Journal of
Research in Psychopathology
https://dx.doi.org/10.22098/jrp.2022.11082.1114

2022; Vol. 3, No. 9
Pages: 15 - 27

Original Article

The relationship of shyness and neuroticism with social anxiety: The mediating role of effortful control

Ali Moghadam [1], Farzaneh Mikaeli Manee [2*] and Sheler Abkhiz [3]

1. M.A. in General Psychology, Urmia University, Urmia, Iran.
2. Associate Professor, Department of Psychology, Faculty of Literature & Humanities, Urmia University, Urmia, Iran.
3. M.A. in Educational Psychology, Urmia University, Urmia, Iran.

Abstract

The current study aimed at investigating the relationship of shyness and neuroticism with social anxiety taking into account the mediating role of effortful control. The research method was descriptive-correlational of structural equation modeling. The population included all high school students (adolescents) in the cities of Tehran province studying in one of the public schools of these cities in the year 2021. The sample was selected from the cities of Tehran province by multi-stage cluster sampling (197 girls and 210 boys). Four standard questionnaires including Revised Cheek-Briggs Shyness Scale (1990), Short form of Five Personality Factors Questionnaire (2006), Social Anxiety Scale for Adolescents (1998) and Effortful Control Scale (2003) were used to collect data. The data were analyzed in two sections: descriptive statistics using $SPSS_{23}$ software and inferential statistics using structural equation modeling in Amos software. The results revealed that only the relationship between shyness with social anxiety (β = 0.46, t = 5.081, sig = 0.000) and shyness with effortful control (β = -0.54, t = 5.985, sig = 0.000) were significant (positively and negatively, respectively). Effortful control does not mediate the effect of neuroticism on social anxiety and the effect of shyness on social anxiety. Correspondingly, neuroticism has no effect on social anxiety. Conversely, the whole model comprising the combination of shyness, neuroticism, and effortful control variables could explain social anxiety (R^2 = 27.4%) and the model had an acceptable fit.

Keywords

Social anxiety
Adolescents
Effortful control
Shyness
Neuroticism

Received: 2022/07/02
Accepted: 2022/07/31
Available Online: 2022/08/30

Introduction

Social Anxiety Disorder (SAD) is the third most common mental health disorder after depression and substance abuse, with a lifetime prevalence of about 12% and is the most common anxiety disorder (Kessler et al., 2005). On this regard, about 80% of cases of SAD are formed from the beginning of adolescence to the second decade of life (youth) (Merikangas et al., 2010). Some researchers are certain that all cases of SAD begin before adulthood (Wittchen et al., 1999). This disorder is characterized by feelings of anxiety and fear of situations in which a person is in the company of others or has to do something in front of them (for instance giving a speech). People with this problem are afraid of and avoid any social situation in which they think they may be negatively evaluated by others (American Psychiatric Association, 2013). The main characteristic of SAD is a defect in social functions (Morrison et al., 2016) which is related to a defect and malfunction in various areas of life (social, occupational and educational) and has a negative impact on it (de Lijster et al., 2018). Social anxiety is defined as "a constellation of cognitive and affective experiences that result from the prospect of interpersonal evaluation in real or imagined social situations " (Schlenker & Leary, 1982, p.665). SAD, which embraces severe social anxiety, is defined by American Psychiatric Association (2013, p. 202) as "marked fear or anxiety about one or more social situations in which the individual is exposed to possible scrutiny by others". In the case of SAD, social situations are experienced with extreme discomfort or are avoided. In the United States, the lifetime prevalence of SAD for adolescents 13 to 17 years of age is 6.2% in men and 11.2% in women (Kessler et al., 2012).

In the field of etiology, various factors which explain anxiety disorders, such as SAD, have been identified. These factors might be divided into three main groups of vulnerable, protective and maintaining factors. These

Corresponding author: Associate Professor, Department of Psychology, Faculty of Literature & Humanities, Urmia University, Urmia, Iran.
E-mail: **f.michaeli.manee@gmail.com**

factors could be environmental or genetic in nature, but what is important is that in most cases SAD is the result of the interaction of all of the above factors. Vulnerability factors (such as behavioral inhibition, negative parenting behaviors, and information processing abnormalities) increase or maintain fear and anxiety while protective factors such as effortful control, self-esteem, resilience, and effective coping strategies counteract or reduce negative emotions. For instance, mothers' fear of negative evaluation and parental control play a role in predicting social anxiety (Sajjadian Khosroshahi & Mikaeli Manee, 2020). When the vulnerability is high and the protection is low, the child or adolescent is more likely to develop pathological anxiety, and when this happens repeatedly over a period of time, it may lead to an anxiety disorder (Muris, 2007).

For years, researchers have concluded that genetic predispositions play a crucial role in the development of anxiety disorders in humans (Ogliari et al., 2010). Personality has been shown to play an important role in the experience of social anxiety (Abdollahi et al., 2016; 2019). In this regard, there are some personality factors that have clear genetic foundations. One of these genetic predispositions is neuroticism (Johnson et al., 2016). Neuroticism indicates a person's tendency to experience anxiety, negative emotions, emotional instability, restlessness and irritability (Yusoff et al., 2021), stress, compassion, hostility, impulsivity, depression and low self-esteem (Costa & McCrae, 1992). People with high levels of this trait often react inappropriately to environmental stresses, interpret neutral and normal situations as threatening, and become severely frustrated and depressed in the face of small failures (Widiger, 2009). On the one hand, they are very sensitive to criticism and on the other hand, they constantly criticize themselves, which makes them feel dissatisfied (Lahey, 2009). Studies have revealed that this characteristic makes a person vulnerable to a range of forms of psychological pathology such as substance abuse, physical symptoms, and eating disorders (Bagby et al., 2017; Paulus et al., 2016). In addition, neuroticism has been associated with symptoms of mood disorders and anxiety at the clinical and non-clinical levels (Vinograd et al., 2020). Social anxiety has also been correlated with high levels of this trait in various research (Costache et al., 2020). There is growing evidence that neuroticism and social anxiety disorder may have common genetic underpinnings that make this personality trait susceptible to such diseases or show symptoms on a non-clinical level (Stein et al., 2017; Scaini et al., 2014). There are studies which show the relationship between neuroticism and social anxiety (e.g. Kaplan et al., 2015; Abdollahi et al., 2022; Scott et al., 2017; Allan et al., 2017). There were positive correlations in Kaplan et al. (2015) and Abdollahi et al. (2022) studies of neuroticism and social anxiety. Other studies have shown that people with high neuroticism characteristics are more likely to experience social anxiety (Scott et al., 2017). These people may experience more fear of negative evaluations in stressful situations and prefer individual activities to social ones (Glinski & Page, 2010). The results of a study by Allan et al. (2017) showed that the relationship between neuroticism and social anxiety could be clarified through inhibitory intolerance, fear of negative evaluation, and social concerns about anxiety sensitivity. Results of Newby et al. (2017) showed that self-consciousness, vulnerability, and impulsiveness aspects of neuroticism uniquely predict interaction anxiety. Conversely, aspects of self-consciousness, vulnerability, and anxiety uniquely predicted assessment anxiety. In addition, studies have shown that people with high levels of neuroticism and social anxiety experience shyness to a significant extent (Schmidt & Fox, 1995; Lawrence & Bennett, 1992).

Durmus believes that shyness is a personality trait, attitude, or state of inhibition. Zimbardo considers shyness to be an experience in which a person pays excessive attention to themself and continuously makes negative evaluations of themself to the extent that these situations lead to discomfort for the shy person and prevent the occurrence of emotions in social situations along with inhibiting the pursuit of interpersonal and professional goals (Zimbardo et al., 1997). Study Matsushima et al. (2000) defined shyness as a person's deterrent reaction to strangers and distant acquaintances. Shyness is defined as "the propensity to respond with heightened anxiety, self-consciousness, and reticence in a variety of social contexts" (Jones et al., 1986, p.630). In fact, shyness is a state of discomfort or caution in the face of other people or new situations (Coplan & Arbeau, 2008). A shy child/ adolescent/ or adult is interested and eager to communicate and interact with others, but refrains due to lack of confidence and fear of negative social evaluations (Rubin et al., 2009). Shyness causes behavioral inhibition in the community and hinders the process of achieving healthy interpersonal relationships and personal goals. Shyness could range from cognitive levels (such as severe negative self-esteem), emotional levels (such as anxiety), physiological (sympathetic arousal) to behavioral levels (such as failure to respond appropriately) and occur in a variety of situations (Henderson et al., 2001). In the United States, 43% of male and 50% of female adolescents report shyness (Burstein et al., 2011). Clinically, shy people express more fears in their lives (D'Souza et al., 2006). Some researchers believe that shyness is one of the dimensions of social anxiety (Hofmann et al., 2004). Findings of study of Hasanvand Amouzadeh (2012) specified that shyness has a positive and significant relationship with social anxiety. Some researchers consider the two to be quite similar, but in fact they are not the same, and only a small percentage (18%) of shy people develop social anxiety, and most of them (82%) do not have it (Heiser et al., 2003). Examining the relationship between shyness and SAD and the effect of socialization on this relationship, study Poole et al (2017) found that socialization modulates the relationship between shyness and SAD symptoms in adults. People who experience conflicted shyness (i.e., high shyness and sociality) display the greatest disturbance in the cognitive, behavioral, and physical components of SAD. Studies

such as Burstein et al (2011) have consistently proven that shy adolescents and young adults are at greater risk for experiencing SAD. Shyness, as a mood talent, could contribute to the development of social anxiety through cognitive biases (Weeks et al., 2016), internalized coping (Findlay et al., 2009), and negative social attitudes (Vassilopoulos et al., 2017). Different researches have suggested positive relationship between shyness and social anxiety (e.g. Rahm-Knigge et al, 2018; Kaplan et al., 2015 ; Muris et al., 2003 ; Vreeke et al., 2012; Zhao et al., 2013; Razavi et al., 2012; Mikaeli Manee & Asadi Mojreh, 2016; Tamannefar & Tovliat, 2015; Hajloo et al., 2015).

One protective factor that has received considerable research attention in recent years is effortful control (EC). EC is a common indicator used for self-regulation and is defined by Rothbart and Bates (2006, p.129) as "the efficiency of executive attention— including the ability to inhibit a dominant response and/or to activate a subdominant response, to plan, and to detect errors". This concept refers to self-regulatory processes that help an individual increase their social and emotional competence through a situational approach avoidance (Creswell et al., 2014). EC is concerned with controlling and regulating behavior under specific conditions and includes not only behavior control but also attention control processes. Behavior inhibition refers to the ability to plan behavior, suppress behavior, or ignore information (Rothbart et al., 2001) and control attention to the individual's ability to focus and change when needed (Ellis & Rothbart, 2001). Accordingly, EC comprises the individual's ability to voluntarily manage attention (attentional regulation), and inhibit (inhibitory control) or activate (activational control) the behavior required for adaptation (Posner & Rothbart, 2007). This multidimensional ability of mood allows the individual to block an immediate and instant automatic response to a stimulus and replace it with another response that did not first occur to the mind (Rothbart & Bates, 2006). Adolescents with low EC levels will not be able to divert their attention from the annoying stimulus and, therefore, might have more difficulty regulating and controlling the negative emotions that result from it. In contrast, adolescents and children with high EC levels are able to control their behaviors, emotions, and attention and are therefore less prone to psychopathology (Eisenberg et al., 2009). For instance, if in an interpersonal situation, a teenager's usual and dominant response to their friends' humor is verbal or physical aggression, the EC ability would help the person refrain from aggressive behavior and instead explain their feelings to their friends and ask them not to joke with them (Pérez-Edgar, 2015). Various studies have proven that EC is associated with anxiety symptoms and anxiety disorders (Niditch & Varela, 2018; Raines et al., 2019; Santens et al., 2020; Raines et al.,2021).

Evidence suggests that neuroticism is associated with self-regulation (e.g. Khorsandi, Kamkar & Malekpour, 2010; Paauw, 2020). Additionally, according to the study of Zhu et al. (2022) EC plays a role in controlling shyness and in the development of social competence in children and adolescents (Eggum-Wilkens et al., 2016; Olson et al., 2017; Wilson et al., 2021). This ability helps the person control their negative emotions and feelings in social situations along with experiencing less anxiety, anger, and shame. On the other hand, research has confirmed that EC as a mood variable could influence and mediate the relationship between contextual (family) variables and psychological problems (Mun et al., 2018), and social competence (Orta et al., 2013) and anxiety (Tortella-Feliu et al., 2012). Thus, in the present study, this variable was considered as a mediator of the relationship between neuroticism and shyness with social anxiety. Findings of study Hasanvand Amouzadeh (2012) unveiled that social anxiety is associated with decreased self-esteem, self-efficacy and assertiveness. Hence, it is vital to study the factors affecting this type of anxiety. In addition, the results of the current study are expected to reveal the importance of the effortful control variable; A variable that enables children to increasingly regulate their emotions and control their behavior, resulting in less stress (Mikaeli Manee & Fathi, 2018).

In this regard, in the present study, an attempt was made to design and test an explanatory model for SAD using the above factors. This is because at any time, the level of anxiety in children and adolescents is determined by a set of vulnerabilities and protective factors. According to the above explanations, the proposed model is presented as follows. The aim of this investigation was to test the relationship between neuroticism and shyness with social anxiety and to determine the mediating role of effortful control in this regard.

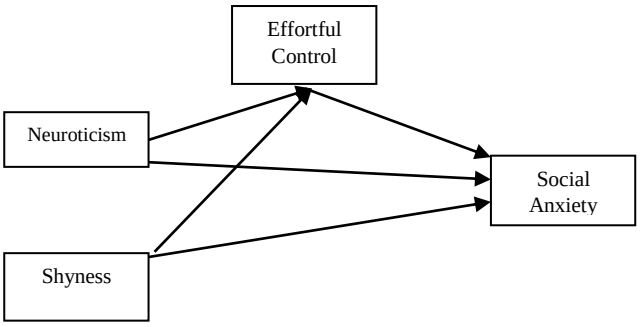

Figure 1. Conceptual model of research

Method

The research method is correlation of structural equation modeling as in this study, the relationships between variables are discussed in the form of a causal model.

Participants

The study population included all high school students (adolescents) in the cities of Tehran province who were studying in one of the public schools in these cities in the year 2021. The research sample was selected by multi-stage cluster sampling method from among the cities of Tehran province. Thus, the region was first divided geographically into five regions: east, west, north, south and center. From each district, a city, then

an educational district, then a girls 'school and a boys' school, and finally the classes and students were randomly selected. To determine the sample size, and Morgan-Krejcie table was used, which was proportional to the standard sample size in the structural equation method. After identifying the clusters, 197 female students (48.4%) and 210 male students (51.6%) were selected. The criterion for participating in the test was student satisfaction. The average age of adolescents was 15 to 17 years. Students' consent was obtained to participate in the test, and if one person did not wish to participate in the research, the individual would be removed from the sample and replaced by another person. Students were also asked to refrain from mentioning their first and last names.

Instrument

Revised Cheek-Briggs Shyness Scale (RSS):

Cheek-Briggs Shyness Scale was developed in 1990 and consists of 14 items and 3 subscales: lack of assertiveness and lack of self-confidence (4 questions), distress and social avoidance (7 questions), and the extent of shyness in relation to strangers (3 questions). It is formed to measure the degree of shyness. The scoring of the questionnaire is in the form of a 5-point Likert scale for the options "Strongly disagree", "Disagree", "No opinion", "Agree" and "Strongly agree" respectively 1, 2, 3, 4 and 5. In this scale, the range of scores could be between 14 and 70, which high score indicates a higher level of shyness and shyness of the subject. Items 6, 9, and 12 are also graded in reverse. In Iran, this measure was studied by Rajabi and Abasi (2011) in terms of factor structure and psychometric properties, which showed the desired reliability and validity and its sufficiency to measure shyness. The reliability of this tool in the present study using Cronbach's alpha method was 0.76, which indicates its optimal reliability.

Neurotic Subscale; Short form of Five Personality Factors Questionnaire (NEO):

This questionnaire was created by Costa and McCrae in 1987 and has been validated by Haghshenass (2006) in Iran. In this questionnaire, participants were asked to answer each item on a five-point scale (strongly disagree= 1 to strongly agree= 5). Due to the high number of questions in this questionnaire, the researchers used only the questions of the neuropsychology section to examine the subjects, which includes 12 questions from 60 items of the NEO personality test. Haghshenass (2006) reported the reliability of the neuroticism subscale as 0.83.

Social Anxiety Scale for Adolescents (SAS-S):

This 18-item scale was created by La Greca and Lopez (1998). Their results confirmed three subscales: 1) Fear of negative evaluation (including 8 items), 2) Social avoidance and grief in new situations (including 6 items), 3) Social avoidance and general grief (including 4 items). This scale has five options (completely like me= 5 to completely different from me= 1). High scores on this scale indicate higher social anxiety. In their research, the reliability of this test is between 0.54 and 75. Ostovar and Razavieh (2013) translated this test into Persian and used it. In their research study on students, the reliability of this test in the subscale of fear of negative evaluation, social avoidance and grief in new situations, social avoidance and general grief were 0.84, 0.74, and 0.77, respectively. The reliability of this tool in the present study using Cronbach's alpha for the whole scale of social anxiety and subscales of fear of negative evaluation, social avoidance and grief in new situations and social avoidance and general grief were 0.85, 0.79 and 0.75, respectively.

Effortful Control Scale (ECS):

The Experimental Control Questionnaire was developed by Phillips (2003). This questionnaire was used for the first time in Iran in the present study. First, the test was translated into Persian by an MA graduate in psychology and then an MA graduate in translation matched the translation with the original text. After the initial corrections, the test was translated back into English so that there was a complete match between the two versions. After the final editing, the test was performed on 30 high school students to ensure that the sentences were understandable and fluent. Psychometric information is reported below. Effortful control is a 24-item scale that asks teens to respond to their behavioral emotions on a Likert scale, with too much= 5 and too little= 1. Based on Phillips (2003), the internal consistency coefficient of the questions is 0.85. The reliability of this tool using Cronbach's alpha method for the whole scale of effortful control showed a good reliability of 0.71.

Procedure

This research is a correlation of structural equation modeling; After obtaining the necessary licenses from Urmia University, a sample of 62 people was selected to validate the instruments and a sample of 410 people was selected to test the model based on the criteria for entering the research. At each stage, with a brief explanation of how to complete the questionnaires, they were distributed among the students. Students were asked to answer the questions honestly and their information would be confidential. After collecting the questionnaires, the data of 407 people were finally analyzed using version 21 of SPSS and Amos software.

Results

Descriptive results related to mean, standard deviation, skewness and kurtosis of the variables are examined in Table 1. Cronbach's alpha and combined reliability (CR) are considered as a traditional measure and as a modern criterion for evaluating equivalent reliability, respectively. The appropriate value for Cronbach's alpha

and combined reliability is 0.7, which indicates the acceptable equivalent reliability for the measurement models. Another evaluation criterion is the extracted variance (AVE) measurement models. A minimum value of 0.5 is considered for this index. It means that the hidden variable in question evaluates at least 50% of the variance of its observations.

Table 1. Descriptive statistics, reliability and validity of the variables

Variable	Component	Mean	S.D	Coefficient of skewness	Coefficient of kurtosis	Cronbach's alpha coefficient	Composite reliability	AVE
Neuroticism	-	36.619	9.415	-0.101	-0.656	0.75	0.90	**0.44**
Shyness	lack of self-confidence	10.638	3.531	0.024	-0.687	0.69	0.88	**0.47**
	distress and social avoidance	20.828	5.252	-0.039	-0.243	0.64	0.85	**0.48**
	extent of shyness in relation to strangers	9.987	2.226	0.290	-0.378	0.70	0.90	**0.48**
	Total	39.454	8.682	-0.061	-0.413	0.62	0.88	**0.65**
Effortful Control	-	62.439	1.432	-.391	-0.429	0.64	0.84	**0.49**
Social Anxiety	Fear of negative evaluation	19.882	6.570	0.268	-0.055	0.90	0.89	**0.72**
	Social avoidance and grief in new situations	13.361	4.014	0.221	-0.510	0.92	0.83	**0.76**
	Social avoidance and general grief	8.914	3.481	0.501	-0.230	0.87	0.81	**0.61**
	Total	42.157	11.696	0.029	-0.474	0.91	0.86	**0.68**

Based on Table 1, the results show that the observed (experienced) mean obtained by students has been reported for the variables of neuroticism, shyness, social anxiety, and effortful control. The values of skewness coefficient at the error level of 0.121 and elongation coefficient at the error level of 0.241 are also in the range (+2 and 2-), which indicates the normality of data distribution for all variables. The assumption that the data distribution is normal is then confirmed. Thus, parametric statistics and structural equation modeling are used to test the hypotheses. The Cronbach's alpha value and the combined reliability are greater than 0.7, so the equivalent reliability is confirmed and proves the high consistency of the indicators of each of the research variables within the measurement models. The amount of variance extracted (AVE) is more than 0.5, which indicates the high role of measurability of research variables based on the indicators of each of them. The relationship between variables and Pearson correlation has been investigated (Table2).

Table 2. Investigation of the relationship between variables and Pearson correlation

	Variable	1	2	3	4
1	Neuroticism	1			
2	Shyness	0.385**	1		
3	Effortful Control	-0.397**	-0.416**	1	
4	Social Anxiety	0.252**	0.467**	-0.373**	1

The results divulged that neuroticism has a positive and direct relationship with shyness and social anxiety as well as shyness with social anxiety. Effortful control is inversely related to neuroticism, shyness, and social anxiety.

Structural Equation Modeling

In order to analyze the research data and statistical inference, Amos software has been used to analyze the conceptual model. One of the valid scientific methods for studying the internal structure of a set of indicators is to measure the validity of the structures, examined based on factor analysis, which is used to estimate the factor load and the relationships between sets that deals with indicators and variables. Factor loading represents the intensity of the impact of the index with the relevant factor and is interpreted like any other impact factor. Accordingly, the larger the factor loading of an index on a factor, the more weight should be given to that index in interpreting that factor. In this study, the construct validity of the research variables and the resulting indices of each variable using factor analysis test based on structural equation modeling technique are presented in Table 3.

Table 3. Results of factor analysis of indicators resulting from the variables

Variable	Item	Factorial Load	T	Variable	Item	Factorial load	T	Variable	Item	Factorial load	T
Neuroticism	R1	0.121	1.145	Extent of shyness in relation to strangers	K12	.377	1.841	Effortful Control	C21	.586	7.286
	R2	0.468	2.188		K13	.021	0.334		C22	.601	7.365
	R3	0.943	2.446		K14	.697	4.612		C23	.021	0.392
	R4	0.935	2.445	Effortful Control	C1	.427	3.214		C24	.619	7.459
	R5	0.996	2.311		C2	.050	0.923	Fear of negative evaluation (Social Anxiety)	A1	.399	1.971
	R6	0.329	2.446		C3	.189	3.314		A2	.545	6.061
	R7	0.943	2.445		C4	.565	7.163		A3	.688	7.205
	R8	0.938	2.103		C5	.419	6.103		A4	.617	6.944
	R9	0.200	2.445		C6	.233	3.959		A5	.697	7.232
	R10	0.935	2.188		C7	.463	6.473		A6	.643	7.044
	R11	0.236	2.229		C8	.229	3.915		A7	.547	6.620
	R12	0.316	2.112		C9	.619	7.458		A8	.569	6.728
Lack of self-confidence (Shyness)	K1	0.284	0.984		C10	.246	4.146		A9	.225	1.714
	K2	0.590	4.750		C11	.173	3.054	Social avoidance and grief in new situations (Social Anxiety)	A10	.369	3.611
	K3	0.600	4.766		C12	.594	7.326		A11	.203	2.791
	K4	0.487	4.539		C13	.308	4.949		A12	.652	4.027
Dis tress and social avoidance (Shyness)	K5	0.428	5.112		C14	.120	2.176		A13	.644	4.022
	K6	0.515	6.484		C15	.281	4.613		A14	.647	4.024
	K7	0.530	6.573		C16	.472	6.543	Social avoidance and general grief (Social Anxiety)	A15	.578	6.694
	K8	0.568	6.788		C17	.236	4.015		A16	.645	9.530
	K9	0.547	6.670		C18	.625	7.617		A17	.642	9.507
	K10	.430	5.880		C19	.311	4.672		A18	.471	7.606
	K11	.463	6.134		C20	.086	1.572				

According to the information in Table 3, because the values of the factor loading coefficients (for questions 1, 6, 9, 11 and 12 of neuroticism; Questions 1, 12 and 13 about shyness; Questions 2, 3, 6, 8, 10, 11, 13, 14, 15, 17, 19, 20, and 23 of effortful control and questions 9 and 11 of social anxiety) are less than 0.4, the variance between the structure and its parameters is less than the variance of the measurement error of that structure and the reliability of that structure, it is unacceptable. Thus, the questions were removed from the model with low factor load and the model was run again in Amos software. Questions with low factor loading were removed from the model and the model was run again in Amos software. In what follows, the structural model is reported by estimating the path coefficients (Figure 4 and Table 5).

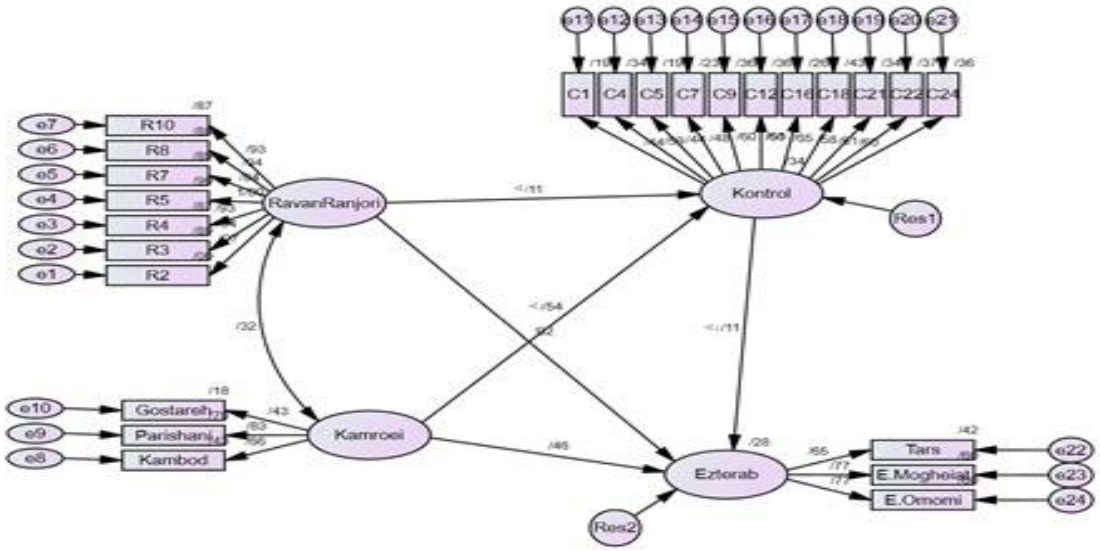

Figure 2. Structural model in standard estimation mode in Amos software

Fit indicators of the research model

In the results of the fit index, the CMIN/DF index must be less than 3, the RMSEA result must be less than 0.08 and the PNFI must be more than 0.05. Besides, the results of GFI and AGFI must be greater than 0.8, and the results of three of the five cases NFI, GFI, RFI and IFI must be above 0.9.

Table 4. Fits of the initial and final research model

Fit indices	Criterion	First model		Final model	
		Value	Result	Value	Result
CMIN/DF	<3	2.410	Unacceptable	1.735	**acceptable**
RMSEA	<.08	.093	Unacceptable	.037	**acceptable**
PNFI	>.5	.621	acceptable	.832	**acceptable**
GFI	>.8	.852	acceptable	.919	**acceptable**
AGFI	>.8	.826	acceptable	.901	**acceptable**
NFI	>.9	.686	Unacceptable	.933	**acceptable**
CFI	>.9	.785	Unacceptable	.970	**acceptable**
RFI	>.9	.653	Unacceptable	.925	**acceptable**
IFI	>.9	.789	Unacceptable	.971	**acceptable**

According to the results of Table 4, the initial model of the research did not have a good fit, so the initial model has modified from the point of view of fit according to the suggestions of the Amos software.

Impact coefficient R^2

Determination coefficient index (R^2) is the criterion for studying the structural model and indicates the effect of an exogenous variable on endogenous variables, which are three values of 0.19, 0.33 and 0.67 as the criterion value. In the first structural (regression) equation, the impact coefficient of the first equation is 0.388, that is the variables of neuroticism and shyness have been able to predict 38.8% of the effortful control which is considered average. In the second structural (regression) equation, the impact coefficient of the second equation is 0.274, that is the variables of neuroticism, shyness and effortful control have been able to predict 27.4% of social anxiety, which is poor value. The results of examining the research model paths are reported in Table 5.

Table 5. Significant/non-significant results of research model paths

	Path	Coefficient of the path	t	Sig	Result
1	The effect of neuroticism on social anxiety with mediating role of effortful control	Direct -.023 Indirect -.115	Direct .402 1.469 Indirect	.688 .142	**Insignificant**
2	The effect of shyness on social anxiety with mediating role of effortful control	Direct -.459 Indirect -.115	Direct 5.081 1.469 Indirect	.000 .142	**Insignificant**
3	The effect of neuroticism on effortful control	-.113	1.142	.253	**Insignificant**
4	The effect of neuroticism on social anxiety	.023	.402	.688	**Insignificant**
5	The effect of shyness on effortful control	-.538	5.985	.000	**Significant**
6	The effect of shyness on social anxiety	.459	5.081	.000	**Significant**
7	The effect effortful control on social anxiety	-.115	1.469	.142	**Insignificant**

In examining the paths of the research model, significant results of coefficients based on the value of t-statistic have been reported so that if the value of t statistic is more than 1.96, the predictor or output variable affects the criterion or input variable. According to Table 5, in the first path, the absolute value of t-statistic for the mediating role of effortful control in the effect of neuroticism on social anxiety is directly equal to 0.402 less than 1.96 and indirectly less than 1.96; thus, effortful control does not mediate the effect of neuroticism on social anxiety. In the second path, the absolute value of t-statistic for the mediating role of effortful control in the effect of shyness on social anxiety is directly equal to 5.081 more than 1.96 and indirectly 1.469 is less than 1.96; therefore, effortful control does not mediate the effect of shyness on social anxiety. In the third path, the absolute value of t-statistic for the effect of neuroticism on effortful control is 1.142 less than 1.96, so neuroticism has no effect on effortful control; thus, neuroticism has no effect on social anxiety. In the fifth path, the absolute value of t-statistic for the effect of shyness on effortful control is equal to 5.985 more than 1.96, therefore, shyness has a negative effect on effortful control. In the sixth path, the absolute value of t-statistic for the impact of shyness on social anxiety is equal to 5.081 more than 1.96, so shyness has a positive effect on social anxiety. In the seventh path, the absolute value of t-statistic for the effect of effortful control on social anxiety is equal to 1.469 less than 1.96 according to which, effortful control has no effect on social anxiety.

Discussion

The aim of this study was to investigate the relationship between shyness and neuroticism with adolescent social anxiety with respect to the mediating role of effortful control. The results indicated that only the relationship

between shyness on social anxiety and shyness on effortful control is significant (positive and negative, respectively). Effortful control does not mediate the effect of neuroticism on social anxiety and the effect of shyness on social anxiety. Similarly, neuroticism has no effect on social anxiety. Nevertheless, the whole model, that is the combination of shyness, neuroticism, and effortful control variables, was able to explain social anxiety, and the model had an acceptable fit.

One of the results specified a significant and positive relationship between shyness and social anxiety. This study is consistent with findings (Rahm-Knigge et al, 2018; Kaplan et al., 2015; Muris et al., 2003; Vreeke et al., 2012; Zhao et al., 2013; Razavi et al., 2012; Mikaeli Manee & Asadi Mojreh, 2016; Tamannefar & Tovliat, 2015; Hajloo et al., 2015). For instance, Rahm-Knigge et al. (2018) in their study concluded that there is a significant positive relationship between neuroticism and social anxiety. In another study, findings of Tamannefar & Tovliat (2015) revealed that there is a significant positive relationship between neuroticism and social anxiety. Correspondingly, Mikaeli Manee and Asadi Mojreh (2016) in their research found that the neuroticism variable is associated with a wide range of psychological disorders including social anxiety and depression. In explaining this finding, according to the theoretical model of Muris and Merckelbach (2001), it could be assumed that normal and abnormal fear and anxiety are on both sides of a continuum. The basic premise of the multifactorial model is that most children and adolescents have normal developmental fears that change and diminish over time. However, in a small group of children, due to genetic vulnerability, fears persist and increase. This genetic vulnerability (i.e. neuroticism) may affect children's anxiety. In other words, the relationship between these two variables in this study can confirm this theory.

Another finding was a significant relationship between shyness and effortful control. This finding is consistent with other studies. For instance, the results of research by Zhu et al. (2022) showed that among children with higher levels of EC, shyness was negatively associated with socio-emotional adjustment problems reported by the mother; however, among children with lower EC levels, shyness is not associated with the socio-emotional adjustment problems reported by the mother. Nonetheless, among children with lower EC levels, shyness was associated with teachers' socio-emotional adjustment problems. In contrast, among children with higher EC levels, shyness was not associated with the socio-emotional adjustment problems reported by the teacher. In the study Wang et al. (2015), low levels of effortful control predicted aggression-antisocial behaviors separately and a low level of effortful control and impulsivity predicted depression syndrome separately as well as both depressive-aggression/ antisocial status. In general, adolescents with low levels of EC cannot divert their attention from the annoying stimulus and, therefore, will have more difficulty in regulating and controlling the resulting negative emotions. In contrast, adolescents and children with high levels of EC are more able to control their behaviors, emotions, and attention and are then less prone to psychological pathology (Eisenberg et al., 2015). Additionally, many studies indicate the positive role of EC in the development of social competence in children and adolescents (Eggum-Wilkens et al., 2016; Olson et al., 2017; Wilson et al., 2021). This ability helps the person control their negative emotions and feelings in social situations along with experiencing less anxiety, anger, and shame. In this regard, the results of studies have shown a positive and protective effect of EC on the onset of symptoms of social anxiety (Moriya et al., 2018). It seems that this feature, by managing attention, inhibiting and activating behavior and controlling impulses, is a kind of higher-level cognitive system based on mood that underlies the individual's ability to organize attention and regulate emotions to achieve long-term and short-term goals. Thus, various disorders are directly and indirectly affected by EC (Santens et al., 2020), one of which, according to different studies, is related to social anxiety.

Yet another finding was that the relationship between neuroticism and social anxiety as well as effortful control was non-significant. These conclusions were inconsistent with the findings of some studies such as Kaplan et al. (2015), Abdollahi et al. (2022), Scott et al. (2017), Allan et al. (2017), and also Khorsandi, Kamkar and Malekpour (2010) and Paauw (2020). Although neuroticism is a genetic cause, it is known by Rothbart and Bates (1998) as a general trait that consists of lower-order traits such as fear, anger/failure, sadness, and negative emotion. These low-level traits are usually formed on the basis of a pattern of negative parental control, parental special apathy, the effects of negative parenting, and an insecure and anxious environment that in turn affect children and predispose them to anxiety. In other words, adolescents whose neuroticism is related to their social anxiety are affected by a complex set of genetic and environmental factors that predispose them to anxiety. In contrast, it is possible that the difference between the present sample and other research samples is particularly effective in terms of differences in personality traits as a result of the current research.

Results demonstrated that there is a non-significant relationship between effortful control and social anxiety. To explain this result, there is no research that directly examines the relationship between effortful control and social anxiety. However, only a handful of studies have examined the role of effortful control in relation to anxiety and depression (Muris et al., 2004; the relationship between attention control and symptoms of mental disorders in non-clinical children aged 8 to 13 years; Muris et al., 2007; the relationship between attention control and a wide range of mental problems, including symptoms of anxiety, depression, aggression and ADHD in a sample of non-clinical children and adolescents). Nevertheless, Muris et al. (2007) shows that effortful control might play a defensive role in protecting adolescents from anxiety and depression;

However, this positive factor sometimes manifests itself in a negative and harmful way. In other words, it could be deducted that in the field of pediatric pathology, the inefficiency of phenomena such as source of control, self-esteem and effortful control has been repeatedly emphasized (Masten et al., 2006). In general, this finding is inconsistent with other studies which have shown relationship of effortful control with anxiety symptoms and anxiety disorders (Niditch & Varela, 2018; Raines et al., 2019; Santens et al., 2020; Raines et al., 2021). According to the theory of several factors that have a dynamic nature, it might be said that protective and harmful factors interact with each other and affect each other, and in a specific environmental situation, a protective variable can play a harmful role. For instance, behavioral inhibition or effortful control in a child may cause parents to be overly protective or rejecting, which could seriously damage the formation of a secure relationship (Shamir et al., 2005). As another example, a parent's anxious response to a child's fearful behavior with behavioral inhibition would reinforce embarrassment and shyness in the child (Hirshfeld-Becker et al., 2004).

Conclusion

Based on multifactorial theories, the role of protective and vulnerable factors could be considered in explaining anxiety. However, it seems that the more protective factors, the better the well-being, and this well-being makes adolescents safe from anxiety. Overall, safety might have positive consequences for academic success, social communication, and self-control in critical situations. As well, considering the temperament of adolescents would give more awareness to teachers and parents in educating them.

Limitations of the Study

According to the study, one of the limitations of the research is the high number of questionnaires and questions. Of course, in such situations, some adolescents leave the questionnaires unfinished and the number of incomplete samples increases. Researchers are advised to conduct research in different communities and compare the results with this research. Although there was a protective variable in this study, researchers in their future research could use more protective variables and consider other variables as mediating variables.

Conflict of interest

No potential conflict of interest was reported by the authors.

ORCID

Farzaneh Mikaeli Manee:

https://orcid.org/0000-0003-3746-8806

References

Abdollahi, A., Ahmed, A. A. A., Suksatan, W., Kumar, T., Majeed, M. S., Zainal, A. G., ... & Allen, K. A. (2022). Courage: a potential mediator of the relationship between personality and social anxiety. *Psychological Studies*, *67*(1), 53-62. doi:10.1007/s12646-022-00641-2

Abdollahi, A., Abu Talib, M., Reza Vakili Mobarakeh, M., Momtaz, V., & Kavian Mobarake, R. (2016). Body-esteem mediates the relationship between self-esteem and social anxiety: The moderating roles of weight and gender. *Child Care in Practice*, *22*(3), 296–308. doi:10.1080/13575279.2015.1054787

Allan, N. P., Oglesby, M. E., Uhl, A., & Schmidt, N. B. (2017). Cognitive risk factors explain the relations between neuroticism and social anxiety for males and females. *Cognitive Behaviour Therapy*, *46*(3), 224-238. doi:10.1080/16506073.2016.1238503

American Psychiatric Association.(2013). *Diagnostic and statistical manual of mental disorders*. 5th. Arlington, VA: American Psychiatric Publishing.

Burstein, M., Ameli-Grillon, L., Merikangas, K. R. (2011). Shyness versus social phobia in US youth. *Pediatrics*, *128* (5), 917–25. doi:10.1542/peds.2011-1434

Bagby, R. M., Uliaszek, A. A., Gralnick, T. M., & Al-Dajani, N. (2017). Axis I disorders. In T. A. Widiger (Ed.), *The Oxford handbook of the five factor model* (pp. 479–506). New York, NY: Oxford University Press. doi:10.1037/pas0000523

Cheek, J. (1983). *The Revised Cheek and Buss Shyness Scale (RCBS)*(Unpublished). Wellesley College, MA. doi:10.13140/RG.2.2.18841.75363

Coplan, R. J., & Arbeau, K. A. (2008). The stresses of a "brave new world": Shyness and school adjustment in kindergarten. *Journal of Research in Childhood Education*, *22*, 377–389. doi:10.1080/02568540809594634

Costa, P. T., Jr., & McCrae, R. R. (1992). *Revised NEO Personality Inventory (NEO-PI-R) and NEO Five-Factor Inventory (NEO-FFI) professional manual* . Odessa, FL: Psychological Assess-ment Resources.

Costa, P. T. Jr., & McCrae, R. R. (1997). Stability and change in personality assessment: The Revised NEO Personality Inventory in the Year 2000. *Journal of Personality Assessment*, *68*(1), 86–94. doi: 10.1207/s15327752jpa6801_7

Costache, M. E., Frick, A., Månsson, K., Engman, J., Faria, V., Hjorth, O., ... & Furmark, T. (2020). Higher-and lower-order personality traits and cluster subtypes in social anxiety disorder. *PloS one*, *15*(4), e0232187. doi:10.1371/journal.pone.0232187

Creswell, C., Waite, P., & Cooper, P. J. (2014). Assessment and management of anxiety disorders in children and adolescents. *Archives of Disease in Childhood*, *99*, 674–678. doi: 10.1136/archdischild-2013-303768

de Lijster, J. M., Dieleman, G. C., Utens, E. M., Dierckx, B., Wierenga, M., Verhulst, F. C., & Legerstee, J. S. (2018). Social and academic functioning in adolescents with anxiety disorders: A systematic review. *Journal of affective disorders*, *230*, 108-117. doi:10.1016/j.jad.2018.01.008

D'Souza, L., Gowda, H. M. R., & Gowda, D. K. S. (2006). Relationship between shyness and fear among high school students. *Pakistan Journal of psychological Research*, *21*, 53-60. https://www.pjprnip.edu.pk/index.php/pjpr/article/view/231

Eggum-Wilkens, N. D., Reichenberg, R. E., Eisenberg, N., & Spinrad, T. L. (2016). Components of effortful control and their relations to children's shyness. *International journal of behavioral development*, *40*(6), 544-554. doi:10.1177/0165025415597792

Eisenberg, N., Taylor, Z. E., Widaman, K. F., & Spinrad, T. L. (2015). Externalizing symptoms, effortful control, and intrusive parenting: A test of bidirectional longitudinal relations during early childhood. *Development and psychopathology*, *27*(4pt1), 953-968. doi:10.1017/S0954579415000620

Ellis, L. K., & Rothbart, M. K. (2001). *Revision of the Early Adolescent Temperament Questionnaire*. Minneapolis: Minnesota.

Findlay, L. C., Coplan, R. J., & Bowker, A. (2009). Keeping it all inside: Shyness, internalizing coping strategies and socio-emotional adjustment in middle childhood. *International Journal of Behavioral Development*, *33*(1), 47-54. doi:10.1177%2F0165025408098017

Glinski, K., & Page, A. C. (2010). Modifiability of neuroticism, extraversion, and agreeableness by group cognitive behaviour therapy for social anxiety disorder. *Behaviour Change*, *27*(01), 42–52. doi.org/10.1375/bech.27.1.42

Hajloo, N., Sobhi-Gharamaleki, N., & Farajiyan, A. (2015). Causal modeling of student's social phobia based on emotional intelligence, social skills, self-esteem, and shyness. *Journal of School Psychology*, *4*(3), 23-46. [Persian] https://www.sid.ir/en/journal/ViewPaper.aspx?id=540157

Hasanvand Amouzadeh, M. (2012). The relationship between shyness, self-esteem, self-efficacy and assertiveness with social anxiety. *Journal OF Social Psychology (New Findings In Psychology)*, *7*(24), 35-56. [Persian] https://www.sid.ir/en/journal/ViewPaper.aspx?id=336060

Henderson, L., Zimbardo, P. G., & Carducci, B. J. (2001). Shyness. In W. E. Craighead & C. B. Nemeroff (Eds.), *The Corsini encyclopedia of psychology and behavioral science* (Vol. 4, pp. 1522-1523). New York, NY: John Wiley.

Heiser, N. A., Turner, S. M., & Beidel, D. C. (2003). Shyness: Relationship to social phobia and other psychiatric disorders. *Behaviour research and therapy*, *41*(2), 209-221. doi: 10.1016/s0005-7967(02)00003-7

Hirshfeld-Becker, D., Biederman, J., Rosenbaum, J., Morris, T., March, J. (2004). *Anxiety disorders in children and adolescents*. Guilford Press.

Haghshenass, H. (2007). *Five-factor design of personality traits: A guide to the interpretation and norms of the NEO PI-R and NEO FFI tests*. Fars University of Medical Sciences and Health Services: Shiraz.

Hofmann, S. G., Heinrichs, N., & Moscovitch, D. A. (2004). The nature and expression of social phobia: Toward a new classification. *Clinical psychology review*, *24*(7), 769-797. doi:10.1016/j.cpr.2004.07.004

Johnson, S. L., Carver, C. H., Joormannc, J., & Cuccaro, M. L. (2016). Genetic polymorphisms related to behavioral approach and behavioral inhibition scales. *Personality and Individual Differences*, *88*, 251-255. doi:10.1016/j.paid.2015.09.024

Kessler, R. C., Petukhova, M., Sampson, N. A., Zaslavsky, A. M., & Wittchen, H. U. (2012). Twelve-month and lifetime prevalence and lifetime morbid risk of anxiety and mood disorders in the United States. *International journal of methods in psychiatric research*, *21*(3), 169-184. doi:10.1002/mpr.1359

Kaplan, S. C., Levinson, C. A., Rodebaugh, T. L., Menatti, A., & Weeks, J. W. (2015). Social anxiety and the Big Five personality traits: the interactive relationship of trust and openness. *Cognitive Behavior Therapy*, *44*(3), 212-222. doi: 10.1080/16506073.2015.1008032

Khorsandi, F., Kamkar, M., Malekpour, M. (2010). Relation of five basic factors of personality and self -regulated of learning approach among Isfahan girls and boys high school students in academic year 1386-87. *New Educational Approaches* , 5(2), 41-64. . [Persian] https://www.sid.ir/fa/journal/ViewPaper.aspx?id=154536

La Greca, A. M., & Lopez, N. (1998). Social anxiety among adolescents: Linkages with peer relations and friendships. *Journal of abnormal child psychology*, *26*(2), 83-94. doi: 10.1023/a:1022684520514

Lahey, B. B. (2009). Public health significance of neuroticism. *American Psychologist*, *64*(4), 241. doi:10.1037/a0015309

Lawrence, B., & Bennett, S. (1992). Shyness and education: the relationship between shyness, social class and personality variables in adolescents. *The British journal of educational psychology*, *62 (Pt 2)*, 257–263. doi:10.1111/j.2044-8279.1992.tb01019.x

Masten, A. S. (2006). Developmental psychopathology: Pathways to the future. *International Journal of Behavioral Development*, *37*, 41-54. doi:10.1177/0165025406059974

Mikaeli Manee, F., Asadi Mojreh, S. (2016). The correlation of neuroticism with symptoms of depression and anxiety in students according to the mediating role of worry and rumination. *Journal of Research and Health.*, *6*(1), 175-85. [Persian] http://jrh.gmu.ac.ir/article-1-592-en.html

Mikaeli Manee, F., Fathi, G. (2018). Anxiety disorders in children and adolescents. Tehran: Miad Andisheh Publications. [Persian]

Moriya, J. (2018). Association between social anxiety and visual mental imagery of neutral scenes: The moderating role of effortful control. *Frontiers in Psychology*, *8*, 2323. doi:10.3389/fpsyg.2017.02323

Morrison, A. S., Mateen, M. A., Brozovich, F. A., Zaki, J., Goldin, P. R., Heimberg, R. G., & Gross, J. J. (2016). Empathy for positive and negative emotions in social anxiety disorder. *Behaviour research and therapy*, *87*, 232-242. doi:10.1016/j.brat.2016.10.005

Mun, C., Dishion, T., Tein, J., & Otten, R. (2018). Adolescence effortful control as a mediator between family ecology and problematic substance use in early adulthood: A 16-year prospective study. *Development and Psychopathology*, *30*(4), 1355-1369. doi:10.1017/s0954579417001742

Muris, P., Huijding, J., Mayer, B., den Breejen, E., & Makkelie M. (2007). Spider fear and covariation bias in children and adolescents. *Behavior Research and Therapy*, *45*(11), 2604-2615. doi:10.1016/j.brat.2007.06.002

Muris, P., Dreessen, L., Bögels, S., Weckx, M., & van Melick, M. (2004). A questionnaire for screening a broad range of DSM-defined anxiety disorder symptoms in clinically referred children and adolescents. *Journal of Child Psychology and Psychiatry*, *45*(4), 813-820. doi:10.1111/j.1469-7610.2004.00274.x

Muris, P., Meesters, C. M., & Van Brakel, A. (2003). Assessment of anxious rearing behaviors with a modified version of ‘‘Egna Minnen Bestra ¨ffende Uppfostran’’ Questionnaire for Children. *Journal of Psychopathology and Behavioral Assessment*, *25*, 229-237. doi:10.1023/A:1025894928131

Muris, P., Meesters, C., & Van Den Berg, S. (2003). Internalizing and externalizing problems as correlates of self-reported attachment style and perceived parental rearing in normal adolescents. *Journal of Child and Family Studies*, *12*, 171-183. doi:10.1023/A:1022858715598

Matsushima, R., Shiomi, K. & Kuhlman, D. (2000). Shyness in Self-Disclosure Mediated by Social Skill. *Psychological reports,*. *86*, 333-8. doi:10.2466/PR0.86.1.333-338

Merikangas, K. R., He, J. p., Burstein, M., Swanson, S. A., & Avenevoli, S. (2010). Lifetime prevalence of mental disorders in US adolescents: results from the National Comorbidity Survey Replication-Adolescent Supplement (NCS-A). *Journal of the American Academy of Child & Adolescent Psychiatry*, *49*, 980–989. doi: 10.1016/j.jaac.2010.05.017

Newby, J., Pitura, V. A., Penney, A. M., Klein, R. G., Flett, G. L., & Hewitt, P. L. (2017). Neuroticism and perfectionism as predictors of social anxiety. *Personality and Individual Differences*, *106*, 263-267. doi:10.1016/j.paid.2016.10.057

Niditch, L. A., & Varela, R. E. (2018). A longitudinal study of inhibited temperament, effortful control, gender, and anxiety in early childhood. *Child & Youth Care Forum*, *47***,** 463–479 . doi: 10.1007/s10566-018-9447-0

Ogliari, A., Spatola, C. A., Pesenti-Gritti, P., Medda, E., & Penna, L. (2010). The role of genes and environment in shaping co-occurrence of DSM-IV defined anxiety dimensions among Italian twins aged 8–17. *Journal of Anxiety Disorders*, *24*, 433–439. doi:10.1111/jcpp.12675

Olson, S. L., Choe, D. E., & Sameroff, A. J. (2017). Trajectories of child externalizing problems between ages 3 and 10 years: Contributions of children's early effortful control, theory of mind, and parenting experiences. *Development and Psychopathology*, *29*(4), 1333-1351. doi:10.1017/S095457941700030X

Orta, I. M., Corapci, F., Yagmurlu, B., & Aksan, N. (2013). The mediational role of effortful control and emotional dysregulation in the link between maternal responsiveness and Turkish preschoolers' social competency and externalizing symptoms. *Infant and Child Development*, *22*(5), 459–479. doi:10.1002/icd.1806

Ostovar, S., & Razavieh, A. (2013). The study of psychometric properties of social anxiety scale for adolescents (SAS-A) for use in Iran, 3(12), 69-78. [Persian] https://www.sid.ir/en/journal/ViewPaper.aspx?id=386751

Paauw, M. T. (2020). *A study examining the relationship between personality traits and self-regulation* (Master's thesis).

Paulus, D. J., Vanwoerden, S., Norton, P. J., & Sharp, C. (2016). From neuroticism to anxiety: Examining unique contributions of three transdiagnostic vulnerability factors. *Personality and Individual Differences*, *94*, 38-43. doi:10.1016/j.paid.2016.01.012

Posner, M. I., & Rothbart, M. K. (2007). Research on attention networks as a model for the integration of psychological science. *Annual review of psychology*, *58*, 1. doi: 10.1146/annurev.psych.58.110405.085516

Poole, K. L., Van Lieshout, R. J., & Schmidt, L. A. (2017). Exploring relations between shyness and social anxiety disorder: The role of sociability. *Personality and Individual Differences*, *110*, 55-59. doi:10.1016/j.paid.2017.01.020

Phillips, B. M. (2003). *Effortful Control as a Temperamental Trait in Children and Adolescents: Construct Validation and Relation to Symptoms of Psychopathology*. Psychology Phd Degree, Florida State University, Tallahassee.

Pérez-Edgar, K. (2015). Effortful control in adolescence: Individual differences within a unique developmental window. In G. Oettingen & P. M. Gollwitzer (Eds.), *The Jacobs Foundation series on adolescence. Self-regulation in adolescence* (p. 78–99). Cambridge University Press. doi:10.1017/CBO9781139565790.005

Rahm-Knigge, R. .L., Prince, M. A., Conner, B. T. (2018). Social interaction anxiety and personality traits predicting engagement in health risk sexual behaviors. *Journal of anxiety disorders, 57*, 57-65. doi:10.1016/j.janxdis.2018.05.002

Rajabi, G., & Abasi, G. A. (2011). A Study of Factorial Structure (construct validity) of the Persian Version of the Revised Shyness Scale among Students. *Iranian JournalL Of Psychology And Clinical Psychology*, *16* (4) ,456-467. http://ijpcp.iums.ac.ir/article-1-1210-fa.html

Raines, E. M., Viana, A. G., Trent, E. S., Woodward, E. C., Candelari, A. E., Zvolensky, M. J., & Storch, E. A. (2019). Effortful control, interpretation biases, and child anxiety symptom severity in a sample of children with anxiety disorders. *Journal of anxiety disorders*, *67*, 102136. doi:10.1016/j.janxdis.2019.102136

Raines, E. M., Viana, A. G., Trent, E. S., Conroy, H. E., Silva, K., Zvolensky, M. J., & Storch, E. A. (2021). Effortful Control Moderates the Relation Between Negative Emotionality and Child Anxiety and Depressive Symptom Severity in Children with Anxiety Disorders. *Child Psychiatry & Human Development*, 1-9. doi:10.1007/s10578-021-01218-2

Razavi, A., Kazemi, S., & Mohammadi, M. (2012). Relationship between personality traits, coping style and social anxiety among blind and normal sighted students in universities of fars Province. Psychology of Exceptional Individuals, 1(4), 109-134. [Persian] https://www.sid.ir/en/journal/ViewPaper.aspx?id=250955

Rothbart, M. K., & Bates, J. E. (1998). Temperament. In W. Damon (Series Ed.) & N. Eisenberg (Vol. Ed.), Handbook of child psychology, Vol. 3. *Social, emotional and personality development* (5th ed., pp. 105-176). New York: Wiley

Rothbart, M. K., & Bates, J. E. (2006). Temperament. In W. Damon (Series Ed.) & N. Eisenberg (Vol. Ed.) Handbook of child psychology. Vol. 3. *Social, emotional, personality development* (6th ed., pp. 99-166). Hoboken, NJ: John Wiley.

Rothbart, M. K., Ahadi, S. A., Hershey, K. L., & Fisher, P. (2001). Investigations of temperament at three to seven years: The Children's Behavior Questionnaire. *Child Development*, *72*(5), 1394–1408. doi: 10.1111/1467-8624.00355

Rubin, K. H., Coplan, R. J., & Bowker, J. C. (2009). Social withdrawal in childhood. *Annual Review of Psychology*, *60*, 141–171. doi:10.1146/annurev. psych.60.110707.163642.

Scott, G. G., Boyle, E. A., Czerniawska, K., & Courtney, A. (2017). Posting photos on Facebook: The impact of narcissism, social anxiety, loneliness, and shyness. *Personality and Individual Differences, 133*, 67–72. doi:10.1016/j.paid.2016.12.039

Sajjadian Khosroshahi, M., & Mikaeli Manee, F. (2020).The role of mothers 'parental control and fear of negative evaluation in predicting students' social anxiety. *Rooyesh-e-Ravanshenasi*, *8*(12), 65-72. [Persian] http://ensani.ir/fa/article/author/202194

Santens, E., Claes, L., Dierckx, E., & Dom, G. (2020). Effortful control–A transdiagnostic dimension underlying internalizing and externalizing psychopathology. *Neuropsychobiology*, *79*(4), 255-269. doi:10.1159/000506134

Schmidt, L. A., & Fox, N. A. (1995). Individual differences in young adults' shyness and sociability: Personality and health correlates. *Personality and individual differences*, *19*(4), 455-462. doi:10.1016/0191-8869(95)00083-I

Schlenker, B. R., & Leary, M. R. (1982). Social anxiety and self-presentation: A conceptualization model. *Psychological bulletin*, *92*(3), 641. doi:10.1037/0033-2909.92.3.641

Scaini, S., Belotti, R., & Ogliari, A. (2014). Genetic and environmental contributions to social anxiety across different ages: A meta-analytic approach to twin data. *Journal of anxiety disorders*, *28*(7), 650-656. doi:10.1016/j.janxdis.2014.07.002

Shamir-Essakow, G., Ungerer, J. A., & Rapee, R. M. (2005). Attachment, behavioral inhibition, and anxiety in preschool children. *Journal of Abnormal Child Psychology*, *33*(2), 131-143. doi: 10.1007/s10802-005-1822-2

Stein, M. B., Chen, C. Y., Jain, S., Jensen, K. P., He, F., Heeringa, S. G., ... & Army STARRS Collaborators. (2017). Genetic risk variants for social anxiety. *American Journal of Medical Genetics Part B: Neuropsychiatric Genetics*, *174*(2), 120-131. doi: 10.1002/ajmg.b.32520

Tortella-Feliu, M., Aguayo, B., Sesé, A., Morillas-Romero, A., Balle, M., Gelabert, J. M., Bornas, X., & Llabrés, J. (2012). Effects of temperament and emotion regulation styles in determining negative emotional states. *Actas espanolas de psiquiatria*, *40*(6), 315–322. PMID: 23165414.

Tamannefar, M. & Tovliat, V. S. (2015). The Prediction of Social Anxiety Based on Self-Assertion and Self-Efficac. *Journal of Personality Individual Didderences. 4* (9), 115-132. [Persian] https://www.sid.ir/fa/journal/ViewPaper.aspx?id=284406

Vreeke, L. J., & Muris, P. (2012). Relations Between Behavioral Inhibition, Big Five Personality Factors, and Anxiety Disorder Symptoms in Non-Clinical and Clinically Anxious Children. *Child Psychiatry and Human Development*, *43*(6), 884–894. doi: 10.1007/s10578-012-0302-5

Vassilopoulos, S. P., Brouzos, A., Moberly, N. J., & Spyropoulou, M. (2017). Linking shyness to social anxiety in children through the Clark and Wells cognitive model. *Hellenic Journal of Psychology*, *14*(1), 1–19. doi:10.1080/03069885.2015.1057474

Vinograd, M., Williams, A., Sun, M., Bobova, L., Wolitzky-Taylor, K. B., Vrshek-Schallhorn, S., Mineka, S., Zinbarg, R. E., & Craske, M. G. (2020). Neuroticism and Interpretive Bias as Risk Factors for Anxiety and Depression. *Clinical Psychological Science*, *8*(4), 641–656. doi:10.1177/2167702620906145

Weeks, M., Ooi, L. L., & Coplan, R. J. (2016). Cognitive biases and the link between shyness and social anxiety in early adolescence. *The Journal of Early Adolescence*, *36*(8), 1095-1117. doi:10.1177%2F0272431615593175

White, L. K., McDermott, J. M., Degnan, K. A., Henderson, H. A., & Fox, N. A. (2011). Behavioral inhibition and anxiety: The moderating roles of inhibitory control and attention shifting. *Journal of Abnormal Child Psychology*, *39*(5), 735–747. doi: 10.1007/s10802-011-9490-x

Wilson, B. J., Dauterman, H. A., Frey, K. S., Rutter, T. M., Myers, J., Zhou, V., & Bisi, E. (2021). Effortful control moderates the relation between negative emotionality and socially appropriate behavior. *Journal of Experimental Child Psychology*, *207*, 105119. doi:10.1016/j.jecp.2021.105119

Wang, F. L., Chassin, L., Eisenberg, N., & Spinrad, T. L. (2015). Effortful control predicts adolescent antisocial-aggressive behaviors and depressive symptoms: Co-occurrence and moderation by impulsivity. *Child development*, *86*(6), 1812-1829. doi: 10.1111/cdev.12406

Widiger, T. A. (2009). Neuroticism. In M. R. Leary & R. H. Hoyle (Eds.), *Handbook of individual differences in social behavior* (pp. 129–146). The Guilford Press.

Wittchen, H. U., Stein, M. B., & Kessler, R. C. (1999). Social fears and social phobia in a community sample of adolescents and young adults: prevalence, risk factors and co-morbidity. *Psychological medicine*, *29*(2), 309-323. doi:10.1017/s0033291798008174

Yusoff, M. S. B., Hadie, S. N. H., & Yasin, M. A. M. (2021). The roles of emotional intelligence, neuroticism, and academic stress on the relationship between psychological distress and burnout in medical students. *BMC medical education*, *21*(1), 1-10. doi:10.1186/s12909-021-02733-5

Zhao, J., Kong, F., & Wang, Y. (2013). The role of social support and self-esteem in the relationship between shyness and loneliness. *Journal of Personality and Individual Difference*, *54*, 577-581. doi:10.1016/j.paid.2012.11.003

Zimbardo, P. G., Pilkonis, P. A., Marnell, M. E. (1990). *Shyness: what it is, what to do about it.* Reading, Mass: Addison-Wesley Pub. Co.

Zhu, J., Xiao, B., Li, Y., Xie, M., & Zhang, L. (2022). Shyness and Socio-emotional Adjustment Difficulties in Urban Chinese Kindergartners: The Moderating Role of Child Effortful Control. *Early Education and Development*, 1-17. doi:10.1080/10409289.2022.2051792