) for the NCS, and they were within the acceptable range (Kline, 2011). There were only low values of 10 and above in the modification indices, and the standardized residual values were less than 5%, which indicates that the model provided an adequate local fit. Based on these findings, we can conclude that empirical support for the construct validity of the TDDS for the NCS.

Factorial Invariance

The results of the model for measurement invariance of TDDS between individuals with OCD and NCS are shown in Table A configural invariance model provided an acceptable fit to the data (S-Bχ2 /*df* = 1.37, CFI = 0.98, RMSEA= 0.056) (Browne & Cudeck, 1992). This proposes that the TDDS symbolizes the same psychological structure between the OCD and NCSs, and serves as a baseline for further models. Additionally, we tested the metric invariance by restricting the items' covariances. This model had an acceptable fit to the data, while the ΔCFI between the metric invariance and the unconstrained model was 0.00 due to CFI values being within the established cut-off (ΔCFI≤0.01) (S-Bχ2 /*df* = 1.39, CFI = 0.98, RMSEA = 0.058) (Meredith, 1993). Scalar invariance was tested by restricting the regression constants between the two groups to be equal. This model had an acceptable fit of the data while the ΔCFI between the scalar invariance and the unconstrained model was 0.01, which is within the established cut-off (ΔCFI≤0.01) (S-Bχ2 /*df*=1.44, CFI= 0.97, RMSEA = 0.061) (Meredith, 1993). As scalar invariance was provided, the researchers could test for strict invariance. Strict invariance assumes that the items' specific variances are equal across groups. This model had an acceptable fit of the data while the ΔCFI between the strict invariance and the unconstrained model was 0.00, which is within the established cut-off (ΔCFI≤0.01) (S-Bχ2 /*df* = 1.43, CFI = 0.97, RMSEA = 0.061) (Meredith, 1993). Therefore, it can be proposed that the TDDS has factorial invariance between the groups of OCD and NCS. (see Table 2)

Table 2. Goodness of fit testing the measurement invariance of TDDS for OCD and NCS.

	S-Bχ2 /*df*	CFI	NFI	NNFI	RMSEA (90 % Cl)
Configural invariance	1.37	.98	.92	.98	.056
Metric invariance	1.39	.98	.92	.97	.058
Scalar invariance	1.44	.97	.91	.97	.061
Strict invariance	1.43	.97	.91	.97	.061

Convergent and Discriminant Validity

The study results showed that TDDS-P had a negligible positive correlation with depression levels in the OCD sample ($r = 0.28$, $p < 0.05$). In contrast, the TDDS-S and TDDS-M did not correlate with depression levels in the OCD group ($r= 0.05$, $p > 0.05$; $r = -0.04$, $p > 0.05$, respectively). Additionally, there were no correlations between TDDS domains (TDDS-P, TDDS-S and TDDS-M) and depression levels in the NCS ($r = -0.05$, $p > 0.05$; $r= 0.02$, $p > 0.05$; $r = 0.04$, $p > 0.05$, respectively). These results support the discriminant validity of the scale, as it indicates that TDDS is measuring a different construct than depression. The researchers also examined the convergent validity of TDDS by examining the correlations between the subscales of TDDS and the DS-R, STAI, and GI. The results showed positive relationships among the subscales of these questionnaires, specifically TDDS-P was correlated in the expected direction with DSR-core, DSR-AR, and DSR-C ($r = 0.37$, $p < 0.05$; $r = 0.35$, $p < 0.05$; $r = 0.25$, $p < 0.05$, respectively) TDDS-S also had a positive correlation with DSR-core, and DSR-AR ($r = 0.25$, $p < 0.05$; $r = 0.37$, $p < 0.05$, respectively), but there was no correlation between TDDS-M and DS-R dimensions ($r = -0.06$, $p > 0.05$; $r = 0.13$, $p > 0.05$; $r = -0.12$, $p > 0.05$, respectively) in the OCD group, which is consistent with the original study (Tybur et al., 2009). The researchers found that the TDDS-P subscale positively correlated with DSR-core, DSR-AR, and DSR-C ($r = 0.47$, $p < 0.05$; $r = 0.45$, $p < 0.05$; $r = 0.43$, $p < 0.05$, respectively) in the NCS. This supports the convergent validity of the TDDS in the OCD and NCS. The TDDS-S also had a positive correlation with DSR-core, DSR-AR, and DSR-C ($r = 0.39$, $p < 0.05$; $r = 0.41$, $p < 0.05$; $r = 0.43$, $p < 0.05$, respectively), and TDDS-M was virtually unrelated to DS-R subdimensions ($r = 0.15$, $p > 0.05$; $r = 0.17$, $p > 0.05$; $r = 0.18$, $p > 0.05$, respectively) in NCS parallel to the original study (Tybur et al., 2009). Additionally, the researchers found that the TDDS-P had positive correlations with STAI total, STAI-trait anxiety ($r = 0.29$, $p < 0.05$; $r = 0.23$, $p < 0.05$; $r = 0.30$, $p < 0.05$, respectively) and GI-total ($r = 0.27$, $p < 0.05$) in the OCD group, but TDDS-S had positive correlations only with GI-moral subdimensions ($r = 0.20$, $p < 0.05$) in the OCD group and TDDS-P, TDDS-S, TDDS-M had positive correlations with GI-moral ($r = 0.31$, $p < 0.05$; $r = 0.33$, $p < 0.05$; $r = 0.25$, $p < 0.05$, respectively) in the NCS, further supporting the convergent validity of the TDDS. (see Table 3)

Table 3. Correlation coefficients between TDDS and its subscales, and BDI, DS-R, STAI, GI and Y-BOCS in OCD and NCS.

	OCD (*N*=131)			
Variables	Pathogen	Sexual	Moral	Total
DS-R total	.38*	.29*	-.01	.26*
DSR-core	.37*	.25*	-.06	.22*
DSR-AR	.35*	.37*	.13	.35*
DSR-C	.25*	.08	-.12	.07
STAI total	.29*	.03	-.02	.10
Trait anxiety	.23*	.02	.01	.08
State anxiety	.30*	.03	-.06	.10
Beck D	.28*	.05	-.04	.19
Y-BOCS	.25*	.50	.58	.14
GI-total	.27*	.78	.51	.38
GI-trait	.26*	-.06	-.07	.06
GI-state	.24*	-.06	-.08	.04
GI-moral	.01	.20*	.16	.18*
	Control (*N*=105)			
Variables	Pathogen	Sexual	Moral	Total
DS-R total	.49*	.44*	.18	.44*
DSR-core	.47*	.39*	.15	.40*
DSR-AR	.45*	.41*	.17	.41*
DSR-C	.43*	.43*	.18	.44*
STAI total	.21	.18	.05	.19
Trait anxiety	.18	.17	.04	.17
State anxiety	.20	.16	.04	.17
Beck D	-.05	.02	.04	.16
Y-BOCS	.09	.06	.08	.09
GI-total	.04*	.08	.06	.02*
GI-trait	.06	.08	.06	.10
GI-state	.14	.05	.10	.12
GI-moral	.31*	.33*	.25*	.36*

note: DS-R= Disgust Scale-Revised, STAI= State Trait Anxiety Inventory, BDI= Beck Depression Inventory, YBOCS= Yale-Brown Obsessive Compulsive Scale, GI= Guilt Inventory.

Reliability

The stratified Cronbach's α values for 21 items were 0.93 and 0.94 in OCD and healthy groups, respectively (see Table 4). Test–retest was conducted on 38 participants (28 females and ten males, aged 18-65) over one month. Pearson's *r* correlation for the total score and the subscales of the pathogen, sexual, and moral were 0.72, 0.71, 0.71, and 0.77, respectively; all values were statistically significant ($p < 0.05$). These results provide empirical support for the reliability of the TDDS (Salvucci et al., 1997).

Table 4. Results of reliability analyses of the Turkish version of the TDDS.

OCD			
TDDS	Cronbach α	McDonald ω	Tabakalı Cronbach α
TDDS-P	.83	.83	--
TDDS-S	.89	.89	--
TDDS-M	.88	.88	--
Total	--	--	.93
Control			
TDDS-P	.83	.84	--
TDDS-S	.90	.90	--
TDDS-M	.84	.84	--
Total	--	--	.94

note: TDDS-P= Three Dimensional Disgust Scale-pathogen, TDDS-P= Three Dimensional Disgust Scale-pathogen, TDDS-S= Three Dimensional Disgust Scale-sexual, TDDS-M= Three Dimensional Disgust Scale-moral.

Discussion

The results of this study indicated that the psychometric properties of the Turkish version were largely consistent with those found in the original research. The TDDS was a valid, reliable, and invariant measure of disgust sensitivity in OCD and NCSs.

Validity and Reliability

We examined the reliability of TDDS subscales by estimating Cronbach's alpha coefficient as a measure of internal consistency and test-retest reliability. The Cronbach's alpha levels for the OCD and NCSs were consistent with the original study. Additionally, the test-retest reliability for the TDSS-P, TDDS-S, and TDDS-M was found to be high, with correlation coefficients that were very similar to other studies at one month. The domains fell in the range of what is typically considered good stability of test scores (Nunnally Jr, 1970). Therefore, we can conclude that the TDDS scales have acceptable internal and test-retest reliability.

The correlation analyses established relationships between the total scores and subscales of the TDDS and anxiety symptoms and disgust, supporting the concurrent validity of TDDS. Similar to previous research, this study found that the emotional traits relevant to disgust positively correlated with TDDS-P and TDDS-S for OCD and NCSs (Olatunji et al., 2012; Tybur et al., 2009). In addition, only TDDS-P positively correlated with anxiety (state and trait) in OCD and NCS. However, depression scores were not associated with disgust in OCD (only negligible correlation with TDDS-P) and healthy groups, consistent with previous

research (Olatunji et al., 2012). Overall, these results contribute to the convergent and discriminative validity of the Turkish version of TDDS.

Factor Structure

The study found that the three-factor structure of the TDDS was the best fit for the data, with high item-factor loadings (all ≥ 0.30). This structure was in line with previous research and suggested that it is appropriate to use the TDDS in the current cultural context (Olatunji et al., 2012; Tybur et al., 2009). However, item 7 shows the lowest factor load in both samples, which might indicate that it is less notionally related to its purported factor and may be associated with another dimension of repugnance. The study provides evidence for the factorial validity of the TDDS, and preserving its original design could allow for intercultural group comparisons in future studies.

Factorial Invariance

In this study, we evaluated the factorial invariance of the TDDS based on Kantor's theory, which emphasizes the importance of stimulus-response reactions among groups (Kantor & Smith, 1975). Our results showed the presence of configural invariance in both the clinical OCD and NCSs, indicating that the same latent factor of disgust is present in both groups. This suggests that these two samples have similar conceptualizations of disgust domains, despite possible differences in their cognitive processing (Armstrong et al., 2014; Chapman et al., 2013; Ferré et al., 2018; Liu et al., 2015; Van Hooff et al., 2013; Whitton et al., 2013). This is crucial for making meaningful comparisons between the two groups and helps support the validity of the TDDS as a measure of disgust sensitivity in Turkish populations. Metric invariance means equal factor loadings, implicating that the groups adjust their measures similarly across the two samples. The following restriction encounters intercepts that are scalar invariance, which proposes no systematic differences in the measurement items receptions and residuals that are strict invariance, which implies equivalency of intercept terms and tests whether OCD and NCSs similarly utilize response way resulting in an acceptable fit to data. There is no study on TDDS invariance between OCD and NCSs, but there are studies on the measurement invariance of TDDS across gender (Tybur et al., 2011). Factor invariance evaluates whether a measurement tool examines a measured property with the same construct between different groups, regardless of a group membership. Our study established TDDS has factor invariance with these results. Thus, this measurement is considered invariant across clinically disordered.

It is the first study to test Turkiye's TDDS psychometric properties and examine the invariance across clinically disordered. However, there are some limitations of the present study that should be noted, such as the gender distribution,

limited age and education level of the sample, and the sample of heterogenous OCD regarding the duration of disorder and treatment, comorbid conditions with OCD, which influence the emotion of disgust measurement, and the use of self-report scales. Moreover, participants in this study did not include anxiety disorders other than OCD. Further studies should use larger and more representative samples in both groups to achieve generalizability. Examination of other invariance models to determine the differences among age, gender, and race is also suggested. The study on this scale is vibrant and continuously presents opportunities for improvement to determine the measured constructs more uniquely, so further longitudinal examinations with bigger samples are necessary.

We tested the factor structure, reliability, validity, and factor invariance of the TDDS in and among clinical OCD and NCS. The item-factor structure of the TDDS was consistent with its original English version. Both subscales of TDDS had adequate internal consistency and test-retest reliability. The findings of this study demonstrated the construct validity for both clinical OCD and NCSs. The three-domain model of disgust sensitivity provided by TDDS may encourage researchers to investigate individual differences in disgust sensitivity, which is heterogenous and relate to the different functional disgust domains. Previous studies found a contradiction in relationships between disgust sensitivity and only pathogen disgust with different disgust measurement scales but not sexual or moral disgust or vice versa. Given that previous disgust, measurement scales have not adequately evaluated these three domains; such issues have yet to be fully explored. The three factorial structures for the Turkish culture might put forward a culture-specific concept of processing, recognizing, conceptualizing, and verbalizing the disgust sensitivity, especially sexual and moral disgust domains. The findings demonstrated that differences in the TDDS scores in disgust sensitivity across clinically-disordered or not groups could be attributed to actual distinctions caused by another reason from scale properties, such as understanding, cognizance, and interpretation of questionnaire items or response formats, could not cause these distinctions. An identified culturally specific aspect may be used to prefer diagnosing and treat psychiatric syndromes that are assumed to be associated with abnormal disgust processing.

Authors' note

Ethical considerations: The participants were informed in detail, and informed consent was obtained. Local ethics committee approval was received for this study (Dec 13th, 2021, numbered 126/09) which was conducted under the ethical standards set out in the 2013 Helsinki declaration.

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Declaration of interest statement: On behalf of all authors, the corresponding author states that there is no conflict of interest.

Data Availability Statement: All relevant data are within the paper and they are available from the corresponding author on reasonable request.

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SELF-OBJECTIFICATION AND SUBJECTIVE WELL-BEING: A SERIAL MEDIATION ANALYSIS ON THE ROLE OF SOCIAL APPEARANCE ANXIETY AND BODY IMAGE

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Abstract

The ideals of beauty and appearance imposed by today's popular society are becoming increasingly important in all stages of life. Correspondingly, research on the concepts of self-objectification, appearance anxiety, body image, and well-being has increased in recent years. Hence, this study aims to investigate whether social appearance anxiety and body image mediate the relation between self-objectification and subjective well-being in a Turkish sample. The study included 480 participants between the ages of 18 and 30. Participants were assessed using measurement tools for self-objectification, social appearance anxiety, body image, and subjective well-being. According to the serial mediation analysis, self-objectification had a negative effect on subjective well-being that was statistically significant. Additionally, it was concluded that social appearance anxiety and body image play a mediating role in the relationship between self-objectification and subjective well-being. It can be argued that the results obtained have both theoretical and practical importance for the related literature.

Keywords: Self-objectification, subjective well-being, social appearance anxiety, body image, young adults.

Fredrickson & Roberts (1997) introduced objectification theory as a framework for understanding the various psychological and physical consequences women face due to living in a culture that objectifies their bodies. This theory holds

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that women see themselves as "objects to be looked at and evaluated" based on their physical appearance in the cultural context. According to the theory, bodies are evaluated in social and cultural contexts and are thus constructed through sociocultural practices and discourses (Fredrickson & Roberts, 1997). Women learn to look at their bodies as if they were outside observers as a result of this structure. They internalize cultural body standards, believing that the standards come from the self and that meeting these standards is important, despite counterproofs (McKinley & Hide, 1996). This internalization of an observer's perspective on one's own body is referred to as self-objectification (Moradi & Huang, 2008). This critical self-perception can result in body surveillance, a form of self-consciousness or habitual monitoring of the body and its appearance, which can increase women's feelings of shame and anxiety while decreasing awareness of realistic bodily situations (Fredrickson & Roberts, 1997).Women become overly preoccupied with their own physical appearance, begin to view themselves as objects and start to value their bodies more for their appearance than for their functionality as a result of objectification (Oehlhof et al., 2009). Self-objectifying women view their bodies in relation to the idealized female body that society has created, and they feel shame when they fall short of this standard or notice a discrepancy between their true selves and their culturally idealized self-image (Choma et al., 2009).

Objectification theory was originally proposed to explain psychological outcomes in women, and studies with women are abundant (Tiggemann & Lynch, 2001; Muehlenkamp & Saris-Baglama, 2002; Miner-Rubino et al., 2002; Calogero et al., 2005; Cohen et al., 2018; Schaefer et al., 2018; Caso et al., 2020; Chen et al., 2022). However, Morrison et al. (2003) asserted that men care more about how their bodies look than what their bodies can do and that the fundamental ideas of objectification theory can be applied to men as well. When the literature is examined, it can be seen that studies conducted with men are also at a substantial level (Hallsworth et al., 2005; Strelan & Hargreaves, 2005; Martins et al., 2007; Kozak et al., 2009; Schwartz et al., 2010; Michaels et al., 2013; Fox & Rooney, 2015; Davids et al., 2019). For this reason, both male and female were included in this study.

While most research on self-objectification has focused on its association with negative psychological and physical outcomes, very little has focused on positive psychological functioning. This indicates that more research is needed to examine the effect of self-objectification on well-being. The concept of well-being refers to optimal psychological functioning and experience (Ryan & Deci, 2001). Within the framework of objectification theory, self-objectification has been evaluated as the primary psychological mechanism that explains the connection between women's cultural-level sexual objectification experiences and their individual-level bodily and subjective well-being (Calogero, 2012). Choma et al.(2009) discovered a negative relationship between self-objectification and subjective well-being, and that the harmful effects of increased self-objectification not only cause negative experiences such as depression and body dissatisfaction but

also have an impact on life evaluations including the sense of satisfaction and emotional reactions in women's lives. According to the study by Mercurio & Landry (2008), self-objectification leads to decreased well-being, and self-objectification has negative correlations with subjective well-being indicators: self-esteem, and life satisfaction. Breines et al. (2008) stated in their study that an individual's experience of objectifying their own body accompanies a decrease in well-being. Accordingly, it was predicted in the current study that subjective well-being is a result of self-objectification. Therefore, experiences of objectifying one's own body can be considered a significant risk factor affecting subjective well-being.

In accordance with the objectification theory (Fredrickson & Roberts, 1997), social appearance anxiety was thought to mediate the relation between self-objectification and subjective well-being in this study. Anxiety includes the anticipation of threats and fear about when and how one's body will be evaluated (Moradi & Huang, 2008). Social appearance anxiety is a construct that combines aspects of social anxiety and negative body image, it defines the levels of social anxiety surrounding the general appearance of the individual, including but not limited to body shape (Koskina et al., 2011). Not knowing when or how their body will be evaluated may cause individuals to worry about whether their appearance matches cultural ideals (Roberts & Gettman, 2004). When individuals take a view of self-objectification, they are increasingly concerned about whether they meet cultural standards of physical attractiveness (Fredrickson et al., 1998). In other words, a culture that objectifies the body provides individuals with experiences that cause constant anxiety and requires them to be alert about their physical appearance (Fredrickson & Roberts, 1997).

Roberts & Gettman (2004) stated that if the individual's self-objectification experiences increase, their anxiety about whether they meet the ever-changing and narrowly defined beauty ideals regarding their own appearance will also increase. According to Slater & Tiggemann (2002), internalizing the objectifying perspective of an observer, in particular, leads to an increase in the individual's shame about their body and appearance anxiety. Studies have also found that an increased self-objectification is associated with a higher level of appearance anxiety (Noll & Fredrickson, 1998; Slater & Tiggemann, 2002; Greenleaf & McGreer, 2006; Michaels et al., 2013; Adams et al., 2017). Body surveillance, which is a dimension of self-objectification, has also been linked to body shame and appearance anxiety (Calogero, 2012). According to Hallsworth et al. (2005), there are significant positive associations between appearance anxiety and self-objectification, body surveillance, body shame, and body dissatisfaction. According to the same study, appearance anxiety mediated the relationship between body surveillance and body dissatisfaction.

Body image, one of the concepts associated with self-objectification, was used as another mediating variable in the current study, with the presumption that it would mediate the relationship between self-objectification and subjective well-being. According to objectification theory, the internalization of objectifying

sociocultural pressures can lead to body dissatisfaction in individuals (Gerrard et al., 2021). One of the psychological consequences of self-objectification, according to Calogero (2012), is negative body image. Similarly, Myers & Crowther (2007) stated that self-objectification leads to body dissatisfaction. Therefore, body image dissatisfaction can be seen as a risk factor in individuals who objectify themselves (Smolak & Murnen, 2011). When individuals internalize the point of view of others towards their own body, ignore the functionality of their body and perceive their body as an object, they may have negative thoughts and perceptions about their body appearance, they may find their appearance repulsive, and this may lead to body dissatisfaction in individuals. Furthermore, the discrepancy between the ideal body accepted by society and the body perceived by the individual can be regarded as a factor contributing to body dissatisfaction.

Current Study

Based on all of these evaluations, a testable model was developed in the current study, consistent with earlier studies, by taking into account the Objectification Theory, to bridge the gap in the literature using a sample from Turkey. According to the literature, social appearance anxiety and body image are important factors in self-objectification. Individuals who objectify themselves by internalizing today's popular beauty ideals may experience negative evaluation anxiety due to their appearance, have negative feelings and thoughts about their body, and this may have a negative impact on their self-confidence, optimism, interpersonal relationships, future outlook, and, most importantly, subjective well-being.

As a result, it is possible to believe that social appearance anxiety, which arises as a result of self-objectification, has a decisive role in subjective well-being, which is one of the indicators of psychological functionality through body image dissatisfaction. The purpose of this study was to see if social appearance anxiety and body image mediated the relationship between self-objectification and subjective well-being. In line with the findings of previous studies in the literature, the following hypotheses were proposed and tested for this purpose.

H_1: Self-objectification will be negatively related to subjective well-being.

H_2: Social appearance anxiety mediates the relationship between self-objectification and subjective well-being.

H_3: Body image mediates the relationship between self-objectification and subjective well-being.

H_4: Social appearance anxiety and body image serially mediate the relationship between self-objectification and subjective well-being.

Method

Participants

The participants of the present study were selected through a convenient sampling and consisted of 504 young adult individuals in a province located in the eastern Black Sea Region in Turkey. After missing data (*n*=14) and extreme values (*n*=10) were removed from the data set, statistical analyses were performed with the remaining 480 participants. Participants were undergraduate and graduate students who were continuing their education. Of the 480 young adults participating in the study, 341 (71%) were female and 139 (29%) were male, aged between 18 and 30, with a mean age of 21.34 (*SD* = 2.12).

Measures

Self-Objectification: The Objectified Body Consciousness Scale, developed by McKinley & Hyde (1996) and adapted into Turkish by Yılmaz & Bozo (2019), is a seven-point Likert-type scale consisting of 24 items. It consists of three subscales: body surveillance, body shame, and control beliefs. In the reliability analysis, the Cronbach's alpha internal consistency coefficients of the subscales were .64, .75, and .70, respectively; test-retest reliability coefficients were found to be .68, .78, and .68, respectively. It has been shown to have very good construct validity ($\chi 2$/sd= 1.39, CFI=.87, RMSEA= .047, SRMR= .077; Yılmaz & Bozo, 2019). In the current study, Cronbach's alpha internal consistency coefficient of the scale was found to be .72.

Social Appearance Anxiety: The Social Appearance Anxiety Scale, developed by Hart et al. (2008) and adapted into Turkish by Doğan (2010), is a five-point Likert-type scale consisting of 16 items. The Cronbach's alpha internal consistency coefficient of the scale was found to be .93; the reliability coefficient obtained by test splitting was .88 and the test-retest reliability coefficient was .85. The scale's lowest possible score is 16, and its highest possible score is 80. High scores obtained from SAAS, which measures unidimensional social appearance anxiety, indicate that appearance anxiety is high. It has been shown to have very good construct validity (RMSEA= .051, NFI= .98, CFI= .99, IFI= .99, RFI= .98, GFI= .93 ve AGFI= .90; Doğan, 2010). In the current study, Cronbach's alpha internal consistency coefficient of the scale was found to be .92.

Body Image: The Body Image Scale, developed by Saylan & Soyyiğit (2022), is a five-point Likert type scale consisting of 21 items. It consists of four factors: negative perception of the body, evaluation sensitivity, positive perception of the body, and body change. In the reliability analyses, Cronbach's alpha internal consistency coefficient was calculated as .92 and .88 for the EFA and CFA samples, respectively. The scale's lowest possible score is 21, and its highest possible score is 105. High scores obtained from the scale indicate that individuals have a negative

body image. It has been shown to have very good construct validity ($\chi 2/df = 1.72$, RMSEA= .061, SRMR= .063, PGFI= .67, NFI= .90, NNFI= .94, PNFI= .7, GFI= .87, AGFI= .83; Saylan & Soyyiğit, 2022). In the current study, Cronbach's alpha internal consistency coefficient of the scale was found to be .76.

Subjective Well-Being: The Subjective Well-Being Scale developed by Tuzgöl-Dost (2005) is a five-point Likert-type scale consisting of 46 items. 26 of the scale items are positive, and 20 are negative statements. Negative statements are scored in reverse order. It is stated that the scale has 12 factors as well as a general factor. Cronbach's alpha internal consistency coefficient of the scale was found to be .93; the test-retest reliability coefficient was .86. The scale's lowest possible score is 46, and the highest score is 230. A high score indicates a high level of subjective well-being (Tuzgöl-Dost, 2005). In the current study, Cronbach's alpha internal consistency coefficient of the scale was found to be .72.

Procedure and Data Analysis

This study was completed considering the 1964 Declaration of Helsinki and the ethical standards thereof. Ethics committee approval was obtained from Ethics Committee in order to conduct this research. The researchers who developed/adapted the scales provided permission for them to be used in the study via e-mail. The participation was based on the principle of voluntariness; participants were included in the implementation phase after receiving their written consent. Informed consent was obtained before participating in the study. Scale instruments based on self-reporting were administered to the participants. Participants were asked to provide answers to measures assessing self-objectification, social appearance anxiety, body image, and subjective well-being, as well as basic information (e.g., gender, age, and questions related to body image). The researchers administered the measuring tools to participants in a classroom environment and the applications lasted approximately 25 minutes.

In line with the conceptual and theoretical framework in the literature, the independent variable of the study was determined to be self-objectification, the dependent variable to be subjective well-being, and the mediating variables to be body image and social appearance anxiety, and a testable model was developed. In this direction, the Serial Multiple Mediation Model (Model 6) proposed by Hayes (2022) was used to identify the mediating role of social appearance anxiety and body image in the relationship between self-objectification and subjective well-being. Gender and age were controlled for as covariates. In the analyses, the bootstrap technique was used to select 5000 resampling options, and indirect effects were evaluated within a 95% confidence interval. Bootstrapped 95% CIs not straddling

zero were considered statistically significant (Hayes, 2022). The data were analyzed with IBM SPSS Statistics v26 and the SPSS Process v4.1 macro plug-in.

Results

Preliminary Analyses

Table 1 displays descriptive statistics, correlation coefficients between variables, and reliability analysis results.

Table 1. Descriptive statistics, correlations, and reliabilities among study variables (N = 480)

Variable	1	2	3	α	*M*	*SD*	Skewness	Kurtosis
1. Self-objectification	1			.72	92.95	11.76	.399	.748
2. Social appearance anxiety	.30**	1		.92	31.34	12.75	1.004	.610
3. Body image	.41**	.77**	1	.76	48.49	14.12	.747	.519
4. Subjective Well-being	-.23**	-.40**	-.47**	.72	163.76	25.96	.194	-.216

**p<.001

When Table 1 is examined, there appears to be a positive relationship between self-objectification and social appearance anxiety (r = .30, p < .001), between self-objectification and body image (r = .41, p < .001), and between social appearance anxiety and body image (r = .77, p < .001); and a negative relationship between subjective well-being and self-objectification (r = -.23, p < .001), between subjective well-being and social appearance anxiety (r = -.40, p < .001), and between subjective well-being and body image (r = -.47, p < .001).

Before beginning the analysis, the statistical assumptions were double-checked. First, skewness and kurtosis values were calculated to see if the variables met the normal distribution assumption. Skewness values range from .19 to 1.00, and kurtosis values range from -.22 to .75. The values of skewness and kurtosis between -2.00 and +2.00 indicate that the data are normally distributed (George & Mallery, 2010), and these values demonstrate that the data are normally distributed. The Cronbach alpha internal consistency coefficients calculated as part of the reliability analysis were found to be greater than .70 and thus acceptable (Cortina, 1993). The Mahalanobis distance of all data was found to be less than 18.47. The VIF values were found to be between 1.20 and 2.66, the tolerance values were between .38 and .83, and the Durbin-Watson value was 1.93. Based on these values, there appeared to be no multicollinearity, autocorrelation, or residual value. All of these results demonstrated that the assumptions were met (Field, 2016).

Serial Multiple Mediational Analysis

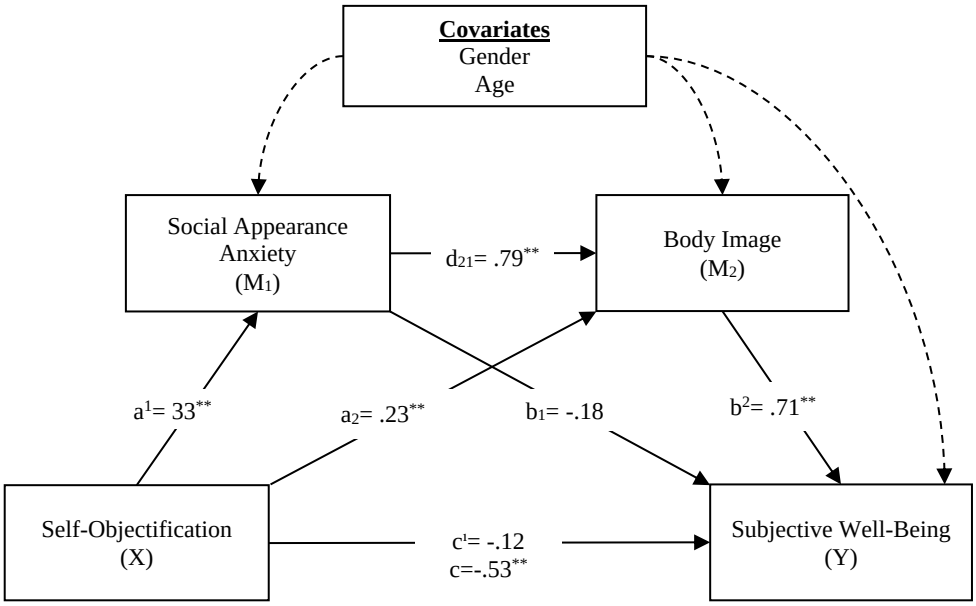

Figure 1. Serial mediation model with unstandardized coefficients. Covariates are represented by dashed lines and were controlled for in all mediation pathways. $^{**}p < .001$

Figure 1 depicts the results of the serial mediation analysis. The analysis revealed that self-objectification had a negative effect on subjective well-being, which was statistically significant (total effect; B = -.53, p<.001), and the H_1 hypothesis was accepted. When social appearance anxiety and body image were included in the analysis as mediating variables, the direct effect of self-objectification on subjective well-being lost its significance statistically (direct effect; B = -.12, p>.05). In addition, self-objectification was discovered to be a positive predictor of social appearance anxiety (B =.33, p<.001) and body image (B =.23, p<.001).

According to the findings of this study, self-objectification had no significant indirect effect on subjective well-being while social appearance anxiety was a mediator (B = -.06, SE =.04, 95% CI = [-.14,.02]). Because the values in the bootstrap confidence interval were zero (0), the result was not statistically significant. The H_2 hypothesis was rejected as a result of this finding. This finding indicated that independent of body image, self-objectification did not affect subjective well-being while social appearance anxiety was a mediator. Self-objectification, on the other hand, was found to have a significant indirect effect on subjective well-being, with body image acting as a mediator (B = -.17, SE =.04, 95%

CI = [-.25, -.10]), and the H_3 hypothesis was accepted. Lastly, the current study tested the indirect effect of self-objectification on subjective well-being using social appearance anxiety and body image as mediators. Because this indirect effect was statistically significant (*B* = -.18, *SE* =.04, 95% CI = [-.28, -.11]), the H_4 hypothesis was accepted. Table 2 summarizes the findings.

Table 2. The indirect effect of self-objectification on subjective well-being

Path	Coefficient	Confidence Interval (CI)	
		Lower Limit	Upper Limit
Total effect	-.53	-.72	-.34
Direct effect	-.12	-.31	.07
Total indirect effect	-.41	-.53	-.30
Self-objectification →Social appearance anxiety →Subjective well-being	-.06	-.14	.02
Self-objectification →Body image →Subjective well-being	-.17	-.25	-.10
Self-objectification →Social appearance anxiety →Body image →Subjective well-being	-.18	-.28	-.11

Discussion

The main focus of this study was to examine the mediating role of social appearance anxiety and body image in the relationship between self-objectification and subjective well-being, based on the Objectification Theory (Fredrickson & Roberts, 1997). The study's findings revealed that the overall effect of self-objectification on subjective well-being was negative and significant. Accordingly, H_1 was accepted. According to this finding, high self-objectification leads to low subjective well-being. Considering that self-objectification creates hard-to-reach ideal body standards and evaluates individuals according to their physical appearance (Fredrickson & Roberts, 1997; Moradi & Huang, 2008), individuals with high self-objectification may have lower subjective well-being. Given that self-objectification is a risk factor for subjective well-being, the findings are consistent with previous research. Many studies have been conducted to investigate the relationship between Objectification Theory variables and psychological well-being indicators. For example, self-objectification, body surveillance, and body shame were found to be negatively related to individuals' self-esteem and psychological health-promoting behaviors (Aubrey, 2006; Fiissel & Lafreniere, 2006; Breines et al., 2008; Mercurio & Landry, 2008; Choma et al. al., 2010; Impett et al., 2011; Barzoki et al., 2018; Guo & Wu, 2021; Garcia et al., 2021). All of these studies show that self-objectification has a negative effect on individuals' well-being.

The direct effect of self-objectification on subjective well-being was not statistically significant when mediator variables were included in the analysis. According to Baron & Kenny (1986), when the mediator variables and the predictor

variable enter the model simultaneously, and if the relationship between the predictor and the predicted variable ceases to be significant, then the data are compatible with the total mediation hypothesis. Accordingly, in the current study, when the mediating variables were included in the analysis, it was observed that the direct relationship between self-objectification and subjective well-being lost its significance level. Therefore, social appearance anxiety and body image can be argued to play a total mediating role in the relationship between self-objectification and subjective well-being. According to this, it can be argued that a high level of self-objectification causes decreased subjective well-being in individuals, entirely as a result of social appearance anxiety and body image.

Contrary to our hypothesis, it was concluded that social appearance anxiety did not mediate the relationship between self-objectification and subjective well-being. Accordingly, H_2 was rejected. This finding indicates that the relationship between self-objectification and subjective well-being is explained entirely by two mediating variables (social appearance anxiety and body image). Appearance anxiety is considered one of the negative consequences of self-objectification (Calogero, 2012). Nonetheless, the findings of this study add to the body of knowledge on self-objectification. This study revealed that both social appearance anxiety and body image are important in the relationship between self-objectification and subjective well-being, rather than just social appearance anxiety. This collective effect is stronger, and it should be considered in studies and evaluations on self-objectification and subjective well-being.

Body image was found to be a mediator of the relationship between self-objectification and subjective well-being in the current study. Accordingly, H_3 was accepted. According to objectification theory, repeated objectification experiences cause individuals to have an observer's perspective on their bodies, thus treating their bodies as objects that need to be looked at and evaluated (Fredrickson & Roberts, 1997). An objectified body is a measurable and controllable body (Calogero, 2012). Therefore, individuals who objectify themselves often evaluate whether they conform to the beauty ideals of popular society by perceiving their bodies as an object. This may lead individuals to dislike their bodies and become more critical of them. Furthermore, individuals may create a negative mental image of their bodies by negatively evaluating them. Even if an individual has never experienced self-objectification, they will likely be influenced by the objectifying perspectives of others and internalize them, thereby objectifying themselves. Depending on the dominant viewpoint in today's popular culture, self-objectification experiences can be viewed as a justification for individuals' negative experiences with their bodies. Many studies have shown that individuals who objectify themselves have more negative body images (Prichard & Tiggemann, 2005; Grippo & Hill, 2008; Winter, 2017; Sun, 2018; Fardouly et al., 2018). According to the findings of this study, people who have a negative body image have lower subjective well-being. According to Yazdani et al. (2018), the more satisfied an individual is

with their body, the greater the likelihood of feeling good. Similarly, Lee et al. (2014) stated that body satisfaction improves an individual's well-being. Swami et al. (2018) and Tager et al. (2006) discovered that body image is an important predictor of well-being. Based on previous research and the current study's findings, it can be concluded that individuals who objectify themselves have negative body images, which are associated with low subjective well-being.

The current study showed that social appearance anxiety and body image were serial mediators in the relationship between self-objectification and subjective well-being. Accordingly, H4 was accepted. This finding indicates that social appearance anxiety and body image are the main mechanisms that can explain the effect of self-objectification on subjective well-being. From this point of view, it can be argued that as individuals' self-objectification experiences increase, so does their social appearance anxiety, their body images become more negative, and thus subjective well-being levels decrease. By experiencing self-objectification through sociocultural forces (family, peers, media), individuals are guided to evaluate their bodies from the critical point of view of others (Fredrickson & Roberts, 1997) and thus learn to view their own bodies as "objects". Individuals who objectify themselves tend to be more concerned about their bodily appearance (Dakanalis et al., 2015; Tiggemann & Slater, 2015). Therefore, it can be argued that individuals who objectify themselves are likely to experience anxiety about their appearance being negatively evaluated by others.

Conclusion

It is possible to argue that the current study has some limitations. One of the study's limitations is that the participants were chosen using the convenience sampling method, and consisted of young adults only, limiting the generalizability of the results. Repeating the study on samples from different cities and regions can validate the tested model and increase the generalizability of the current study's findings. Future research on the subject with participants at various stages of development can provide comparative evaluations. Another limitation of the study is that the data is cross-sectional and relational, with no determination of causality. It is important to emphasize at this point that establishing a causal link between the variables solely through mediation analysis is insufficient (Li et al., 2022). Future studies using longitudinal and experimental data collection may be able to reveal attitude and behavior differences as well as complex causal relationships that may occur over time, overcoming the relational nature of the findings. Even though the data is cross-sectional, the current study provides preliminary information that can be used as a model for future research using other methods.

The analysis conducted using Hayes' Serial Multiple Mediation Model (2022) led to the conclusion that social anxiety and body image serve as serial mediators in the relationship between self-objectification and subjective well-being. When the effects of these variables were examined separately, it was discovered that social appearance anxiety did not have a significant mediating effect on the relationship between self-objectification and subjective well-being, whereas body image did. Theoretically, the fact that social appearance anxiety does not have a mediating effect in the current model can pave the way for different studies on this subject by bringing new insights to the literature. Therefore, it may be recommended to retest this result on samples with larger or different cultural structures. Given that positive body image is a strong predictor of well-being (Swami et al., 2018), it is thought to be critical to conduct studies to increase body satisfaction and body appreciation not only to encourage more positive body image but also to improve individuals' well-being. On the other hand, it is regarded as critical in both the scientific and current communities to assess how idealized body appearances are and how realistic they are, given the existence of many dissatisfied individuals who are unable to achieve these ideals. Body dissatisfaction levels revealed in the studies necessitate this. Furthermore, in other studies to be conducted, a more detailed evaluation of individuals' body satisfaction (such as satisfaction with the physical appearance and functionality of the body) will contribute to the subject being dealt with more comprehensively and descriptively.

Despite these limitations, the current study is expected to contribute to the literature in the Turkish sample by revealing the direct and indirect relationships between self-objectification, social appearance anxiety, body image, and subjective well-being. The current study's findings indicate that self-objectification, increased social appearance anxiety, and negative body image are important factors in decreasing subjective well-being. Based on these findings, it is expected that the study will contribute to the practices of professionals, educators, and parents by raising their awareness of the factors influencing subjective well-being and informing them to take precautions to prevent the negative effects of these factors. As a result, the obtained findings can be argued to have both practical and theoretical significance for the related literature.

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EFFECT OF TRAINING ON BELIEFS ABOUT EXPOSURE THERAPY IN EXPERIENCED THERAPISTS

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Abstract

Exposure therapy is an effective psychotherapeutic intervention for anxiety disorders, obsessive-compulsive disorder, and acute or posttraumatic stress disorder. Despite its effectiveness, exposure therapy is underutilized in situations in which it could be beneficial for patients. Negative beliefs about exposure therapy in therapists may partly explain this. This study therefore investigated the effect of a one-day training in exposure therapy on beliefs about exposure therapy in 81 experienced therapists with mostly cognitive behavioral orientations. In addition, anxiety sensitivity and intolerance of uncertainty were tested as predictors of this effect. Results showed that a one-day training had a significant moderate positive effect on therapist beliefs about exposure therapy. The magnitude of this effect was not predicted by anxiety sensitivity or intolerance of uncertainty in therapists. Further research is needed that includes control conditions and longer posttest intervals, investigates the effect of exposure training in therapists with different theoretical orientations, and examines if changes in beliefs about exposure therapy mediate the effect of exposure training on actual therapist behaviors.

Keywords: exposure therapy; behavior therapy; training; anxiety sensitivity; intolerance of uncertainty.

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Introduction

Exposure therapy is an effective psychotherapeutic intervention in cognitive behavioral therapy for a wide range of disorders such as anxiety disorders, obsessive-compulsive disorder, and acute or posttraumatic stress disorder. Despite its effectiveness (e.g., Franklin et al., 2000; Powers & Emmelkamp, 2008; Reger et al., 2011) for different clinical populations (e.g., Lemmon & Mizes, 2002; Neuner et al., 2004; Ruf et al., 2010), studies suggest that exposure therapy is underutilized in patients that could benefit from it (Stobie et al., 2007). One reason for this is that despite the positive long-term effects for many patients, exposure therapy may have some negative consequences in the short-term (Meyer et al., 2014), most notably the fear that is elicited during the actual exposure procedures. Although fear is an indicator of successfully conducted exposure procedures (Reger et al., 2019), it is problematic for therapists who believe that psychological treatment should not elicit distress in a patient (Meyer et al., 2014). In addition, some therapists overestimate the risks of exposure therapy, including for example the risks of worsening the patient's problems, decompensation of the patient, or in PTSD, vicarious traumatization of the therapist (Deacon et al., 2013). Even limited endorsement of such negative beliefs is associated with less adequate delivery of exposure therapy and with more negative therapist opinions about exposure therapy (Deacon et al., 2013). Negative beliefs also seem to negatively impact the frequency in which therapists offer exposure therapy (Trivasse et al., 2020). The barrier that these beliefs pose to the competent delivery of exposure therapy seems to be partially modifiable however, in that negative beliefs about exposure therapy may become more positive through training or workshops (Deacon et al., 2013; Fang et al., 2019), which in turn promotes more frequent and more competent delivery of exposure therapy to patients (Farrell et al., 2016). This underscores the need for studies of how beliefs about exposure therapy can be improved in different therapist samples and of individual therapist characteristics that predict such improvements.

Interestingly, research also suggests room for improvement in experienced therapists with -presumably- already quite positive beliefs about exposure therapy, such as cognitive behavioral therapists. For example, while interoceptive exposure to bodily sensations has added value in panic symptom reduction in the long term (Boettcher et al., 2016), cognitive behavioral therapists offered it to only slightly more than half of their panic disorder patients (Sars & Van Minnen, 2015). Improving these therapists' beliefs about exposure therapy may help to improve this situation (Trivasse et al., 2020).

Beliefs about exposure therapy may be associated with individual characteristics of the therapists, such as anxiety sensitivity or the fear of sensations of panic or dread (McNally, 2002), and intolerance of uncertainty or a person's attitudes towards uncertainty and its implications (Carleton et al., 2012). Individuals

who are sensitive to anxiety react fearfully to sensations of panic or dread, thereby further increasing their anxiety (Vujanovic et al., 2007). This may become a motive to avoid situations in which anxious feelings could arise. It follows that those therapists with higher levels of anxiety sensitivity may be more likely to avoid exposure therapy because of the high levels of anxiety that successful exposure elicits in patients. In such therapists, the perceived risks of exposure therapy (such as decompensation, vicarious traumatization, and lawsuits; Deacon et al., 2013) could also generate stress. Previous studies showed conflicting results regarding the relationship between anxiety sensitivity and therapist beliefs about exposure therapy (Fang et al., 2019; Deacon et al., 2013). Higher anxiety sensitivity predicted less competence and greater reluctance in the delivery of exposure therapy (Harned et al., 2013; Meyer et al., 2014). While Fang et al. (2019) found no association between anxiety sensitivity and therapist beliefs, Deacon et al. (2013) did find a positive association between therapist beliefs and the physical component of anxiety sensitivity. Given these inconclusive findings, additional research on the relationship between anxiety sensitivity and therapist beliefs about exposure therapy is warranted. Intolerance of uncertainty in therapists may have a similar effect on the delivery of exposure therapy because despite the large amount of evidence, the success of exposure therapy in a specific patient can never be guaranteed. As expected, research found that intolerance of uncertainty was associated with concerns about the use of elements from cognitive behavioral therapy (Turner et al., 2014) and with less frequent use of exposure techniques by younger clinicians (Levita et al., 2016).

In sum, the first aim of the current study was therefore to further determine how Dutch cognitive behavioral therapists think about exposure. Second, we examined the effect of a one-day training in exposure therapy on these beliefs in our relatively experienced therapist sample. Third, we attempted to identify individual therapist characteristics that could predict this effect of training in exposure therapy, as this may tell us something about which therapists benefit most from direct training in exposure therapy, versus therapists that may benefit more from other approaches.

Methods

Participants

Participants (*N*=81) were attendees of a one-day online training in exposure therapy (see Procedure). Every attendee of the training was invited to participate in the present study. The participants' mean age was 48.44 years (*SD*=12.07). Participants reported an average of 19.18 years of experience as a mental healthcare professional (*SD*=11.61, range=0–44 years). Most participants were female (65; 80.2%). Of the 81 participants, 72 (88.9%) reported having a cognitive behavioral

orientation. Other therapeutic orientations included eclectic (1; 1.2%), experiential (1; 1.2%), EMDR and schema therapy (2; 2.5%), or a mix of orientations in addition to a cognitive behavioral orientation (5; 6.2%). Most participants (61; 75.3%) were members of the Dutch Association for Behavioural and Cognitive Therapies. Two of those participants were also members of the Dutch Psychoanalytic Institute and the Association for Person-Oriented Experiential Psychotherapy, and the other 20 participants (24.7%) reported no membership of any psychotherapy association. Sixty-six therapists primarily treated (young) adults (81.5%), 11 therapists mostly treated children (13.6%), and 4 therapists mostly treated elderly patients (4.9%). At least 85.2% of the participants had conducted some form of exposure in the 12 months prior to the training (further details on participants' clinical expertise, work setting, professional education, and experience with exposure are available upon request).

Measures

Therapist beliefs. The Therapist Beliefs about Exposure Scale (TBES; Deacon et al., 2013; Dutch translation by Van Emmerik & Greeven, 2020) is a 21 item self-report questionnaire assessing therapist beliefs about exposure therapy. Questions are answered on a five-point Likert scale, ranging from 'Strongly disagree' (0) to 'Strongly agree' (4), and have the form of statements such as "It is unethical for therapists to purposely evoke distress in their clients". The total scores on the TBES range from 0 to 84. Lower scores indicate more positive beliefs about exposure therapy. The TBES showed excellent internal consistency (a = .95), good 6-month test-retest reliability (r = .89), and good construct validity (Deacon et al., 2013). In the current study, the TBES had good internal consistency (a = .88) at pretest.

Anxiety sensitivity. The Anxiety Sensitivity Index (ASI; Reiss et al., 1986; Dutch translation by Vujanovic et al., 2007) is a sixteen item self-report questionnaire assessing anxiety sensitivity. Questions are answered on a five-point Likert scale, ranging from 'Strongly disagree' (1) to 'Strongly agree' (5). An example item is "When I am nervous, I worry that I might be mentally ill". The total scores on the ASI range from 16 to 80. Higher scores indicate more anxiety sensitivity. The ASI has been found to be a valid and reliable measure of anxiety sensitivity, with good internal consistency (a = .83), convergent validity, discriminant validity, and incremental validity (Vujanovic et al., 2007). The internal consistency in the current study was good (a = .83).

Intolerance of uncertainty. The Intolerance of Uncertainty Scale-Shortened (IUSS; Carleton et al., 2007; Dutch translation by Helsen et al., 2013) is a twelve item self-report questionnaire assessing intolerance of uncertainty. It has two subscales for 'Prospective anxiety' (seven items) and 'Inhibitory anxiety' (five items). Questions are answered on a five-point Likert scale, with answers ranging

from 'Strongly disagree' (1) to 'Strongly agree' (5). An example of an item of the Prospective anxiety subscale is "It frustrates me not having all the information I need". The Inhibitory anxiety subscale includes items such as "When I am uncertain, I can't function very well". The total scores on the IUSS range from 12 to 60. Higher scores indicate more intolerance of uncertainty. The IUSS showed good construct validity and internal consistency (a = .85; Helsen et al., 2013). The internal consistency in the present study was good (a = .85).

Procedure

The study was approved by the Ethics Review Board of the Faculty of Social and Behavioural Sciences of the University of Amsterdam. Informed consent was obtained from all participants. Participants could sign up for a one-day online (due to COVID-19) training in exposure therapy on November 28th, 2020, via the website of the Dutch Association for Behavioural and Cognitive Therapies. Before (pretest) and after (posttest) the training, participants were asked to fill out online surveys using Qualtrics. In the pretest survey, sent to participants on November 26th, 2020, participants provided demographic and professional characteristics and completed the TBES, IUSS, and ASI.

The training lasted six hours and started with a 45-minute plenary lecture on the history, outcome research, working mechanisms, indications, and contra-indications of various forms of exposure therapy. This was followed by two rounds of 1,5-hour training sessions on specific forms of exposure by specialists in each form. Participants followed one training session in each round. The first round included training sessions on exposure in vivo, imaginary exposure, and interoceptive exposure. The second round included training sessions on virtual reality exposure therapy, writing therapy, narrative exposure therapy, and cue exposure. Finally, the training was concluded with a plenary lecture on future developments in exposure therapy. The fee for the total training was €160 for members of the Dutch Association for Behavioural and Cognitive Therapies and €210 for non-members. Attendees received education credits and a handbook on exposure therapy (Greeven & Van Emmerik, 2020).

The posttest survey only included the TBES and was sent to the participants immediately after the training, followed by an automatic reminder eleven days later.

Data analysis

Outliers in ASI, IUSS, and TBES scores were defined as 1.5 times the quartile distance under Q1 or over Q3 of the box plot and three such observations were replaced by the most extreme non-outlier value (the Winsorizing method; Field, 2009). Within-group change in TBES scores was tested using a two-tailed paired samples t-test and a Cohen's d_z effect size for paired samples was calculated (Lakens, 2013). In addition, the percentage of participants who showed positive change, no

change, or negative change in TBES scores after the training was calculated after subtracting participants' pretest TBES scores from their posttest TBES scores. Associations of ASI and IUSS scores to TBES difference scores were tested using simple regression analyses. Assumptions of linearity and homoscedasticity were checked using scatterplots. Analyses were based on the intent-to-treat sample (after carrying forward the initial TBES scores of 12 participants) and differences in the pattern of findings for the completer sample (n=69) will be reported.

Results

Descriptive statistics of TBES, ASI, and IUSS scores can be found in Table 1. The assumption of normality was not violated for either variable (all *Shapiro-Wilk*(81)>.97, all p>.060). The mean posttest TBES score was significantly lower than the mean pretest total TBES score with a medium effect size (t(80)=4.56, p<.001, d_z=0.51), indicating increased positive beliefs about exposure after the training. A total of 51 participants (63.0%) had lower TBES scores after the training than before the training, 16 participants (19.8%) showed no change in TBES scores, and 14 participants (17.3%) had higher TBES scores after the training than before the training.

Table 1. Descriptive Statistics of the TBES, ASI, and IUSS Scores

Measure	Range	*M*	*SD*
TBES (pretest)	0-44	20.96	9.66
TBES (posttest)	0-41	17.31	9.76
ASI	16-38	22.34	4.81
IUSS	12-42	24.91	6.06

Note. TBES=Therapist Beliefs and Attitudes Scale; ASI=Anxiety Sensitivity Inventory; IUSS=Intolerance of Uncertainty Scale-Shortened.

Two simple regression analyses were conducted to test whether ASI scores or IUS scores predicted change in TBES scores between pretest and posttest. The assumption of linearity was not violated for the relationships of both the ASI scores and IUS scores to the TBES change scores. The assumption of homoscedasticity was also not violated for both the ASI scores and IUS scores. The model including the ASI scores did not significantly predict TBES difference scores (adjusted R^2=.02; F(1,78)=2.17, p=.145). The same applied for the model including the IUSS scores (adjusted R^2=-.01, F(1,79)=.15, p=.703).

Repeating the analyses in the completer sample (n=69) did not change the pattern of the results (details are available upon request).

Discussion

The current study examined changes in therapist beliefs about exposure therapy after a one-day training in exposure, and whether anxiety sensitivity and intolerance of uncertainty in therapists predicted these changes. Although the sample predominantly consisted of experienced cognitive behavioral therapists, beliefs about exposure still showed significant and considerable improvement after the training, regardless of participants' levels of anxiety sensitivity and intolerance of uncertainty.

These results are, for the most part, in line with previous research. Changes in therapist beliefs about exposure were previously observed in Chinese (Fang et al., 2019) and American (Deacon et al., 2013; Farrell et al., 2016) samples of therapists from different psychotherapeutic backgrounds. Differences in the composition of the therapist samples may explain the fact that our effect, while statistically significant, was considerably smaller (d_z=.51) than the effects found by Deacon et al. (2013) (d=1.50) and Fang et al. (2019) (d=1.07). Our sample of mainly cognitive behavioral therapists had lower TBES scores at pretest (M=20.96) than the Deacon et al. (2013; M=33.10) and Fang et al. (2019; M=42.79) studies and there may simply have been less room for further improvement. Of note, cognitive behavioral therapy, of which exposure therapy is a central component, is less well accepted in China (Fang et al., 2019) and only 65.0% of Deacon et al. (2013) sample reported having a behavioral therapeutic orientation (compared to 88.9% of our sample). Another explanation of our moderate effect size may be the online format of the exposure training, that limited the possibilities for the interaction, role playing, and practice that characterize face-to-face clinical training. An unexpected finding of the current study is that 17.3% of the participants reported more negative beliefs about exposure therapy after the training. This underscores the importance of further research into the predictors and mechanisms of training effects.

Several limitations should be considered in the interpretation of our findings. First, given the fee of the training for participants, our sample may have been biased towards therapists that are older and better paid (and thus more experienced) or more eager to learn. Second, it is unclear to what degree the observed change in beliefs translates to changes in the way exposure therapy is conducted. The relevance of that question is underscored by Deacon et al. (2013), who observed that higher TBES scores were associated with less competent delivery of exposure. Third, the design of our study did not include a control condition or long-term posttest. Given these limitations, we recommend that future studies replicate and extend our findings in several ways. First, controlled studies are needed that include long-term posttests that also assess if changes in beliefs about exposure mediate the effect of exposure training on actual therapist behaviors. Second, studies are needed of therapist samples with different demographic and professional characteristics, such as less

experienced therapists with different psychotherapeutic orientations. Third, we need to examine predictors and mechanisms of negative effects of training on therapist beliefs about exposure, to prevent the backfiring of training efforts on therapist and - ultimately - their patients.

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EMPOWERING THE VICTIMS OF BULLYING: THE 'BULLYING: THE POWER TO COPE' PROGRAM

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Abstract

This study replicates an earlier study (Markopolous & Bernard, 2015) that evaluated the impact of the program, *Bullying: The Power to Cope* (Bernard, 2019) on potential victim's cognitive, emotional and behavioral responses. The program is aimed at teaching student rational beliefs and coping skills they can employ to cope with various types of bullying. In the present study, participating classes were randomly allocated to either an experimental or control condition. The study conducted in Melbourne, Victoria, Australia, consisted 115 participants (n = 55, experimental group; n = 60 in the control group), 57 males and 58 females, aged 10 to 14 years of age. Self-report data was collected pre- and post-test, measuring children's cognitive, behavioral and emotional coping responses to four written bullying vignettes. Measures of state and trait anxiety were also collected at pre- and post-tests. Results revealed students in the experimental group significantly improved in cognitive and emotional coping responses compared with students in the control group. Nonsignificant differences were found between males and females and between primary and secondary school students on their response to the program. State anxiety did not influence responsiveness to the program, but students with lower levels of trait anxiety (pre-test) made significantly greater improvements on emotional coping responses compared to students with higher levels of trait anxiety. Implications of these findings are discussed as well as limitations and considerations for future research.

Keywords: bullying, coping skills, CBT, children, prevention program, universal, school-based, social-emotional learning, cognitive behavior therapy, rational emotive behavior therapy, distress, mental health, cognitive restructuring, irrational and rational beliefs

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Over the past three decades, bullying has emerged as an increasing concern for school communities around the world because of its prevalence and harmful impact (e.g., Gaffney, Farrington, & Ttofi, 2019). Bullying was previously considered an unpleasant yet typical social experience to occur during school years (Arseneault, Bowes, & Shakoor, 2010). However, contemporary research suggests bullying victimisation and perpetration can have severe immediate and long-lasting consequences for children, their families and society at large (Fry et. al., 2018; Juvonen & Graham, 2014; Moore et. al., 2017; Price & Dalgleish, 2010). Additionally, large numbers of young people report being bullied. The Australian Institute of Health and Welfare (AIHW, 2020) reported the following data from the Longitudinal Study of Australian Children (LSAC, 2016): 7 in 10 children aged 12–13 experienced at least one bullying-like behavior within a year while one in four children aged 8–12 experienced unwanted contact and content while online.

Increased awareness and reporting of the detrimental effects and mental health concerns that stem from school bullying have resulted in a boom in research evaluating school-wide, anti-bullying interventions and programs aimed at curbing this negative behavior. A variety of intervention programs have been developed for use in school settings, each with a distinctive focus and often deriving from diverse theoretical models (e.g., Swearer & Hymel, 2015). Meta-analytic and systematic reviews suggest there is some evidence supporting the effectiveness of school-based intervention programs targeting bullying. However, evidence is varied and inconsistent (e.g., Merrell, Gueldner, Ross, & Isava, 2008; Smith, 2011; Smith, Ananiadou, & Cowie, 2003). Ttofi and Farrington (2011) analysed the effectiveness of 44 school-based anti-bullying programs and reported that on average bullying perpetration was reduced 20-23% and victimization rates reduced 17-20% post-intervention. A review of 26 studies evaluating school-based interventions found reduction rates to be dependent on program type, age of children, and population group (Vreeman & Carroll, 2007).

Anti-Bullying School Programs

Some of the more popular and researched programs include perhaps, the earliest, whole-school anti-bullying program, the *Olweus Bullying Prevention Program* (Olweus, 1993) designed to modify and improve the school environment to reduce and prevent bullying behavior partially through adults communicating warmth and positivity towards students including acting as positive and authoritative role models, stricter rules, regulations and consequences for anti-social student behavior, and the implementation of non-aggressive consequences for unacceptable behavior. The *Kiva anti-bullying program* (Kärnä, et. al., 2013) is based on several different theories including Bandura's social-cognitive theory and has a focus on increasing empathy, self-efficacy and anti-bullying attitudes of bystanders. The

Viennese Social Competence program (e.g., Strohmeier, et. al., 2012) which is based on Bronfenbrenner's socio-ecological perspective and Bandura's social learning theory emphasizes the responsibility of teachers and other adults in preventing student bullying behavior and the development in students of social skills they can use to prevent bullying and other forms of aggressive behavior.

The many universal school-based programs target different risk and protective factors linked to aggression, bullying, and victimization. From a socio-ecological and social learning perspective, bullying is understood as a systemic problem with mechanisms operating on several levels: individual, family, peer, classroom, and school. Anti-bullying preventive programs may target one or more factors involved in bullying and aggressive behaviors: individual (bully, victim, all students), peers, teachers, environment (school, home).

The *Bullying. The Power to Cope* (Bernard, 2019) program evaluated in the present study targets the individual student and derives from a major form of cognitive behavior therapy (CBT), Rational Emotive Behavior Therapy (REBT) (Ellis, 1994). CBT principles and practices have been incorporated in a number of evidence-based, anti-bullying programs (e.g., *Friendly Schools*, Cross et. al., 2011) with the intent of strengthening the social-emotional skills of students such as empathy and friendship-making in order to reduce bullying behavior. The focus of REBT is empowering young people to manage and reduce the emotional stress of being bullied, including anxiety, feeling down and anger. The author of this program had been and continues to be concerned about the tendency of young people to take bullying personally and the impact this thinking style has on their depression and severe forms of self-destructive behavior (Ford, et. al., 2017). One of the fundamental practices of REBT is to teach people of all ages self-acceptance in order to not take things personally. The following example of two girls responding differently to the same example of cyber-bullying illustrates the importance of the way young people interpret and evaluate the act of bullying on their feelings and behaviors.

Two girls receive the same cyber-message on several occasions saying that each looks FAT and UGLY. Carmen is quite devastated; feeling extremely anxious and depressed about the impact of the message on her popularity, while Alex pays little attention to the message, reminds herself that she is a worthwhile person, and returns an SMS saying that the sender should have paid more attention in their recent health class on celebrating differences and not judging people by their appearance, culture or behaviour.

The emotional impact of this cyber-bullying event is dramatically different for the two girls because of the different attitude or mindset of each girl. As a consequence of her attitude of self-depreciation, Carmen's takes being cyberbullied quite personally and thinks, "Because I am being picked on for my physical appearance, there must be something wrong with me. I now think less of myself and I must be a real loser". In contrast, Alex's attitude of self-acceptance literally protects

her. She refuses to rate her self-worth and value based on another's opinion of her, instead thinking, "I accept myself no matter what" and "I am me and that's OK". (Bernard, 2019).

Rational Emotive Behavior Therapy, Rational Emotive Education

REBT has a long and robust evidence-based successful history of being applied by mental health practitioners to help young people with a broad range of emotional difficulties and mental health problems (e.g., Ellis & Bernard, 2006; Bernard & Joyce, 1984; Bernard & Terjesen, 2020). Additionally, REBT has been applied in schools for over four decades in the form of Rational Emotive Education (REE) (e.g., Knaus, 1974; Vernon, 2006 a, b) and You Can Do It! Education (e.g., Bernard & Walton, 2011; Bernard, 2013; Vernon & Bernard, 2019). REE is preventative, mental health education with substantial international research proving the effectiveness of REE in helping students in schools overcome social-emotional difficulties such as anxiety, feeling down and anger (Gonzalez, et. al., 2004; Hajzler & Bernard, 1991; Tripp, Vernon & McMahon, 2007; Terjesen, Duhning, Pata & Prizer, 2020; Yamamoto, Matsumoto & Bernard, 2017).

REBT emphasises the role of cognition in behavioral and emotional reactions to experiences. The theory postulates that the individual's behavioral and emotional responses to adversity depends on the extent to which s/he thinks in ways that are flexible, moderate, logical and evidence-based (rational) or rigid, extreme, not sensible and not empirical (irrational). Irrational thoughts about adverse events such as being teased or bullied lead to extreme levels of anxiety, feeling down and/or anger and unhelpful behaviors such as aggression or withdrawal, whereas rational thinking about adversity leads to less extreme levels of emotional upset and to goal achieving behavior. Students who experience extreme emotional and behavioral reactions to bullying often have a tendency to take the bullying personally ("I must be a loser."), catastrophize ("This is the worst thing in the world that could happen."), evaluate the bullying as intolerable ("I can't stand nor cope.") and to evaluate the act of being bullied in absolute terms ("This must not happen. People should always act considerately and treat me fairly."). Students who are better at emotional regulation when faced with bullying behavior appraise and interpret the bullying more moderately and flexibly, thinking: "I strongly want people to treat me nicely and not harshly, but sometimes that's the way others behave. Being treated this way is bad, but not the worst thing that can happen to me. I don't like, but I can cope. I accept myself, no matter what.").

Bullying: The Power to Cope Program

The *Bullying: The Power to Cope* program teaches students ways of thinking espoused in the practice of REBT and in REE including ways to cognitively

restructure unhelpful to helpful thinking. For example, they learn that 'Things are neither good or bad but thinking makes it so' (Shakespeare, Hamlet, Act 2, Scene 2), that they have the power to choose the way to think including how not to catastrophize ("This is not the end of the world"), to be self-accepting, not taking the act of bullying personally ("I accept myself no matter what") and to increase their frustration tolerance ("I can cope"). The program consists of four lessons. It includes four short, animated videos and associated classroom activities covering four elements: Part 1. Bullying and Its Impact; Part 2. Thinking Makes It So; Part 3. Things to Say and Do; and Part 4. Coping in Action. The *Bullying: The Power to Cope* program differs from other CBT-oriented, social-emotional learning programs such as *Second Step* and *Steps to Respect*, through its heavy emphasis on cognitive interpretation and restructuring, while sharing similar elements including the teaching of specific coping skills (actions to take; things to say) in response to bullying.

Replication

The present study replicates published research (Markopolous & Bernard, 2015) that investigated the effectiveness of the Bullying: The Power to Cope program. Self-report data were collected at pre- and post-test of students' cognitive, behavioral, and emotional coping responses to four written bullying vignettes. The sample consisted of 139 participants in Melbourne, Australia (n = 80 in the experimental group; n = 59 in the no-treatment, control group), aged from 10 to 14 years. Results indicated students in the experimental group improved in cognitive and emotional coping responses relative to students in the control group. Females showed greater improvement than males in coping responses to bullying as a consequence of the program. These preliminary findings provide encouraging support for the effectiveness of the *Bullying: The Power to Cope* program as a school-based intervention program. However, the results indicate that further evaluation of the effectiveness of the program across different educational settings and age groups is needed. Thus, the present study aims to demonstrate generalizability of previous findings and to corroborate and further strengthen the evidence base of the program. There is also a focus on a child's individual characteristics such as gender, age and anxiety and the impact they may have on program efficacy.

For more than two decades, research has revealed there are significant gender differences in the way young people cope with and manage being bullied. Frydenberg and Lewis (2000) reported that girls tend to seek social support at higher rates but are less likely to seek professional support in comparison with boys. Girls have been found to be more likely to utilise ineffectual strategies such as tension reduction, self-blame and worry, whereas boys engage in different non-productive strategies such as distancing, retaliation, aggression and avoidance (Causey &

Dubow, 1992). These gender differences can possibly explain gender differences in the utility of intervention programs addressing bullying.

Gender

An examination of the impact of cognitive-behavioral and coping skill programs with students has shown that in a proportion of studies, boys and girls often respond differently to the same programs. For example, Pahl and Barrett (2010) examined the effectiveness of the Fun Friends (Barrett, 2005) program that is designed to increase social-emotional competence and decrease and prevent worry and emotional distress. At post-intervention and at 12-month follow-up, both males and females within the intervention group demonstrated reductions in anxiety. In the intervention group, improvements were also found in behavioral inhibition and in social-emotional skills (e.g., emotion regulation and social skills), with females experiencing greater improvement than boys from pre- to post-intervention.

The efficacy of the *Bullying: The Power to Cope* program was investigated by Markopoulos and Bernard (2015). The strength of this program is in strengthening the cognitive and emotional responses of potential victims. The majority of school-wise anti-bullying intervention programs focus on changing bystanders' attitudes and behaviors. Girls were found to make significant improvements in emotional and cognitive coping responses to hypothetical bullying vignettes, whereas boys did not. The study revealed that although girls and boys had similar mean scores at the conclusion of the program, the significant improvement in coping by girls was due in part to girls beginning females the program with markedly greater irrational evaluations and negative emotionality in response to bullying vignettes. These results echo previous research indicating girls are more likely to assess problems as extreme and perceive they have diminished ability to cope with difficulty (Frydenberg & Lewis, 1993, 2000). Gender differences in relation to both coping and program utility highlights the need to further explore the extent to which gender differences exist in the efficacy of CBT-type anti-bullying programs.

Age

Age-related differences have also been found in how young people cope with bullying.

Younger children are inclined to favor more overt bullying behaviors such as physical aggression and direct verbal bullying (Rivers & Smith, 1994) and are more likely to tell an adult or a peer, distance themselves from the bully and worry about the situation (Kristensen & Smith, 2003). In comparison, covert, indirect and relational types of bullying are more frequently reported as age increases. Older children and adolescents are less willing to seek social support from adults and more likely to engage in externalising behaviours and tension reduction, such as drinking

and smoking, in response to stressful situations (Frydenberg & Lewis, 2000; Kristensen & Smith, 2003).

Studies aiming to ascertain how age affects the efficacy of anti-bullying programs have noted varying results. Some studies have demonstrated increased utility and significant results in childhood, reducing in efficacy as age increases (Smith, Salmivalli, & Cowie, 2012).

Yeager, Fong, Lee, and Espelage (2015) reported significantly reduced or non-existent anti-bullying program efficacy for adolescents above Grade 8. In terms of the efficacy of CBT-type, anti-bullying programs, it is important to determine how age might influence their utility, because age has a clear impact on the way students engage in and respond to bullying.

Markopolous and Bernard (2015) found heightened emotional reactivity in girls before commencing participation in the *Bullying: The Power to Cope* program when responding to different bullying vignettes. Emotional reactivity refers to the intensity of an emotional response, the threshold of stimuli needed to provoke an emotional response and the time a person remains in that emotional state (Davidson, 1998). Intense emotional reactivity is strongly associated with anxiety (Carthy, Horesh, Apter, & Gross, 2010) such that effective responding to adversity may be attenuated by presence of anxiety. Anxious children respond to perceived threats and negative experiences with heightened reactivity, expressed as intense and frequent negative emotional responses. In a sample of 91 children aged between 10 and 17 years of age, Carthy, Horesh, Apter, Edge, and Gross (2010) examined whether anxious children experienced highly negative emotional reactivity and deficits in cognitive emotion regulation compared with non-anxious peers. Findings revealed that anxious children were more likely to respond with greater negative emotion and lesser cognitive regulation ability in comparison with controls. Research has also indicated that anxious children are more likely to respond to vignettes that elicited worry and anger and ambiguous vignettes with potentially threatening meaning with greater negative emotional intensity when compared with non-anxious children (Carthy, Horesh, Apter, & Gross, 2010; Suveg & Zeman, 2004). Therefore, examining the differences in child and adolescent levels of anxiety might serve to elucidate why bullying intervention and prevention programs appear to be more effective for some more than others.

Research Questions

Research questions 3 and 4 represent distinctive contributions of this replication study.

1. Do students who participate in the *Bullying: The Power to Cope* program show improvements in cognitive, behavioral, and emotional coping responses to bullying vignettes compared with students who do not participate in the program

2. Do girls and boys respond differently to the program by demonstrating different levels of improvement in their coping responses (cognitive, behavioral, emotional) to bullying vignettes?

3. Do students in primary school (grades 5 and 6) in comparison with students in secondary school (grade 7) respond differently to the program by demonstrating different levels of improvement in their coping responses (cognitive, emotional and behavioral) to bullying vignettes?

4. Do students who obtained lower and higher scores of anxiety (state and trait) respond differently to the program by demonstrating different levels of improvement in their coping responses (cognitive, behavioral, and emotional) to bullying vignettes?

Method

Participants

Students were recruited from primary and secondary schools in Melbourne, Australia. The first author contacted multiple primary schools and secondary schools for inclusion and three responded as willing participants (two government primary schools and one government secondary school) yielding two Grade 5, two Grade 5/6 and two Grade 7 classes. Following approval from the Human Research Ethics Committee at the University of Melbourne and each school, students and their parents were sent home a plain language statement and consent form. The three participating schools contributed 148 students, who were all invited to participate. The individual schools randomly assigned each participating class to either the experimental or control group. The decision was independent of the first author and largely based on the school's timetable. Of the students invited to participate, 119 (80%) returned consent forms and completed pre-intervention questionnaires. At post-intervention data collection, the final sample reduced to 115 students (57 girls, 58 boys), as four students were absent. The experimental group included 55 students (32 girls, 23 boys) and the control group included 60 students (25girls, 35 boys). Participants were aged between ten and fourteen years (M = 11.45 years, SD = 1.14). There were 55 students in Grade 5, 14 students in Grade 6, and 46 students in Year 7.

Measures

The Coping Response Bullying Questionnaire (CRBQ; Markopolous & Bernard, 2015) is a 44-item measure that is designed to assess student's cognitive, behavioral, and emotional responses to four bullying scenarios: physical, verbal, social, and cyber. Four items comprise the cognitive and behavioral scale and three items comprise the emotional scale for each of the four bullying vignettes.

Participants are asked to respond to written hypothetical vignettes, describing a common student experience of bullying by indicating how they would think and behave if the incident happened to them on a four-point Likert scale that ranges from Strongly Disagree (1) to Strongly Agree (4). Additionally, participants are asked rate how strongly they would feel on a scale ranging from A Little (1) to Very (10). The vignettes are hypothetical scenarios and do not relate to participants personally, allowing students to express their opinions and choose how they might think, feel or act, while remaining detached from actual experiences and feeling safe from personal threat (Poulou, 2001).

Sample vignette and examples of CRBQ questions

A student who is in your class who is bigger and stronger keeps hitting and kicking you when nobody is looking and tells you if you tell anyone, he will just hurt you more.

Instructions: If the incident happened to you, show whether you agree or disagree with the following thoughts/behaviors or how you would be feeling by circling a number.

	Strongly Disagree	Disagree	Agree	Strongly Agree
I am a real 'loser'.	1	2	3	4
I would do nothing.	1	2	3	4

	A Little				Medium					Very
I would feel worried.	1	2	3	4	5	6	7	8	9	10

The CRBQ takes approximately 15 minutes to complete. Raw scores are computed by summing the scores for each item across the cognitive, emotional and behavioral scales. Reverse scoring is required for item four on the cognitive scale and items two and three on the behavioral scale. Higher scores are indicative of less effective coping responses to situations of bullying. The CRBQ has shown adequate internal consistency at pre- and post-test for the Cognitive (α = .87 and .88), Behavioral (α = .79 and .84), and Emotional (α = .92 and .91) subscales (Markopoulos & Bernard, 2015). For the present study, the CBRQ demonstrated good internal consistency at pre- and post-test for the Cognitive scale (α = .87 and .89), the Behavioral scale (α = .85 and .85) and the Emotional Scale (α = .92 and .94).

The State-Trait Anxiety Inventory – Children (STAI-CH; Spielberger & Edwards, 1973) is a 40-item scale designed to assess children's state anxiety, a fleeting emotional state, and trait anxiety which is a proneness to experience elevated anxiety. The 20-item state anxiety scale requires participants to rate how they how

they feel about themselves "at this very moment" on a three-point Likert scale. The stem for each item is, "I feel", and for each adjective term there are three alternatives. The child responds by checking with alternative describes him best (e.g., "very nervous", "nervous", "not nervous"). Items indicating the absence of anxiety are reverse scored. The 20-item trait anxiety scale required participants to rate how they "generally feel" on a three-point Likert scale ranging from Hardly Every (1) to Often (3). The STAI-CH takes approximately 15 minutes to complete. Scores for each scale range from 20 to 60, with higher scores indicating greater anxiety. The STAI-CH is designed for children with a fourth grade reading level and above. In the current study, psychometric properties were strong, with internal consistency at pre- and post-test for state anxiety scale (α = .87 and .92) and trait anxiety scale (α = .91 and .93).

Test of Knowledge of Bullying: The Power to Cope Questionnaire (KBBPCQ; Markopolous & Bernard, 2015) ia an 11-item survey is designed to assess children's knowledge of bullying and coping skills taught during the *Bullying: The Power to Cope* program. There are nine multiple choice answer questions (e.g., "what is self-talk?') and two short answer questions (e.g., "What did you enjoy most about the program?"). The evaluative questionnaire allows researchers to determine information that was easily retained, information that could be further explained or reviewed, and student experiences of the program. Scores for multiple choice answer questions are computed by summing correct answers, with total raw scores ranging from 0 to 9. Higher raw scores indicate more acquired knowledge of bullying and coping skills taught.

Procedure

During pre-test (week 0), data were collected from all participants. Students in both the experimental and control groups completed paper versions of the CRBQ, CASS-A, and STAI-CH. The student researcher introduced the project, provided a brief explanation of the questionnaires and explained that all information provided was confidential. Participants were instructed to complete the questionnaires independently and as honestly as they could. If participants did not understand or were unsure of how to answer a question, they were encouraged to ask the student researcher or classroom teacher for assistance. During weeks 1 to 5, the student researcher taught the *Bullying: The Power to Cope* program, to students in the experimental group at each participating school during a 55-minutes class session. Each school decided the program would contribute to their wellbeing curriculum and that all students would thus participate in sessions regardless of whether they completed the questionnaires. All sessions involved a short introduction to the content, the relevant animation, group discussions, and whole class, independent, and paired activities. Students were encouraged to contribute to discussions;

however, sharing personal experiences of bullying was not expected. Student handouts were collated into a workbook prior to program commencement and students kept these at the conclusion of the program to be used for future reference. Participants in the control group did not receive the program during these five weeks and continued with regular timetabled classes. Each school was provided the opportunity to deliver the program to the control group in order not to disadvantage these participants.

In week 7, all participants in the experimental and control groups again completed the CRBQ, CASS-A, and STAI-CH. Additionally, the experimental group completed the evaluative questionnaire, KBPCQ. The students were again encouraged to work independently and complete the questionnaires as honestly as they could.

Data Analysis

The current research project was quasi-experimental in nature, employing a repeated measures design with the condition (control and experimental group) as the between-subjects factor and time (pre- and post-test) as the within-subjects factor. The independent variables were condition, control group and experimental group, gender, male and female, grade of participants, primary school and secondary school, and level of state and trait anxiety (high and low). The dependent variables were the cognitive, behavioral and emotional coping responses to bullying vignettes at pre- and post-test.

The Statistical Package for the Social Sciences Version 22 (SPSS 22) was employed to conduct all statistical analyses. First, a Multivariate Analysis of Variance (MANOVA) was conducted to determine the homogeneity of control and experimental groups at pre-test, in terms of their cognitive, behavioral and emotional cognitive coping responses. The second repeated-measures MANOVA, was conducted to examine differences from pre- to post-test in participants cognitive, behavioral and emotional coping responses between the control and experimental group. The third and fourth repeated-measures MANOVAs were conducted to examine differences from pre- to post-test in participants' cognitive, behavioral, and emotional coping responses between girls and boys and primary and secondary school students in the experimental group.

For analysis, state anxiety and trait anxiety scores were recoded into two levels: upper and lower 50% of scores. Mean scores were used as cut-off points to delineate lower and higher scores. Repeated-measures MANOVA's were conducted to investigate differences in the effect of the program on cognitive, behavioral, and emotional coping responses for students lower on state and trait anxiety (lower 50%), as compared to students who obtained a higher score (upper 50%) at pre-test. Finally, to

determine whether the experimental group had learnt and retained key skills taught scores of the KBPCQ were recoded into two levels: low scores ≤6 and high scores ≥7. Levels were based on ranges stated by Markopoulos and Bernard (2015). MANOVA analyses were chosen in preference to a series of Analysis of Variances (ANOVAs) to compare groups on a range of dependent variables simultaneously, while adjusting for and reducing the risk of Type 1 errors (Tabachnick & Fidell, 2013).

Preliminary analysis was conducted to ensure no violations of the assumptions required for multivariate analysis of variance. Assumption testing was conducted to assess adequate sample size, univariate and multivariate outliers, normality, linearity, homogeneity of variance-covariance matrices, and multicollinearity, with no serious violations noted. Linearity was assessed via examination of scatter matrices and appeared to have an even distribution, random spread and no curvilinear scatters.

Missing Data

Prior to analysis, the Statistical Package for Social Sciences Version 22 (SPSS 22) program was used to conduct data cleaning for all variables within each time point according to protocols outlined by Tabachnick and Fidell (2013). Data was screened for errors in responses and negatively worded items were reversed scored. All participant responses and total scores were found to be within the acceptable range. All variables were missing responses from four participants at post-test and consequently were deleted from further analysis in accordance with Field (2013). Missing values analysis revealed variables were missing no more than 0.9% of responses at pre-test and post-test. Subsequent investigations revealed one participant had missing data for all STAI-CH items at pre-test. To allow the participant data to be included in analyses for which they have the necessary information, exclude cases pairwise option was used to deal with the missing values during analysis in accord with Pallant (2013).

Results

Pre-Test Comparison of the Control and Experimental Conditions

A one-way between groups MANOVA was performed to investigate whether there were differences between the experimental and control group on students' cognitive, emotional and behavioral coping responses to bullying vignettes at pre-test. There was a nonsignificant difference between control and experimental groups on the combined dependent variables, F (3, 111) = 0.96, p = .41; Wilks'

Lambda = .98; partial eta squared = .25. When results for dependent variables were considered separately, a non-significant difference was found between control and experimental groups on all measures. These results suggest groups were homogenous on coping responses prior to intervention.

Effects of the Bullying: The Power to Cope Program

A repeated-measures MANOVA was performed to investigate the program effect on participants coping responses, from pre-test to post-test, between the control and experimental group. Descriptive statistics for cognitive, behavioral, and emotional coping responses at pre- and post-test for the control and experimental group were determined (see Table 1). Results of the multivariate analysis showed a significant overall effect of time by group, $F(3,111) = 4.58$, $p = .005$; Wilks' Lambda = .89; partial $\eta^2 = .11$. This suggests there were significant differences on one or more dependent variables among the control and experimental group from pre- to post-test. When the results for the dependent variables were considered separately, the effect of time by group interaction was statistically significant for cognitive coping response, $F(1, 113) = 10.47$, $p = .002$; partial $\eta^2 = .085$, and for the emotional coping response, $F(1, 113) = 5.61$, $p = .02$; partial $\eta^2 = .047$. However, the interaction of time by group did not reach statistical significance for the behavioral coping response, $F(1, 113) = .87$, $p = .35$; partial $\eta^2 = .008$.-By looking at the difference in change scores, it was clear the experimental group improved significantly more on their cognitive and emotional coping responses compared to the control group.

Table 1. The Effects of the Bullying: The Power to Cope Program

Coping Response	Time Period	Group					
		Control ($n = 60$)			Experimental ($n = 55$)		
		M	*SD*	95 % CI	*M*	*SD*	95% CI
Cognitive	Pre-Test	29.43	7.03	27.31-31.56	30.86	9.53	28.63-33.08
	Post-Test	28.58	6.99	26.72-30.45	25.80	7.60	23.85-27.45
Behavioural	Pre-Test	30.63	7.88	28.49-32.79	29.87	8.98	27.62-32.12
	Post-Test	31.07	7.39	28.99-33.14	29.35	8.80	27.18-31.51
Emotional	Pre-Test	69.28	26.55	62.56-76.01	67.18	26.03	60.16-74.21
	Post-Test	68.37	26.74	61.27-75.46	58.02	28.80	50.61-65.43

When examining within-group differences, results showed a significant improvement in mean score from pre- to post-test within the experimental group for cognitive, $F(1, 54) = 20.10$, $p \leq .001$; with a large effect size, partial $\eta 2 = .27$and emotional coping responses, $F(1, 54) = 10.51$, $p = .002$; with a large effect size, partial $\eta 2 = .16$ (e.g., Pituch & Stevens, 2016). There was a non-significant change from pre- to post-test for behavioural coping responses, $F(1, 54) = .49$, $p = .49$; partial $\eta 2 = .009$, although there was a slight improvement in mean score. Whereas there were non-significant differences from pre- to post-test on cognitive, behavioral, and emotional coping responses for the control group.

The results of the multivariate analysis showed a non-significant overall interaction of time by gender, $F(3, 51) = .13$, $p = .94$; Wilks' Lambda = .99; partial $\eta 2 = .007$. Additionally, when each dependent variable was considered separately, the interaction of time by gender was found to be non-significant for each of the dependent variables. This indicates there were no differences between males and females on cognitive, behavioral, and emotional coping responses from pre- to post-test, rather they made similar improvements in coping responses from pre- to post-test.

A repeated-measures MANOVA was performed to investigate differences in the effect of the program between students in primary and secondary school in the experimental group ($N = 55$). The results of the multivariate analysis showed a non-significant overall interaction of time by age, $F(3, 51) = .63$, $p = .60$; Wilks' Lambda = .96; partial $\eta 2 = .036$. Results indicate no differences between children in primary school and secondary school on cognitive, behavioural, and emotional coping responses from pre- to post-test, rather they made similar improvements in coping responses as a result of the program.

Impact of state-trait anxiety on the effects of the Bullying. The Power to Cope Program

A multivariate analysis revealed a nonsignificant interaction between time and level of state anxiety, $F(3, 50) = .49$, $p = .69$; Wilks' Lambda = .97; partial $\eta 2 = .029$. These results indicate children's entering levels of state anxiety does not influence the effectiveness of the intervention program on coping responses to bullying vignettes.

However, there was a significant interaction between time and level of trait anxiety found, $F(3, 50) = 3.09$, $p = .035$; Wilks' Lambda = .84; partial $\eta 2 = .16$. This suggests there were significant differences on one or more dependent variables among those who obtained lower and higher scores of trait anxiety from pre- to post-

test. When the results for the dependent variables were considered separately, the effect of time by level of trait anxiety interaction was statistically significant for emotional coping response, $F(1, 52) = 8.43$, $p = .005$; partial $\eta^2 = .14$. An inspection of the mean scores indicated children in the experimental group who obtained lower trait anxiety scores at pre-test reported greater improvement in emotional coping responses compared to those who obtained higher trait anxiety scores (see Table 2).

Table 2. Impact of Trait Anxiety on the Effects of the Bullying. The Power to Cope Program

Coping Response	Time Period	Experimental Group					
		Lower Trait Anxiety ($n = 31$)			High Trait Anxiety ($n = 23$)		
		M	*SD*	95 % CI	*M*	*SD*	95% CI
Cognitive	Pre-Test	28.71	8.84	25.34-32.08	33.87	10.00	29.96-37.78
	Post-Test	23.65	5.70	21.01-26.28	28.74	9.05	25.68-31.80
Behavioural	Pre-Test	28.36	9.25	25.12-31.59	31.74	8.58	27.99-35.49
	Post-Test	27.74	9.28	24.58-30.90	31.39	8.01	27.72-35.06
Emotional	Pre-Test	65.29	26.98	55.74-74.77	69.30	25.59	58.26-80.35
	Post-Test	49.77	25.89	39.83-59.72	69.52	29.74	57.98-81.06

Evaluation of Children's Knowledge and Attitudes Regarding the Program at Post-Test

Data from the KBPCQ was used to investigate whether the experimental group had learnt and retained attitudes and coping skills taught in the Bullying: The Power to Cope program. Forty-five children achieved scores greater than seven on the multiple-choice section of the KBPCQ, indicating 81.8% of the experimental group remembered what they had been taught throughout the program. The KBPCQ also provided qualitative data. Table 3 presents the children's comments in response to question 10 ("How do you feel about your ability to cope with bullying?").

Table 3. Comments from Students on Ability to Cope with Bullying

Child Comment	Gender	Educational Level
I feel like if I was getting bullied now, I'd definitely know how to make myself calm and not worry about it.	Female	Secondary School
I think that my ability to cope with bullying is pretty good and has improved a lot over the past few weeks.	Female	Secondary School
Confident.	Male	Primary School
I think that over these sessions I have learnt how bullying does suck but there are heaps of ways to deal with it and it's definitely not the worst thing in the world.	Female	Secondary School
I feel that now, if I get bullied, I would be prepared and I would know what to do.	Female	Primary School
Although I haven't undergone any bullying yet, I can tell that after this amazing series of workshops, I can cope with bullying more than I thought I could.	Male	Primary School
I feel more confident.	Female	Primary School
I feel like I can actually cope with bullying.	Female	Primary School
I feel like if bullying ever happens I will have better ways to cope.	Female	Primary School

It appears as though the Bullying: The Power to Cope program was a helpful experience for students in the experimental group. 51 out of the 55 children (92%) reported the rational attitudes and coping skills taught in the program to be valuable and useful in their own lives. Additionally, children reported their confidence and abilities to manage situations of bullying had increased throughout the program.

Discussion

The present study investigated the effects of the prevention program, *Bullying: The Power to Cope* (Bernard, 2019), designed to teach students attitudes and coping skills they can employ in response to various types of bullying. Findings revealed a significant overall effect of the program on student's coping responses. When coping responses were considered individually, participating students demonstrated significant improvements in cognitive and emotional coping responses to bullying vignettes compared with those who did not participate. However, there were no significant improvements found for behavioral coping responses post-intervention.

The current results echo those of Markopolous and Bernard (2015), who also found students' cognitive and emotional responses improved after implementing *Bullying: The Power to Cope*, with no significant change in behavioral coping. The consistency of results across the two studies suggests that the program is highly efficacious in improving the way students think about themselves and situations of bullying, which may in turn foster calm emotional reactions. Efficacy may be due to the focus on restructuring students' irrational and negative thought patterns as well as teaching that emotions and behaviors are greatly influenced by thinking as key aspects of the program. These techniques are the foundation of rational emotive behavior therapy (REBT) and rational emotive education (REE) and are consistently shown to be powerful in reducing irrational beliefs (e.g., Terjesen, et. al., 2020; Trip, Vernon, & McMahon, 2007). The current findings support the value in teaching students cognitive coping skills such as keeping things in perspective (using tools like the "Catastrophe Scale"), using positive rather than negative self-talk, unconditional self-acceptance and that they have a choice how to think when faced with bullying. It is these skills that enable students to effectively shift their mindset and negative thinking patterns, leading them to be less vulnerable and more resilient to potentially harmful effects of bullying.

Despite the cognitive and emotional improvements, the current study did not demonstrate a reduction in dysfunctional behaviors post-intervention. This is possibly explained by the short time-frame in which the program was taught and post-test data collected. Students were taught effective behaviours to better cope and manage situations of bullying if and when they occur, however, there was limited time in which these behaviors could have been practiced and put into action. Successful behavioral change often requires considerable opportunity for practice of behavioral skills coupled with the application of key cognitive changes, which is likely to take some time (Prochaska & DiClemente, 1982).

It is also likely that many students participating in the program have not experienced bullying; therefore, they have not therefore had the risk present in their lives needed to enact behavioral change, as cited by Gillham, Shatté, and Reivich

(2001) as important for intervention effects to emerge. Furthermore, cognitive and emotional coping skills were taught over three sessions of the program, whereas behavioural skills, such as verbal communication and body language, finding someone to talk to, and seeking professional help, were taught over only one session. Given that only one session in the program is allocated to behavioral coping versus three sessions allocated to cognitive/emotional coping skills, adding more behavioral coping content to the program may result in behavioral improvements as well.

The findings from the current study support previous research highlighting the success and efficacy of school-based interventions, such as *Steps to Respect, KiVa, Cool Kids Program* and *Friendly Schools* (Berry & Hunt, 2009; Brown, Low, Smith, & Haggerty, 2011; Cross et al., 2011; Frey et al., 2005; Kärnä et al., 2013; Williford et al., 2012). By focusing on teaching adaptive coping skills, promoting assertiveness, confidence, self-efficacy and resilience within students, these programs empower students to respond more effectively.

The second research question examined gender differences in the effectiveness of *Bullying: The Power to Cope*. Results found no differences between males and females on cognitive, behavioral nor emotional coping responses from pre to post-test. This indicates while both boys and girls made significant improvements in cognitive and emotional coping responses as a result of the program, they made these gains similarly to one another.

This is in accord with previous research that found REBT and REE to be comparably effective for boys and girls (e.g., Bistamam et al., 2015). However, this finding is inconsistent with Markopolous and Bernard (2015), who found that girls made greater improvements in cognitive and emotional coping responses from pre- to post-test compared with boys. The authors explained that this finding is a result of females reporting less effective and more irrational cognitive and emotional coping responses compared with males prior to the program, thus greater gains were possible as a result of intervention. Conversely, the present results did not indicate any pre-test differences in cognitive and emotional coping responses between males and females. This is an important finding because it supports the effectiveness of REBT methods for both boys and girls. Additionally, as all participating schools were co-educational, the non-significant difference between boys and girls suggests the content is equally relevant and beneficial for both genders and their potentially different experiences of bullying.

The third research question examined differences in the effectiveness of *Bullying: The Power to Cope* and improvements made between primary school and secondary school students. Results demonstrated no differences across grade groups on students cognitive, behavioral or emotional coping responses from pre- to post-test, which suggests improvements were made regardless of grade level. Results provide support for the use and efficacy of Bullying: The Power to Cope with students from Grades 5 to 7 (ages 10 to 14). Previous research has shown varied results when investigating the influence of age on the effectiveness of bullying

prevention and intervention programs (Ttofi & Farrington, 2012; Yeager et al., 2015). However, a common finding is that program effectiveness decreases with increasing age (Smith et al., 2012). The current program found no age-related differences in effectiveness, indicating the program was able to focus broadly on bullying, while also using examples of bullying experiences and discussing the different types of bullying tailored to the age group of each participating class. Therefore, success of the program within different age groups may be partly attributed to the flexibility of activities, while maintaining important learning points in each session.

Another possible explanation for the similar effectiveness between primary and secondary school students is that REBT has been found to be effective in various age groups across childhood, adolescence and adulthood (Hajzler & Bernard, 1991). However, Gonzalez et al. (2004) reported students in primary school benefited more from REBT programs than did those in secondary school. Therefore, as the population group in the current study focused on students in primary school and early secondary school, perhaps the developmental factors influencing the decrease in effectiveness, such as severity of problems and ingrained opinions and beliefs (Gonzalez et al., 2004; O'Shaughnessy, Lane, Gresham, & Beebe-Frankenberger, 2002), were not pronounced enough to influence response to intervention.

The fourth research question examined whether effectiveness of the program and changes in coping responses were influenced by student's state and trait anxiety.

The findings revealed entering levels of state anxiety did not influence the effectiveness of the program. Students with high levels of state anxiety improved comparably on coping responses compared with students with low levels of state anxiety. This result also suggests that students with high levels of state anxiety can benefit from a universal intervention rather than requiring a targeted approach; thus providing support for class delivered social-emotional learning.

In contrast, students entering levels of trait anxiety did significantly influence the efficacy of the program. Students with lower trait anxiety levels made significantly greater improvements on emotional coping responses to bullying vignettes as a result of the program compared with students with higher trait anxiety levels. Previous research has found students with high levels of anxiety express more intense negative emotional responses to perceived threats and adverse experiences compared with less anxious peers (Carthy, Horesh, Apter, Edge, et al., 2010; Carthy, Horesh, Apter, & Gross, 2010; Suveg & Zeman, 2004) and they will thus be more likely to take longer and require more effort to employ new knowledge and skills to change emotional responding. However, results showed students with higher levels of trait anxiety improved similarly to those with lower levels on cognitive coping responses.

Development of appropriate cognitive responses to adversity has been linked to patterns of emotional regulation (Tamir, John, Srivastava, & Gross, 2007). Therefore, it may be that children with increased anxiety are able to develop effective

patterns of cognitive response efficiently, but as emotional reactivity is heightened, newly developed cognitive response patterns do not provide necessary emotional relief (Carthy, Horesh, Apter, Edge, et al., 2010).

Furthermore, findings suggest temperamentally highly anxious young people may benefit less from brief cognitive-behaviour intervention than those less temperamentally anxious. If so, children with higher levels of trait anxiety may need additional intervention sessions to ensure the effective coping responses become automatic and influential on emotional responses.

Qualitative investigations revealed that participating in the *Bullying: The Power to Cope* program was a positive experience and empowered students to feel more confident and prepared in their ability to cope with bullying. Comments also suggest the program is enjoyable and fun.

Students were provided with opportunities to engage in group and whole class discussions, as well as independent work, a combination which has been reported to lead to feelings of increased engagement in the classroom (Shernoff, Csikszentmihalyi, Schneider, & Shernoff, 2014). This is important to note because as a program that is enjoyable for students is likely to be more effective, due to students being more engaged in learning.

Strengths, Limitations and Future Research

The current study implemented the program in classroom and the significant results illustrate the ease of classroom use. The inclusion of a control group to demonstrate group differences was a strength of the current study as a common methodological flaw in intervention research is the lack of a control condition (Card & Hodges, 2008). However, there are limitations to be considered.

Participating students in Grade 5, 6 and 7 (ages 10 to 14) were recruited, so the present results cannot be generalised to year levels outside this range. Therefore, future research should attempt to demonstrate the positive results in other age groups, such as Grade 3 and 4 or Year 8 and 9. The study assessed students' coping responses at pre-test and immediate post-test. It is unknown whether improvements in cognitive and emotional coping responses could be sustained long-term. Additionally, the immediate post-test data collection may have limited the behavioral changes due to lack of opportunity to action the skills learnt throughout the program. Hence, future research would benefit from conducting a long-term follow up to determine long-term efficacy and sustainability of results.

Student self-report measures were used in this study to measure coping responses and and anxiety. Self-report measures can be subject to bias due to students responding in a socially desirable way, particularly when reporting on a behavior potentially seen as negative or socially unacceptable (Rigby, 1987). Furthermore, the use of vignettes as a means for judging student response to bullying may limit the validity of these results. It may be beneficial for future research to

incorporate behavioral observations and reports from parents and teachers to validate changes made as a result of the program.

The control and experimental groups were not truly randomly assigned. Due to implementation occurring in intact class groups within school timetabling, random allocation of students in schools was impractical. Nonetheless, future iterations could improve methodology by true randomisation. It is recognised that the statistical significance of results may have been influenced by the lack of independence in the data (i.e. students nested in schools/classrooms, O'Dwyer & Parker, 2014). Future research is needed to establish long-term effects of the *Bullying. The Power to Cope* program and its generalizability to other age groups.

Conclusion

A major takeaway of this and the previous study it replicated is that one element of a comprehensive school-wide anti-bullying prevention program is equipping all students with the mindset (attitudes and coping skills) they can employ when faced with victimization to emotionally regulate and respond effectively. REBT provides a theoretical framework that offers insight and practices (e.g., cognitive re-structuring, self-acceptance, anti-awfulising, high frustration tolerance, other acceptance) into how to go about empowering the victims of bullying. Recent empirical evidence has provided a newer perspective on the issue of bullying prevention, whereby schools have the opportunity to address bullying and its consequences by building the social-emotional capabilities of all students (Divecha & Brackett, 2020) leading to a reduction in anti-social and aggressive behaviour on the one hand and improved emotional coping and resilience on the other.

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MENTAL HEALTH LITERACY: A SURVEY OF THE PUBLIC'S ABILITY TO RECOGNIZE MENTAL DISORDERS AND THEIR KNOWLEDGE ABOUT THE EFFECTIVENESS OF HELPFUL INTERVENTIONS TO HELP THE VICTIMS

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Abstract

Background- Although Mental health literacy (MHL) among public has been widely studied in many countries, there are few studies on MHL in Srilanka. MHL is important as it is closely related to help seeking behavior and mental health outcomes. Poor MHL has been a major barrier on improving mental health care in Sri Lanka. The objective of this study was to describe MHL in terms of ability to recognize mental health problems, knowledge of helpful interventions and professional help available. The association between socioeconomic variables and MHL was also identified.

Methods- This descriptive cross-sectional study used a pretested questionnaire on 430 people aged between 18-60, where MHL was assessed using four case vignettes. The vignettes represented depression with suicidal ideation, social phobia, schizophrenia, and dementia.

Results- The response rates for recognition as a mental health problem was 83.7% (n=297) for the depression vignette, 80.8% (n=287) for schizophrenia vignette, 56.6% (n= 201) for dementia vignette and 54.4% (n= 193) for social phobia vignette. Satisfactory levels for the ability to recognize professional services were 44.5% (n= 158) for both depression and schizophrenia vignettes and 37.7% (n= 134) for dementia and social phobia vignettes. Satisfactory levels in recognizing helpful interventions were 43.4% (n= 154) for social phobia vignette, 27.9% (n= 99) for schizophrenia vignette, 21.1% (n= 75) for dementia vignette and 20.3% (n= 72) for depression vignette. A statistically significant association was found among the educational level

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and the ability to recognize mental health problems, the ability to recognize professional services and knowledge of helpful interventions.
Conclusion- Though the majority was able to recognize the mental disorders as mental health problems, their knowledge of professional services and helpful interventions were relatively very low. Therefore, the MHL of the target population is inadequate comparing to the most of western countries. There is an urgent need for mental health education initiatives to improve MHL among the public considering their socioeconomic background in Sri Lanka.

Keywords: Mental Health Literacy, MHL, depression vignette, Sri Lanka

Mental health literacy (MHL) is described as "knowledge and beliefs about mental disorders which aid their recognition, management or prevention" (Jorm, 2000). Mental health literacy consists of six components, including (1) the ability to recognize specific disorders or different types of psychological distress; (2) knowledge and beliefs about risk factors and causes; (3) knowledge and beliefs about self-help interventions; (4) knowledge and beliefs about professional help available; (5) attitudes which facilitate recognition and appropriate help-seeking; and (6) knowledge of how to seek mental health information (Jorm, 2000). MHL has been recognized for helping improve health outcomes for people (Kutcher et al., 2016; Bowyer et al., 2023).

Jorm (2000) stated that assessing mental health literacy is essential among mental health professionals and the public. He believed raising mental health literacy among the public would promote mental health care in the country. Jorm and his research group conducted many studies based on Australia using large representative samples (Furnham & Hamid, 2014; Renwick et al., 2022). The further author noted that this group was most interested in depression and schizophrenia and perceived treatment pathways. In Jorm's early studies on MHL, he highlighted the need to improve mental health literacy in the Australian community (Jorm, 2000). Jorm's late studies were mainly focused on examining the variations of MHL with the age, gender, and socioeconomic status of the people (Reavley et al., 2012; Farrer et al., 2008; Griffiths et al., 2009; Wong et al., 2022). It was found that the male gender, younger age, lower level of education and being born outside Australia were associated with a lower level of MHL (Reavley et al., 2012). Moreover, Jorm stated that MHL could be improved through interventions.

Recent literature suggests that people living in developed countries tend to show a higher level of mental health literacy, like mental health professionals' perspective, compared to people in developing countries (Furnham & Hamid, 2014; Furnham & Swami, 2018; Marinucci et al., 2023). Though depression and schizophrenia are the most studied disorders in mental health literacy research, considerable effort was made to understand the mental health literacy of various

mental disorders in developed countries (Recto & Champion, 2017). It includes anxiety disorders, children's mental disorders, Post-traumatic stress disorder, Perinatal depression, and personality disorders. A study of mental health literacy and the anxiety disorders of the British adult population in 2019 showed various levels of literacy with high recognition of obsessive-compulsive disorder (64.67%) but very poor for panic disorder (1.26%), GAD (2.84%) and separation anxiety disorder (5.99%) (Furham & Lousley, 2013). Above results point towards the need for more interventions to increase Knowledge about anxiety disorders among people.

Mental health literacy among the public in developing countries is poorly understood (Furnham & Hamid, 2014). According to a recent survey, around 450 million people suffer from mental or neurological disorders (WHO, 2022). Moreover, among the affected people with mental disorders, nearly 80% life in low- and middle-income countries (Thyloth et al., 2016). Thyloth et al. (2016) pointed out that the burden of mental disorders is increasing in developing countries due to a lack of resources, low budget for mental health, underutilization of services and stigma attached to mental illnesses. Ganeshan et al. (2007) pointed out that mental health literacy is low in developing countries, and there is considerable room to improve the state of MHL. Further, he said there is a significant gap in research and that efforts should be directed to mental health literacy to address some of the disparities in mental health care in developing countries.

Cultural beliefs are firmly held in developing countries regarding mental illness (Ganeshan et al., 2007; Chen et al., 2022). A study in India in 2014 found that 74% of respondents sharing that mental illness is nothing, but an evil spirit or black magic, possibly due to sins in one's past life (Gaiha et al., 2014). Further, the same number of respondents believed that going to a traditional healer would improve the condition. Mohamad et al. 2012 found that each ethnic group in Malaysia had solid cultural beliefs about mental illness. Such beliefs may badly influence the components of mental health literacy in most developing countries.

There are few published papers on MHL in Sri Lanka. However, the Knowledge of helpful interventions and treatments could be much better. A recent study in 2017 described the MHL in adolescents (Attygalle et al., 2017). This study found that recognition of a mental disorder for the depression vignette; was 82.2%, for the psychosis vignette, 68.7% and the social phobia vignette, 62.3%. Further, this study revealed an association between several socioeconomic variables: parents' education and monthly income and mental health literacy—the level of mental health literacy among the Sri Lankan public needs to be adequately described.

Objective

Therefore, this study will describe mental health literacy among the Sri Lankan public, considering the association with socioeconomic status. As this is an undergraduate project, only 04 mental disorders have been selected (depression with

suicidal ideation, social phobia, schizophrenia, and dementia). Only three components of MHL (ability to recognize mental illness, Knowledge of helpful interventions, and professional services) were assessed. Educational level has been selected for the socioeconomic variable.

Methods

Research approach and design

The current study has two specific objectives to describe the level of MHL in terms of the ability to recognize problems, helpful interventions, and helpful referral options and to identify the association between MHL and the socioeconomic status of the target population. A self-administered questionnaire was used to collect data. A descriptive cross-sectional survey will be adopted in this study to provide the audience with a snapshot of what is happening in the selected group of the public at one time in order to establish a degree of association between variables. Therefore, the reasoning behind using cross-sectional design in this study is to provide a snapshot of its variables at a specific point in time.

Research setting

This study is a community project, and the field of this study was selected considering the organisational structure of community health service in Sri Lanka. These are commonly known as the medical officer of health (MOH) areas. Each MOH area extends from 130-150 square kilometres with an average population of approximately 60,000. There are 341 MOH areas in Sri Lanka. They are managed by a medical doctor, supported by the public health field consisting of public health nursing sister, public health inspector, supervising public health midwife and public health midwife. The public health midwife is also responsible for a sub-divided area (PHM area) and the respective population. For the current study, the research setting will be selected as the Meddepola PHM area, which belongs to the Pannala MOH area in the Kurunegala district. Sri Lanka. This area consists of three Grama Niladari divisions (three villages) Meddepola Ihala, Medddepola Pahala and Konduruwawela. This area in the Northwestern province of Sri Lanka features a tropical and hot climate throughout the year.

Population and sample

The target population of this study is all the people aged between 18-60 years who live in this Meddepola PHM area. There are 1882 people included in the target population.

This study will be used a probability sampling method of simple random sampling to select a sample. Simple random sampling is a scheme in which each subject in the population has an equal chance of getting selected for the sample. A simple random sample is an unbiased surveying technique. Furthermore, it does not need any technical knowledge. However, it may be getting more time to select the sample. The sample size was calculated using the following formula.

$$n = Z^2_{1-\propto/2} \times \frac{P(1-P)}{d^2}$$

n = required sample size

$Z^2_{1-\propto/2}$ = Z value at 95% significant level = 1.96

d = precision = 5%

P = Expected prevalence of good mental health literacy. (It will be assumed as 50%, as used in previous studies where prevalence rates were unknown)

$$N = \frac{1.96^2 \times 0.5 \times (1-0.5)}{0.05^2}$$

N = 384

Anticipated nonresponse rate – 10%

N = 422

Sample size (N) will be rounded into 430 participants

The sample size of this study was 430 people. The sample size is significant because if inadequate, it will be affected to come to a reasonable conclusion or generalize to the target population. The inclusion criteria of this study are the male or female subjects aged 18 to 60 years and those who provide valid informed consent before the study. The exclusion criteria are pregnant mothers and people with chronic mental or physical illnesses.

Ethical consideration

Ethical approval was obtained for this research from the Ethics Review Committee, National Institute of Mental Health (ERC Number 150/08/2020). A layered information leaflet describing the study, its objectives, risks and benefits were developed in Sinhalese. All the eligible participants were given the information leaflets, and adequate time was given to go through them. They were encouraged to ask questions and clarify further. Participants were made to understand that they were free to decide whether to participate or not participate in the study and had the right to withdraw from the study at any time. Suppose they wished to do so. After that, all participants obtained written informed consent before answering the questionnaire. Data collection was done confidentially using the questionnaire. Whatever data is collected will be confidential. Personal information collected in the

participant information sheet was detached from the primary data collection tool and linked with a number known only to the data collectors. The collected data sheet will be coded, and a serial number will be given manually. They were entered into a computer. Then data collection sheets were kept password protected with them. Protected files restricted access only to the principal investigator and four co-investigators.

Data Collection Method

The data contained within this study were collected using a questionnaire focusing on three areas, the ability to recognize mental illness, knowledge of helpful interventions and knowledge of professional services. All participants were given a self-administered questionnaire. The questionnaire of the present study was self-developed by the researchers considering the research objectives (Annexure 1). It was developed by reviewing the past literature. The questionnaire has two sections. Section one included demographic data, age, sex, education level and occupation. Section two consisted of four case vignettes on depression with suicidal ideation, schizophrenia, social phobia and dementia. Each of these case vignettes consisted of 03 close-ended questions. The questions required the respondents to give their opinion on (1) whether the vignette depicted a mental health-related problem, spiritual problem, social problem, physical problem or another problem and (2) what interventions could be helpful. (3) what kinds of referrals would be helpful for each vignette? Respondents were allowed multiple answers. The pilot test was done with 20 participants from another area to establish the questions' acceptability and comprehension of the vignettes and questions, to assess the completeness of returned questionnaires and participation rates and calculate the average time needed for completion. The questionnaire was initially written in English and translated into Sinhala (all the participants were Sinhalese). Some modifications were done before submitted in the questionnaire. It was expected to take 30 minutes to fill out the questionnaire.

Reliability and Validity of the Questionnaire: The content validity of the questionnaire was received by the Consultant Psychiatrist, Dr M. Ganeshan, National Institute of Mental Health, Angoda, Sri Lanka. Test-retest reliability was assessed by administering the questionnaire to the 20 pilot study participants a week later.

Data collection: March 2021. Most of the participants received the questionnaire in their own homes. The researchers believed it was comfortable for them to complete the questionnaire at home. Researchers themselves collected the data with the help of a few villagers. The Covid 19 pandemic was a significant limitation in collecting data. The researchers strictly followed the guidelines of the health ministry when collecting data. Though 430 sample was selected, some could not participate due to quarantine issues. The researchers needed help to collect their filled questionnaires. Due to this pandemic, the duration had to be extended to two months. Data collection was done at weekends as many participants were busy on

weekdays. As this was a rural village, some participants needed more education. The researchers had to avoid these people as this was a self-administered questionnaire.

Data Analysismultiple responses

Each case vignette's responses were presented using frequencies and parentages. It took much work to assess the level of the ability to recognize professional help and helpful interventions as multiple responses were given. Therefore those responses were classified into two groups, satisfactory level and not satisfactory level, by considering the responses according to expert opinions. Then the satisfactory ability to recognize professional help and helpful interventions was presented as frequencies and percentages. Then all the responses each participant gave for all four case vignettes were calculated by giving scores for each observation and presented using frequencies and percentages. Pearson correlation analysis was performed to find the associations between socio-demographic variables such as age, gender, education level and occupation, with significance set at < 0.05.

Results

Out of the 430 questionnaires that were distributed, 356 were completed and returned (83% response rate). It was 355 total responses used for the analysis, as one response was omitted during the data-cleaning process due to missing values. In this results chapter, the first demographic data of participants were presented, and then the responses for recognizing the problem, professional help and helpful interventions were presented. Finally, the factors associated with MHL were assessed.

Demographic Characteristics: Under demographic variables, age, gender, education level and occupation are identified, and all are categorical variables. Table 1 shows the age distribution of the respondents. Most of the respondents belonged to the age group 51- 60 years. A minimum number of participants was in the age category of 46- 50 years. There were mostly female participants, which is 61.7%. Most participants (156) have passed Advance Levels s, and 22 out of 355 have a degree.

Table 1 – Demographic data of the study population

Age Distribution of Respondents		
Age group (years)	Frequency(n=355)	Percentage (%)
18-24	49	13.8
25-30	48	13.5
31-35	60	16.9
36-40	58	16.3
41-45	37	10.4
46-50	29	8.2
51-60	74	20.8

Gender Distribution of Respondents			
	Female	219	61.7
	Male	136	38.3
Educational Level of Respondents			
	Grade 05	32	9
	Passed O/L	145	40.8
	Passed A/L	156	43.9
	Degree	22	6.2
Occupations of Respondents			
	Student	19	5.4
	Unemployed	97	27.3
	Cultivation	49	13.8
	Self-employed	35	9.9
	Gov. Sector,	101	28.5
	Private Sector	54	15.2

Ability to Recognize Mental Health Problems

Table 2 shows the responses to the recognition of problems for each case vignette in the questionnaire. The response rates for recognition as a mental health problem was 83.7% (*n*= 297) for the vignette depicting depression, 80.8% (*n*= 287) for the schizophrenia vignette, 56.6% (*n*=201) for the dementia vignette and 54.4% (*n*= 193) for social phobia vignette. Of the four vignettes, social phobia had the highest response rate as a social problem at 25.6% (*n*=91). The Dementia vignette had the highest response rate at 23.6% (*n*=84) as a physical problem.

Table 2 - Responses for Recognizing of Problems

	Depression		Social Phobia		Schizophrenia		Dementia	
	Frequency *N*=355	Percentage (%)	Frequency *N*=355	Percentage (%)	Frequency *N*=355	Percentage (%)	Frequency *N*=355	Percentage (%)
A Spiritual Problem	8	2.3	14	3.9	5	1.4	36	10.1
A Physical Problem	39	10.9	27	7.6	10	2.8	84	23.6
A Mental Problem	297	83.7	193	54.4	287	80.8	201	56.6
A Social Problem	5	1.4	91	25.6	20	5.6	5	1.4
A Behavioral Problem	6	1.7	30	8.4	33	9.3	29	8.1

Ability to Recognize Professional Help

Table 3 reflects the participants' responses regarding helpful, professional services for each vignette. In this question, participants were allowed to choose multiple answers. 68.7% (*n*=244) of participants rated psychiatrists as helpful for depression vignettes, followed by 54.7% (*n*=194) for psychological counsellors. In the Schizophrenia vignette, 70.7% (*n*=257) rated psychiatrists helpful. Nevertheless,

for the dementia vignette and social phobia vignette, only 46.8% (*n*=166) and 31.8% (*n*=113) rated the psychiatrist as helpful. 55.7% (n=198) said close friends as helpful, and 45.9% (*n*=163) said the clergy was helpful for the dementia vignette. These results were further categorized into two parts satisfactory level and non-satisfactory level in recognizing professional help. Satisfactory level – all the responses are chosen professional services only Non-satisfactory level – all the mixed responses with non-professional persons or services.

Table 3 - Responses for Recognizing Professional Help

	Depression		Social Phobia		Schizophrenia		Dementia	
	Frequency *N*= 355	Percentage (%)	Frequency *N*= 355	Percentage (%)	Frequency *N*= 355	Percentage (%)	Frequency *N*= 355	Percentage (%)
Help from close family friends	134	37.7	100	28.2	82	23.1	95	26.7
A typical general practitioner	59	16.6	48	13.5	39	10.9	122	34.4
A native doctor	20	5.6	5	1.4	13	3.6	17	4.8
A Psychiatrist	244	68.7	113	31.8	251	70.7	166	46.8
Help from close friends	120	33.8	198	55.7	132	37.18	46	12.9
The clergy/ a minister or priest	130	36.6	92	25.9	123	34.6	163	45.9
Telephone counselling service	28	7.8	43	12.1	31	8.7	23	6.5
An astrologer	25	7	22	6.2	29	8.2	30	8.5
A psychological counsellor	194	54.7	184	51.8	197	55,5	143	40.3
Not approach anyone for help and deal with problem alone	15	4.23	76	21.4	28	7,9	15	4

Table 4 shows the proportions of satisfactory levels for each case vignette in recognizing professional help. For depression and schizophrenia vignettes, 44.5% (n=158) of participants were satisfactory and 37.7% (n=134) for both social phobia and dementia vignettes. These results were further categorized into two parts satisfactory level and non-satisfactory level in recognizing helpful interventions (Table 4). Satisfactory level- all the responses are chosen professional interventions only Not satisfactory level – all the mixed responses with non-professional interventions.

Table 4 - Satisfactory Levels in Recognizing Professional Help

	Depression		Social Phobia		Schizophrenia		Dementia	
	Frequency (*N*=355)	Percentage (%)	Frequency (*N*=355)	Percentage (%)	Frequency (*N*=355)	Percentage (%)	Frequency (*N*=355)	Percentage (%)
Satisfactory level in recognizing professional services	158	44.5	134	37.7	158	44.5	134	37.7

Ability to Recognize Helpful Interventions

Participants allowed multiple answers to this question also. Table 5 shows the responses to helpful interventions for each case vignette. Taking medications for psychiatric illness, rated 40.8% (*n*=145) for schizophrenia vignette, 36.9% (*n*=131) for depression vignette, 21.7% (*n*=77) for dementia vignette and 14.7% (*n*=52) for social phobia vignette. Another helpful intervention of being admitted to a psychiatric ward or hospital rated as 3.4% (*n*=12) for depression and suicidal ideation vignette and 11.6% (*n*=41) for schizophrenia vignette respectfully. Meanwhile, psychotherapy was rated as helpful by 47% (*n*=167) for the depression vignette, 46.8% (*n*=166) for the social phobia vignette, 45.9% (*n*=163) for the schizophrenia vignette and 30.1% (*n*=107) for dementia vignette. These results were further categorized into two parts satisfactory level and non-satisfactory level in recognizing helpful interventions (Table 5). Satisfactory level – all the responses are chosen professional interventions only (Table 6). Not satisfactory level – all the mixed responses with non-professional interventions.

Table 5 - Response for Helpful Interventions

	Depression		Social Phobia		Schizophrenia		Dementia	
	Frequency *N*=355	Percentage %	Frequency *N*=355	Percentage %	Frequency *N*=355	Percentage %	Frequency *N*=355	Percentage %
Perform ceremonies to expel 'evil eye'	21	5.9	17	4.8	23	6.5	14	3.9
Taking vitamins and minerals	29	8.2	6	1.7	6	1.7	23	6.5
Pain relievers such as paracetamol	19	5.3	1	0.3	7	2	5	1.4
Sleeping pills	9	2.5	2	0.5	15	4	3	0.8
Medications for psychiatric illness	131	36.9	52	14.7	145	40.8	77	21.7
Becoming physically more active (Playing more sport, gardening)	176	49.5	156	43.9	164	46.8	94	26.5

	Depression		Social Phobia		Schizophrenia		Dementia	
	Frequency *N*=355	Percentage %	Frequency *N*=355	Percentage %	Frequency *N*=355	Percentage %	Frequency *N*=355	Percentage %
Reading about people with similar problems	165	46.5	240	67.6	158	44.5	78	21.9
Relaxation, stress management , meditation and yoga	208	58.6	135	38	166	46.8	257	72.4
Psychotherapy	167	47	166	46.8	163	45.9	107	30.1
Hypnosis	4	1.1	5	1.4	13	3.7	5	1.4
Perform religious activities	211	59.4	99	27.9	143	40.3	239	67.3
Being admitted to psychiatric ward or hospital	12	3.4	6	1.7	41	11.6	16	4.5
Use alcohol/ cigarettes/ drugs	0	0	0	0	2	0.5	0	0
Cut down use of alcohol/ cigarettes/ drugs	9	2.5	14	3.9	40	11.3	12	3.4

Table 6-Satisfactory Level in Recognizing Helpful Interventions

	Depression		Social Phobia		Schizophrenia		Dementia	
	Frequency *N*=355	Percentage %	Frequency *N*=355	Percentage %	Frequency *N*=355	Percentage %	Frequency *N*=355	Percentage %
Satisfactory level in recognizing helpful interventions	72	20.3	154	43.4	99	27.9	75	21.1

Considering the frequencies and percentages in every four cases, two significant observations can be seen. The participants had more than 50% ability to recognize the mental health problem correctly, but they needed more ability to (> 50%) recognize the professional services and helpful interventions.

Associated Factors of MHL

Table 7 describes the association among several socio-demographic factors, namely age, gender, education level and occupation, with the ability to recognize mental health problems, the ability to recognize professional services and the ability to recognize helpful interventions. In this study it was found a strong correlation between higher education and the ability to recognize mental disorders correctly, $r(354)=0.19$, $p<0.001$, and correctly recognizing persons/services, $r(354)=0.14$, $p<0.05$; and correctly recognizing actions/interventions $r(354)$, 0.12, $p<0.05$. Also, we found a strong relationship between good occupation and their ability to correctly

recognize mental disorders $r(354)$, 0.15, $p<0.05$, correctly recognizing persons/services dealing with mental disorder $r(354)$, 0.1, $p<0.05$ and correctly recognizing actions/interventions $r(354)$, 0.1, $p<0.05$.

Table 7 - Correlation Analysis

	Ability to correctly recognizing mental disorder (Level of A)		Ability to recognize persons and services to dealing with mental disorder (Level of B)		Ability to recognize actions/interventions to deal with mental disorder (Level of C)	
	Corelation	Significance	Corelation	Significance	Corelation	Significance
1.Age	0.034	0.518	-0.068	0.200	-0.047	0.381
2.Gender	-0.047	0.380	-0.019	0.722	-0.057	0.281
3.Education Level	0.185**	0.000	0.139**	0.009	0.116**	0.029
4.Occupation	0.146**	0.006	0.105**	0.048	0.110**	0.039

** Correlation is significant at the 0.05 level (2-tailed)

Then, we can conclude that when the person has good education background and the occupation, he/she has a little bit good mental health literacy. Validity assessment was done for the study, with the construct validity to evaluate whether the measure accurately represents the intended construct. This can involve factor analysis to determine if items load onto the expected factors.

Discussion

In this present study data, majority of participants were females. Most of respondents fell within the ages of 51-60 and 31-35 years. Most of participants have passed A/L. It means majority of participants had good educational level. This study used vignette based questionnaire which allowed participants to select more options. In this chapter the results were discussed under four topics which were related to the specific objectives of this study.

Mental health literacy refers to the knowledge and understanding that individuals have about mental health, including the ability to recognize and manage mental health problems. Here are some suggestions for designing and implementing strategies to enhance mental health literacy:

Education and training: Providing education and training on mental health can be an effective way to enhance mental health literacy. This can include workshops, seminars, and online courses that provide information on mental health, its causes, symptoms, and treatment options.

Community-based programs: Community-based programs, such as peer support groups, can help individuals with mental health issues feel less isolated and improve their understanding of their condition. These programs can also provide a

safe space for individuals to discuss their mental health concerns and learn from others.

Collaboration with mental health professionals: Collaborating with mental health professionals can help individuals gain a better understanding of mental health conditions and how to manage them. This can involve working with therapists, psychiatrists, and other mental health professionals to develop educational materials and resources.

Awareness campaigns: Awareness campaigns that aim to reduce the stigma surrounding mental health can help individuals feel more comfortable discussing their mental health concerns and seeking help. These campaigns can include public service announcements, social media campaigns, and other forms of outreach.

Access to resources: Providing access to mental health resources, such as hotlines, online support groups, and mental health apps, can help individuals with mental health concerns feel more empowered to seek help and manage their condition. This can include partnerships with mental health organizations to provide free or low-cost resources to individuals in need.

Ability to recognize mental health problems

This study's findings showed that most respondents correctly recognized Depression, Schizophrenia, Dementia and Social Phobia as mental health problems. Similar findings could be seen in another Sri Lankan study assessing MHL among adolescents (Attygalle et al., 2017). In both studies, the participants were not expected to give the correct diagnostic label for these mental disorders. In Sri Lanka, the lay terms used for many mental disorders in the local language are unfamiliar to the general public (Amarasuriya et al., 2015). It sounds pretty unusual to say "Vishadaya" for Depression. The authors believed these lay terms might confuse the participants. This difficulty was a possible reason for the low recognition of Depression among undergraduates in a study in Sri Lanka (Amarasuriya et al., 2015).

Depression (83.7%) and Schizophrenia (80.8%) were quickly recognized as mental illnesses by most respondents in this study. It seems that many participants were aware of the symptoms of these mental illnesses. Researchers believe this result reflects some improvement in mental health care services, especially at the community level. These results are also close to several western studies discussed in the literature review (Reaveley et al., 2011; Zorilla et al., 2019).

Recognition of anxiety disorders like Social Phobia was relatively low in the present study. According to the NMHS (2007), 1.9% of people suffer from anxiety disorders in Sri Lanka. However, insufficient attention is paid to improving the MHL of anxiety disorders in Sri Lanka. It is compared with the findings of an Australian study (Reavley et al., 2011). Above one-fourth of respondents believed the Social Phobia vignette was a social problem in the present study. The result indicates the need for more interventions to improve public knowledge of anxiety disorders.

The present study's findings are inconsistent with some Chinese studies (Huang et al., 2019). Only 32.6% recognized Schizophrenia and Depression, both vignettes, as mental illnesses. The authors cited several possible reasons for these findings, including a lack of public mental health education and a severe stigma of mental illness. The result of the present study on the recognition of Dementia vignettes is not satisfactory when comparing the Singapore study (Chong et al., 2016). 66.3% identified Dementia vignettes in Singapore, while 56.6% in Sri Lanka. According to the authors of that study, this resulted from substantial educational initiatives conducted in public health services to face the challenge of the fastest ageing population in Singapore. Sri Lanka is also facing this demographic shift like Singapore. It is necessary to implement educational strategies to improve knowledge of Dementia in Sri Lanka.

Ability to recognize professional services

According to the findings, the ability to recognize professional services could have been more satisfactory among respondents in this study. The majority recommended help from informal sources than traditional sources. In the Social Phobia vignette, 55.7% rated help from close friends. Research has consistently shown that Asians prefer to seek help from informal sources such as family, close friends, close relatives and clergy (Picco et al., 2016; Poreddi et al., 2019; Mohamad et al., 2012; Attygalle et al., 2017). Most people choose informal sources because of their stigma and lack of knowledge (Ganeshan et al., 2007). Seeking appropriate help from professional sources is very important for the prevention, early detection and treatment of and recovery from mental disorders (Jorm, 2000). Timely referral for these professional services is also essential. Therefore these informal sources of help should have adequate skills and knowledge to recognize mental health issues and refer for professional services when needed.

In the dementia vignette, a relatively high proportion has rated meeting a clergy as helpful in this study. This finding indicates that cultural and religious beliefs may also influence help-seeking behaviour. In Buddhist culture, many people like to take advice from the clergy. It is a common practice among most Buddhists. This is compared with the findings of another Asian country, Malaysia (Mohamad et al., 2012). In this study, most participants used religious and traditional coping mechanisms in their help-seeking process. Cultural influence on MHL is another area of future research, especially in the Asian context.

However, the findings of similar studies in western countries are incompatible with the present study (Reavley et al., 2011: Zorrilla et al., 2019). Most participants rated professional services as helpful for vignettes. It may be due to good awareness of evidence-based treatments among people and the availability of such resources in those countries.

Ability to recognize helpful interventions

Concerning the other component of MHL, the knowledge of helpful interventions of the participants was inferior for all 04 case vignettes in this study. When asked about helpful interventions for Depression with suicidal ideation vignette, most participants rated attending courses of relaxation, stress management, meditation and yoga/performing religious activities / becoming physically more active and reading about people with similar problems are helpful than using psychiatric medication and being admitted to psychiatric ward or hospital. This finding indicates that general people prefer lifestyle interventions to professional ones. Though these lifestyle interventions are helpful, they may delay the person seeking professional help (Jorm, 2000). Depression with suicidal ideation is precarious, and early treatment is essential. If not taken timely action, it may lead to suicide also. Therefore this finding is emphasized that people should be educated about professional interventions that are more likely to be effective.

Other Western studies found that participants rated these lifestyle interventions even higher (zorilla et al., 2019; Reavley et al., 2011). However, considering the participants' help-seeking behaviours, they likely practice these lifestyle interventions with professional guidance. Most Asian studies are consistent with the present findings (Wu et al., 2017; Thai et al., 2018).

One interesting finding in the present study was that a relatively higher proportion (nearly 40%) of participants rated psychotherapy/ counselling as helpful for all 04 vignettes. Though this is a positive way to deal with mental health problems, people might need help finding qualified psychologists or counsellors in their area. It is another issue that the health authorities should pay attention to give some solution for the issue.

Perform religious activities like "Bodhipooja" was rated as helpful by the majority of participants for all 04 vignettes in the present study, following Dementia (67.3%), Depression (59.4%), schizophrenia (40.28%) and Social Phobia (27.89). It indicates a religious and cultural influence in choosing interventions among people. In previous Sri Lanka study cited above rated relatively low proportions for the above intervention as Depression (29.9%), Social Phobia (21.5%) and Psychosis (31.7%). This study was done with adolescents in Sri Lanka. Therefore, choosing helpful interventions may affect the sample's age.

Socio economic variables and mental health literacy

According to the findings of this study, higher levels of education level were significantly associated with better recognition of mental health problems, helpful interventions and professional services (Table 6). This is supported by findings of many studies in the world (Reavley et al., 2012; Picco et al., 2016; Li et al., 2019; Amarasuriya et al., 2015). This could be due to acquiring some aspects of MHL

through the education system and having better access to mental health information (Picco et al., 2016). Further, the researchers believe that stigma towards mental illness can also be minimized through education. In a South Korean study, the level of education and psychology-related education were the best predictors of MHL among the public (Jeon et al., 2017). This finding also implies the importance of including psychology-related subjects in the school curriculum in Sri Lanka. Further, when planning mental health initiatives in future, socioeconomic factors like the educational level of the participants should be considered.

Mental health literacy refers to an individual's knowledge and understanding of mental health, including recognizing and managing mental health problems. It is an essential aspect of overall health and well-being, and improving mental health literacy can significantly benefit individuals and society.

One of the primary benefits of improving mental health literacy is that it can help reduce the stigma surrounding mental health. Stigma can prevent individuals from seeking help for mental health concerns, worsening symptoms and leading to adverse outcomes such as social isolation, unemployment, and even suicide. When people have a better understanding of mental health, they are more likely to seek help and support when needed, reducing the impact of stigma on their lives.

In addition, improving mental health literacy can also help individuals recognize and manage mental health problems in themselves and others. This can lead to earlier intervention, improving outcomes and reducing the long-term impact of mental health conditions. Individuals with high levels of mental health literacy can also better support their friends and family members who may be struggling with mental health issues.

Several ways to improve mental health literacy include education and training, community-based programs, collaboration with mental health professionals, awareness campaigns, and access to resources. These strategies can be implemented at the individual, community, and societal levels to improve mental health outcomes for all.

Overall, improving mental health literacy is an essential step towards reducing the burden of mental illness and promoting mental well-being. By increasing knowledge and understanding of mental health, we can create a more supportive and compassionate society that values mental health as an essential component of overall health and well-being.

Summary

The general objective of this study to assess the MHL among the general public in the Meddepola PHM area with their socioeconomic status was successfully achieved. According to the findings of the study, the MHL of the general public needed to be improved. Though the majority were able to recognize mental disorders as mental problems, their knowledge of helpful interventions and professional

services could have been more profound. The education level of the people has affected their MHL. Findings showed low educational level people possessed poor MHL. These findings reflect the reality of Sri Lankan mental health services that must be urgently addressed. Though many steps have been taken to improve mental health services in the country, people still need to learn to accept these services. Therefore more interventions need to improve the MHL of the Sri Lankan people, especially considering their different socioeconomic backgrounds. How to improve MHL is an area of future research. Limitations There are some limitations to this study. It is difficult to generalize the current study's findings to other geographical areas of Sri Lanka with different socioeconomic backgrounds. The current study used the case vignettes method to assess MHL. The responses to case vignettes may not indicate reality sometimes. Courtesy bias, as well as recall bias, may affect the responses. The self-administered questionnaire was used as a data collection tool. It was based on vignettes rather than a rating scale. Hence the MHL levels could not be scored, but such vignette-based questionnaires have been used in most studies on MHL worldwide, providing valuable results.

Implications for nursing

Nurses need to be able to provide mental health education and care with a positive attitude in the community. The community psychiatric nursing (CPN) post was introduced recently, aiming to extend mental health care beyond the hospital to the community. These specialist nurses work in collaboration with the primary health care team. They provide mental health education to the community to improve the MHL of the people. However, there are only 02 psychiatric nurses allocated to each district. Though insufficient, CPNs do a great job in the community to their best. Nurses are the most available health professionals to patients in hospitals. They should practice a holistic approach to caring for patients. Hence they can identify the mental health needs of the people and risk factors for future mental health issues.

Recommendations

It is essential to assess MHL Island-wide. National-level MHL surveys should be conducted. Hence relevant authorities could get a clear idea. Educational strategies should be planned to improve the MHL of the general public. Mental health services should be well-funded and efficiently distributed around the country. The necessary human resources should be trained and allocated to the community. Community health services should be more focused on the mental health needs of the people. Mental health education should be included in the school curriculum. It is important to disseminate accurate information through media to improve MHL and prevent the stigma of mental illnesses. Further research needs to be conducted on MHL and its affecting factors.

Authors' note

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Appendix

"Mental health literacy": a survey of the public's ability to recognize mental disorders, and their knowledge about the effectiveness of helpful interventions to help the victims

Self-administered questionnaire

Part - A

Please provide the following details about yourself.

1. Age (Years):
   - 18 - 24 ☐
   - 25 - 30 ☐
   - 31 - 35 ☐
   - 36 - 40 ☐
   - 41 - 45 ☐
   - 46 - 50 ☐
   - 51 - 60 ☐

2. Gender:
   - Male ☐
   - Female ☐

3. Ethnicity:
   - Sinhala ☐
   - Muslim ☐
   - Tamil ☐
   - Other ☐

4. Religion:
   - Buddhists ☐
   - Hindu ☐
   - Islam ☐
   - Christian ☐
   - Other ☐

5. Employment Status:

Student	☐	Gov. Sector	☐
Unemployed	☐	Private Sector	☐
Cultivation	☐	Others	☐
self-employed	☐		

Part - B

There will be four scenarios of four people describe below. please answer about your ideas and decisions regarding the questions asked about them. (You can choose more than one answer for each question).

Vignette 1

Kamala is 30 Years old and was fine until six months ago when she began to feel tired all the time. She says that she is sad and has lost interest in life. Even her children and family don't make her feel happy. She cannot sleep and she has lost the he tastes for food, which she used to love. she has lost interest in cooking because she can't concentrate. Sometimes she feels like jumping into the well to end her life.

Her Problem is,
(Tic (√) the most appropriate answer as you think)

a. A Spiritual Problem
b. A Physical Problem
c. A Mental Problem
d. A Social Problem
e. A behavior Problem
f. Other

(a) Given below are persons and services that Kamala might approach for help when dealing with this problem. Tic (√) one or more answers likely to be appropriate.

Help from close family members	
A typical general practitioner.	
A Native doctor	
A psychiatrist	
Help from close friends	
the clergy, a minister or priest	
Telephone counselling service	
An astrologer	
A Psychological Counsellor	
Not approach anyone for help and deal with problem alone	
Other (specify)……	

(b) Given below are some actions/interventions Kamala might engage in when trying to deal with this problem. Tic (√) one or more interventions likely to be helpful.

Perform ceremonies to expel the ' evil eye'	
vitamins and minerals, tonic of herbal medicines	
Pain relievers such as paracetamol	
Sleeping pills	

medications used for psychiatric illness	
Becoming physically more active, such as playing more sport or doing a lot more walking, or gardening	
Reading about people with similar problems and how they have dealt with them	
Attending courses of relaxation, stress management, meditation and yoga.	
Psychotherapy	
Hypnosis	
perform religious activities (eg: bodipooja)	
Being admitted to psychiatric ward or hospital	
Use alcohol/cigarettes/drugs	
Cut down use of alcohol/cigarettes/drugs	
Other (specify)……	

(c) If you like, please write something about the above vignette.
……
……
……

Vignette 2

Kumara is an 18 years old student. He has extreme fear of talking in the presence of others. On these Occasions he feels extremely fearful even when talking of such situation with these symptoms he has been having many difficulties in continuing his school work.

(a) His Problem is,
(Tic (√) the most appropriate answer as you think)
   a. A Spiritual Problem
   b. A Physical Problem
   c. A Mental Problem
   d. A Social Problem
   e. A behavior Problem
   f. Other

(b) Given below are persons and services that Kumara might approach for help when dealing with this problem. Tic (√) one or more answers likely to be appropriate.

Help from close family members	
A typical general practitioner.	
A Native doctor	
A psychiatrist	
Help from close friends	
The clergy, a minister or priest	

Telephone counselling service	
An astrologer	
A Psychological Counsellor	
Not approach anyone for help and deal with problem alone	
Other (specify)……	

(c) Given below are some actions/interventions Kumara might engage in when trying to deal with this problem. Tic (√) one or more interventions likely to be helpful.

Perform ceremonies to expel the ' evil eye'	
vitamins and minerals, tonic of herbal medicines	
Pain relievers such as paracetamol	
Sleeping pills	
medications used for psychiatric illness	
Becoming physically more active, such as playing more sport or doing a lot more walking, or gardening	
Reading about people with similar problems and how they have dealt with them	
Attending courses of relaxation, stress management, meditation and yoga.	
Psychotherapy	
Hypnosis	
perform religious activities (eg: bodipooja)	
Being admitted to psychiatric ward or hospital	
Use alcohol/cigarettes/drugs	
Cut down use of alcohol/cigarettes/drugs	
Other (specify)……	

(d) If you like, please write something about the above vignette.
……
……
……

Vignette 3

Piyasiri is a 30 years old bus driver. Since about a month he has been refusing to go to work. He prefers to stay at home with doors and window shut. His wife complains that he sleeps poorly at night, laughs and talks on his own. He claims he is responding to voices he hears. He does not maintain self-care and claims that he remains at home as his neighbors trouble him. He believes he has no illness.

(a) His Problem is,
(Tic (√) the most appropriate answer as you think)
a. A Spiritual Problem

b. A Physical Problem
c. A Mental Problem
d. A Social Problem
e. A behavior Problem
f. Other

(b) Given below are persons and services that Piyasiri might approach for help when dealing with this problem. Tic (√) one or more answers likely to be appropriate.

Help from close family members	
A typical general practitioner.	
A Native doctor	
A psychiatrist	
Help from close friends	
The clergy, a minister or priest	
Telephone counselling service	
An astrologer	
A Psychological Counsellor	
Not approach anyone for help and deal with problem alone	
Other (specify)……	

(c) Given below are some actions/interventions Piyasiri might engage in when trying to deal with this problem. Tic (√) one or more interventions likely to be helpful.

Perform ceremonies to expel the ' evil eye'	
Vitamins and minerals, tonic of herbal medicines	
Pain relievers such as paracetamol	
Sleeping pills	
Medications used for psychiatric illness	
Becoming physically more active, such as playing more sport or doing a lot more walking, or gardening	
Reading about people with similar problems and how they have dealt with them	
Attending courses of relaxation, stress management, meditation and yoga.	
Psychotherapy	
Hypnosis	
Perform religious activities (eg: bodipooja)	
Being admitted to psychiatric ward or hospital	
Use alcohol/cigarettes/drugs	
Cut down use of alcohol/cigarettes/drugs	
Other (specify)……	

(d) If you like, please write something about the above vignette.

Vignette 4

Rani is 75 years old and retired. Her husband noticed that she has problems remembering things that happened recently. She repeats questions which he has already answered. She misplaces her things and occasionally gets confused during their conversations sometimes. Rani and her husband quarrel as she accuses him of taking her things. She lost her way once or twice whilst going to their son's home.

(a) Her Problem is,
(Tic (√) the most appropriate answer as you think)
   a. A Spiritual Problem
   b. A Physical Problem
   c. A Mental Problem
   d. A Social Problem
   e. A behavior Problem
   f. Other

(b) Given below are persons and services that Rani might approach for help when dealing with this problem. Tic (√) one or more answers likely to be appropriate.

Help from close family members	
A typical general practitioner.	
A Native doctor	
A psychiatrist	
Help from close friends	
the clergy, a minister or priest	
Telephone counselling service	
An astrologer	
A Psychological Counsellor	
Not approach anyone for help and deal with problem alone	
Other (specify)……	

(c) Given below are some actions/interventions Rani might engage in when trying to deal with this problem. Tic (√) one or more interventions likely to be helpful.

Perform ceremonies to expel the ' evil eye'	
Vitamins and minerals, tonic of herbal medicines	
Pain relievers such as paracetamol	
Sleeping pills	
Medications used for psychiatric illness	
Becoming physically more active, such as playing more sport or doing a lot more walking, or gardening	
Reading about people with similar problems and how they have dealt with them	
Attending courses of relaxation, stress management, meditation and yoga.	
Psychotherapy	

Hypnosis	
Perform religious activities (eg: bodipooja)	
Being admitted to psychiatric ward or hospital	
Use alcohol/cigarettes/drugs	
Cut down use of alcohol/cigarettes/drugs	
Other (specify)……	

(d) If you like, please write something about the above vignette.

……

……

……

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