

Early Maladaptive Schemas as Moderators of the Impact of Stressful Events on Anxiety and Depression in University Students

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Abstract The aim of this study was to test the effects of early maladaptive schemas (EMS) derived from the Schema Therapy model (Young 1999) according to the diathesis-stress paradigm. We expected that EMS would make students more vulnerable to symptoms of depression and anxiety in the presence of stressful events and that the effects of these schemas would be different for each symptom. In particular, it was hypothesised that abandonment, emotional deprivation, defectiveness, and failure schemas would interact with stressful events to predict depressive symptoms, whereas abandonment, vulnerability to harm, and dependence schemas were expected to moderate anxiety symptoms. Due to gender differences in EMS and depressive and anxiety symptoms, we also expected that sex would act as a moderator of the relationships between EMS and symptoms. A two-wave prospective study showed that the presence of EMS constitutes a vulnerability factor for both, depressive and anxiety symptoms, and this effect was also moderated by sex. Moreover, the EMS's content specificity revealed which schemas were more relevant to each symptom, providing valuable information for prevention and intervention programmes.

Keywords Schemas · Anxiety · Depression · Stressful events · University students

Early Maladaptive Schemas as Moderators of Stress

A number of studies have revealed that the time during which students are adjusting to university life is a period when they are more vulnerable to developing emotional disorders (Bouteyre et al. 2007). Across cultures, up to one-third of all university students meet the criteria for a diagnosis of depression and anxiety (e.g., Allgöwer et al. 2001). A variety of stressors, such as academic demands, new friendships and romantic relationships and, in some cases, adjustment to living outside of the family home characterise this transition. However, despite the importance of stressful events, they only explain a small proportion of the variance in symptoms of distress (Smith et al. 1990). Cognitive vulnerability-stress models, also called diathesis-stress models, propose that certain thinking and information processing styles represent a predisposition to becoming distressed in the presence of stressful events (Hankin et al. 2004).

The most widely known diathesis-stress models are Beck's model of cognitive therapy (1976) and the hopelessness theory (Abramson et al. 1989), both of which originally focused on depression. These models state that dysfunctional attitudes and/or negative inferential styles increase the likelihood that experiencing stressful events will lead to depression. These models also suggest that cognitive vulnerabilities remain latent until they are activated by the occurrence of relevant stressors, resulting in heightened anxiety and depressive symptoms. In the present study, we assess whether this paradigm can be extended to early maladaptive schemas, which represent a key component in the Schema Therapy model (Young 1999; Young and Klosko 1994).

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According to the Schema Therapy model, as a result of the interaction between child temperament and parenting styles, people develop a number of stable structures known as Early Maladaptive Schemas (EMS) that become fundamental to their self-concept and world-view (Young et al. 2003). Young (1999) described 18 maladaptive schemas, which he organised into five domains (impaired autonomy, disconnection, impaired limits, over-vigilance, and other-directedness) according to the ways they interfered with children's access to basic needs. For example, the abandonment/instability schema belongs to the disconnection domain and is characterised by a lack of confidence in providers because they are unstable, unpredictable or likely to leave. Likewise, the vulnerability to harm or illness schema belongs to the impaired autonomy domain and is characterised by an exaggerated fear of imminent misfortune without any possible protection. By definition, these schemas are highly dysfunctional (McGinn and Young 1996). They are present in the general population but become more rigid and extreme in clinical samples.

Comparing the cognitive vulnerability-stress models (Abramson et al. 1989; Beck 1976) with the Schema Therapy model, a significant difference emerges. Whereas both Beck's model and the hopelessness theory focus on cognitive variables as vulnerability factors (dysfunctional attitudes and inferential style), early maladaptive schemas include emotions, memories and bodily sensations in addition to cognitive variables (Young et al. 2003). Therefore, testing the diathesis-stress paradigm with EMS extends the scope of our study more than previous studies based only on cognitive factors.

In addition to the cognitive model, Beck also proposed the *cognitive content-specificity hypothesis*, which states that emotional disorders are characterised by cognitive content that is specific to each disorder (Beck et al. 1987; Clark et al. 1989). Extending this hypothesis to EMS, those schemas that imply negativity towards oneself, the world and the future should be specific to depression. Anxiety would imply schemas that involve physical or psychological threats creating an amplified sense of vulnerability. Although the findings have been mixed, studies have generally shown that the emotional deprivation, abandonment, failure, and defectiveness schemas are more present in depression (e.g. Calvete et al. 2005; Harris and Curtin 2002; Oei and Baranoff 2007; Petrocelli et al. 2001; Schmidt et al. 1995; Shah and Waller 2000; Stopa et al. 2001). In anxiety, the most prevalent schemas are abandonment, dependence, unrelenting standards, and vulnerability to harm (e.g., Calvete et al. 2005; Eberhart et al. 2011; Glaser et al. 2002; Lumley and Harkness 2007; Schmidt et al. 1995; Stopa et al. 2001; Welburn et al. 2002). Previous studies, however, have several limitations. First, most of them have focused primarily on demonstrating the

association between schemas and different forms of psychological symptoms, ignoring the schemas' roles as moderators between stressful events and symptoms. As explained above, this moderating effect is essential to the diathesis-stress model. Very few studies have tested the interaction between EMS and stressful circumstances (e.g. Calvete et al. 2007; Eberhart et al. 2011; Schmidt and Joiner 2004). In a sample of women who had suffered an abusive relationship, Calvete et al. (2007) found a moderation effect for the impaired autonomy domain in the development of symptoms of depression. Similarly, Schmidt and Joiner (2004) found that the association between stressful events and depressive and anxiety symptoms was higher for students with low EMS scores. On the other hand, Eberhart et al. (2011) only found the self-sacrifice schema to interact with stressful events. A second limitation of the previous studies is that they are based on cross-sectional designs, which has impeded them from demonstrating the direction of the associations between schemas and symptoms (for exceptions see Eberhart et al. 2011, with 5 weeks follow-up).

Moreover, previous studies on EMS have not considered sex differences despite the fact that women are more likely to experience internalizing symptoms than men (Simon 2002; Wade et al. 2002), and to score higher on several cognitive vulnerabilities (Hankin and Abramson 2001; Mezulis et al. 2010), including some EMS (Welburn et al. 2002). Furthermore, previous research suggests that sex may moderate the role of some cognitive vulnerabilities, although the direction of such moderation is mixed. For instance, some studies find that the interaction between negative inferences and stressors more strongly predicts depression for women (Abela and McGirr 2007; Mezulis et al. 2010). In contrast, in a recent study the schema of sociotropy more strongly predicted the residual increase of depressive symptoms among men (Calvete 2011a).

Overview of the Present Study

It has been suggested that early maladaptive schemas are precursors of psychological maladjustment (Young 1999). In the existing literature, this association has been tested using cross-sectional designs (e.g., Calvete et al. 2005; Glaser et al. 2002; Lumley and Harkness 2007, among others). Therefore, the *first objective* of this study was to examine the schemas' ability to predict the development of depressive and anxiety symptoms using a prospective design. Following the specificity hypothesis, schemas that imply negativity towards oneself, the world and the future were selected to examine depressive symptoms and those implying a sense of vulnerability to harm or inability to cope without the help of others were selected to examine anxiety symptoms. Consistent with previous Schema Model

studies, the schemas of abandonment, emotional deprivation, defectiveness, and failure were expected to predict an increase in depressive symptoms whereas schemas of abandonment, vulnerability to harm, and dependence were expected to predict an increase in anxiety symptoms.

The *second objective* was to test, based on the diathesis stress models, EMS as moderators of the impact of stressful events on anxiety and depressive symptoms following the previously-mentioned selection of schemas for each symptom. Consistent with the diathesis stress models, we expected that the association between stressors and the increase in depressive and anxiety symptoms would be stronger for those individuals who score high on EMS. That is, those students high in EMS would interpret life events as more stressful than students low in EMS, so that they would tend to experience more psychological symptoms as a consequence.

Considering the existence of sex differences not only in symptoms but also in cognitive vulnerabilities, we included sex in all the analyses. We expected that some of the paths included in the interaction model were more characteristic of women than of men, contributing to our understanding of gender differences in anxiety and depression. That is, we expected that the predictive relationship between EMS, both alone and when interacting with stressors, would be higher for women than for men.

Method

Participants

The study was conducted on a sample of first- and second-year college students at the University of Deusto and the University of the Basque Country, both in Northern Spain. Though the initial sample was comprised of 510 undergraduate students, only 374 completed measures at time 1 (T1) and time 2 (T2). That is, the attrition rate was 27%. Students in science and technical studies represented 34.8% of the sample, and the rest studied social and human sciences. The mean age was 19.16 ($SD=1.69$) at T1 and 19.01 ($SD=1.62$) at T2. The distribution by sex was 331 (65%) females and 179 (35%) males at T1 and 249 (67.1%) females and 122 (32.9%) males at T2. Comparing those participants who were lost to those who remained, the only significant difference between them was the number of stressful events experienced being higher on the lost sample ($M=11.44$ vs. $M=10.58$; $F(1, 509)=5.91$; $p<0.05$).

Instruments

To determine the occurrence of stressful events, the Life Stress Questionnaire (LSQ; Wadsworth et al. 2005) and the Social Stress Questionnaire (SSQ; Connor-Smith and

Compas 2002) were used. Both consist of a short list of stressful events selected from the Adolescent Perceived Events Scale (APES; Compas et al. 1987) that has been previously adapted to Spanish youngsters (Connor-Smith and Calvete 2004). The Life Stress Questionnaire includes queries about 11 stressful life events, such as health problems, parents' divorce or academic difficulties. The Social Stress Questionnaire consists of 10 items that cover a range of stressful interpersonal events, such as difficulties in romantic relationships and friendships. Participants indicated whether these events had happened in their lives recently (during the last 6 months). If so, they were asked to evaluate the extent to which these events had been stressful or problematic using a scale ranging from 0 (*not stressful*) to 3 (*very stressful*). In this study, we used the total number of events experienced as the measure, because those scores obtained by evaluating the degree of stress experienced can easily be contaminated by depressive symptoms and cognitive styles (Dohrenwend 2006).

Early maladaptive schemas were assessed through the Young Schema Questionnaire-Short Form (YSQ-SF; Young and Brown 1994). The YSQ-SF is a 75-item questionnaire that assesses 15 EMS. Each of the scales consists of five items, and participants are asked to rate the items using a 6-point Likert scale (1 = *completely untrue of me*, 2 = *mostly untrue of me*, 3 = *slightly more untrue than true*, 4 = *moderately true of me*, 5 = *mostly true of me*, and 6 = *describes me perfectly*). In this study, the SQ-SF was used to assess six schemas (abandonment, emotional deprivation, defectiveness, failure, dependence, and vulnerability to harm). *Abandonment* refers to the perceived unreliability of significant others; *emotional deprivation* involves the expectation that the need for emotional support will not be adequately satisfied; *defectiveness* describes the feeling that one is defective, unwanted, or invalid in significant aspects; *dependence* is the belief that one is not able to handle daily responsibilities; *vulnerability to harm* involves an exaggerated fear of mishap; *failure* describes the belief that one has failed, will inevitably fail, or is fundamentally inadequate relative to one's peers, in areas of achievement. The first three schemas belong to the disconnection and rejection domain, whereas the other three belong to the impaired autonomy domain. Calvete et al. (2005) validated the factor structure and predictive value of the Spanish version of the YSQ-SF. In the present study, Cronbach's alpha coefficients were .83 (abandonment), .83 (emotional deprivation), .72 (defectiveness), .59 (dependence), .72 (vulnerability to harm), and .84 (failure).

The Center for Epidemiological Studies Depression Scale (CES-D; Radloff 1977) was used to measure depressive symptoms. This scale consists of 20 statements rated on a 4-point Likert scale (0 = *rarely or none of the time*, 3 = *most or all the time*). Previous studies using the

Spanish version have confirmed its factor structure and excellent psychometric properties (Calvete and Cardeñoso 1999). The alpha coefficients obtained in this study were .90 at T1 and .88 at T2.

The Anxiety Subscale of the SCL-90-R (Derogatis 2002) assesses the clinical manifestations of anxiety, both generalised and acute. Responders rate a list of 10 anxiety symptoms on a scale ranging from 0 (*not at all present*) to 4 (*extremely present*). The internal consistency coefficients for each of the scales of the SCL-90 are high and have good test-retest reliability over a period of 2 weeks (Derogatis 1983). The coefficient alpha obtained for the anxiety scale in this study was .88 at both T1 and T2.

Procedure

After receiving approval from the contacted universities, some professors agreed to collaborate in the study conceding one hour of class time for that purpose. Using a longitudinal design, the questionnaires were administered in two stages, 5 months apart. At T1, participants completed the EMS, stressful events and depressive and anxiety symptoms questionnaires. At T2, they again completed the stressful events and depressive and anxiety symptoms questionnaires. The questionnaires were administered by team members who gave instructions on how to complete them, the objective of the study, and its anonymous and voluntary nature. To link data from T1 with T2, participants were asked to use a code only known by the participants, thereby preserving anonymity.

Results

General Descriptors

Table 1 shows the general descriptors of the variables used in this study: stressful events (T2), EMS, and depressive and anxiety symptoms (T1 and T2). As can be observed, several correlations between EMS and symptoms are significant. Table 2 also shows that women scored higher on abandonment, failure, depressive and anxiety symptoms, and number of stressors. Men scored higher on emotional deprivation.

EMS, Stressors, and Depressive Symptoms

We first examined whether EMS alone or in interaction with stressors and sex predicted depressive symptoms. In the first step, depressive symptoms at T1 were introduced as predictors. In the second step, we included sex (-1 = female, 1 = male), the number of experienced stressors, and the selected schemas (abandonment, emotional deprivation, defectiveness, and failure). In the third step, we entered the

Table 1 General descriptors and correlations for depressive and anxiety symptoms, stressful events and early maladaptive schemas (N=374)

	1	2	3	4	5	6	7	8	9	10	11	12	M	SD
1. Stressful events T2	1												9.87	5.45
2. Abandonment	.15**	1											14.99	6.11
3. Emotional Deprivation	.07	.36**	1										9.05	5.08
4. Defectiveness	.10	.41**	.55**	1									8.35	6.20
5. Dependence	.13*	.42**	.37**	.37**	1								9.21	3.43
6. Vulnerability to Harm	.15**	.53**	.32**	.34**	.45**	1							11.15	5.06
7. Failure	.18**	.36**	.37**	.54**	.56**	.37**	.41**	1					9.79	4.48
8. Depression T1	.27**	.44**	.47**	.47**	.47**	.43**	.39**	.46**	.63**	1			16.28	9.83
9. Depression T2	.40**	.44**	.40**	.43**	.42**	.39**	.33**	.43**	.65**	.63**	1		16.17	8.76
10. Anxiety T1	.18**	.49**	.31**	.49**	.40**	.51**	.37**	.33**	.65**	.49**	.49**	1	9.56	7.76
11. Anxiety T2	.33**	.29**	.25**	.29**	.32**	.39**	.34**	.28**	.44**	.64**	.51**	.51**	9.32	7.19

**p<.001; *p<.05

Table 2 Gender differences in EMS, depressive and anxiety symptoms, and stressful events

	Men		Women		<i>F</i> (1, 370)	Effect size (<i>d</i>)
	M	SD	M	SD		
1. Abandonment	13.12	5.91	15.93	5.98	32.65**	-0.47
2. Emotional Deprivation	9.81	5.42	8.66	4.87	7.59*	0.22
3. Defectiveness	8.56	3.72	8.25	3.62	1.05	0.08
4. Dependence	8.91	3.03	9.38	3.61	2.79	-0.15
5. Vulnerability to Harm	10.72	5.10	11.39	5.01	2.59	-0.14
6. Failure	9.24	4.15	10.07	4.57	5.24*	-0.19
7. T1 Depression	14.11	9.02	17.12	8.49	9.91*	-0.34
8. T1 Anxiety	7.99	7.91	10.01	6.74	6.53*	-0.27
9. T2 Depression	14.08	8.56	17.40	10.26	17.14**	-0.36
10. T2 Anxiety	7.55	6.87	10.64	8.01	24.14**	-0.43
11. Stressful events	8.75	5.59	10.37	5.30	7.38*	-0.29

p*<.05; *p*<.001

two-way interaction terms: EMS × Stressors, EMS × Sex, and Sex × Stressors. In the fourth step, we entered the three-way interactions terms (EMS × Sex × Stressors). Following standard procedure, predictors were centered to maximize interpretability and minimize potential problems with multicollinearity (Frazier et al. 2004; Holmbeck 2002).

Table 3 shows the results of the regression analysis. Both sex and the emotional deprivation schema were significant

predictors of the residual increase in depressive symptoms. None of the two-way interaction terms were significant. However, two three-way interaction terms were significant predictors of T2 depressive symptoms: Emotional deprivation × Stressors × Sex, and Abandonment × Stressors × Sex. The inclusion of the three-way interaction terms significantly increased the determination coefficient ($\Delta R^2 = 0.16, p < .05$).

Table 3 Summary of hierarchical regression analysis for sex, stressful events, and EMS predicting depressive symptoms and its interaction effects

	B	SE	β	T	Change in R^2
Step 1					$R^2 = 0.40, F(1, 368) = 244.17^{**}$
Depression T1	0.37	0.04	0.42	8.40**	
Step 2					$\Delta R^2 = 0.07, \Delta F(6, 362) = 7.97^{**}$
Sex effect	-1.06	0.41	-0.11	-2.60*	
Stressful events	0.84	0.38	0.09	2.19*	
Abandonment	0.20	0.19	0.06	1.04	
Emotional deprivation	1.19	0.46	0.13	2.57*	
Defectiveness	0.59	0.54	0.06	1.08	
Failure	0.97	0.56	0.10	1.71	
Step 3					$\Delta R^2 = 0.01, \Delta F(9, 353) = 1.13$
Sex × Stressors	-0.02	0.41	-0.02	-0.05	
Abandonment × Stressors	0.05	0.48	0.00	0.10	
Deprivation × Stressors	0.43	0.51	0.04	0.83	
Defectiveness × Stressors	-0.12	0.64	-0.01	-0.18	
Failure × Stressors	0.32	0.65	0.03	0.49	
Abandonment × Sex	-0.19	0.48	-0.21	-0.40	
Deprivation × Sex	0.31	0.45	0.03	0.68	
Defectiveness × Sex	-0.16	0.54	-0.02	-0.29	
Failure × Sex	0.39	0.56	0.04	0.69	
Step 4					$\Delta R^2 = 0.02, \Delta F(4, 349) = 2.88^*$
Abandon × Stressor × Sex	-0.92	0.46	-0.10	-2.00*	
Deprivat × Stressors × Sex	1.17	0.49	0.12	2.39*	
Defective × Stressors × Sex	-1.24	0.64	-0.12	-1.93	
Failure × Stressors × Sex	0.06	0.64	0.01	0.10	

p*<.05; *p*<.001

To understand the form of these three-way interactions we conducted additional regression analyses following procedures in which slope estimates are calculated and examined at high (Mean +1SD) and low (Mean - 1 SD) levels of the moderator (Aiken and West 1991; Holmbeck 2002). The post hoc analyses provided information about how associations between stressors and T2 depression varied for those who scored high versus low on emotional deprivation and for women versus men. These analyses indicated that the number of stressors significantly predicted the increase in depression for women who were low on emotional deprivation ($\beta=.70, t(73)=3.50, p<.001$), but not for women who were high on emotional deprivation ($\beta=.14, t(45)=1.17, ns$). Among men, however, the association between stressors and T2 depression was significant for men who scored high on emotional deprivation, ($\beta=.43, t(40)=3.90, p<.001$), but not for men who scored low, ($\beta=.11, t(28)=1.16, ns$). Figure 1a displays scores on T2 depression for men and women at low (-1 SD from the mean) and high (1 SD from the mean) values of emotional deprivation and stressors.

We used the same procedure to examine the Abandonment \times Stressor \times Sex interaction. The results from the post hoc tests indicated that the stressors predicted the residual increase in depression for women who scored high on abandonment ($\beta=.30, t(82)=2.86, p=.006$), but not for women who were low on abandonment ($\beta=.19, t(51)=1.72, ns$). Among men, those who scored low on abandonment displayed a significant association between stressors and T2 depression, ($\beta=.37, t(50)=2.82, p=.007$), whereas those who scored high on abandonment displayed a non significant association between stressors and T2 depression ($\beta=.11, t(19)=1.11, ns$). Figure 1b displays scores on T2 depression for men and women at low (-1 SD from the mean) and high (1 SD from the mean) values of abandonment and stressors.

EMS, Stressors, and Anxiety Symptoms

A similar procedure was used to test the effect of the schemas of vulnerability to harm, dependence, and abandonment on anxiety symptoms. As shown in Table 4, the number of stressors, the vulnerability to harm and dependence schemas were significant predictors of anxiety symptoms. As for the two-way interaction terms, Dependence \times Stressors, Abandonment \times Sex, and Dependence \times Sex were also significant, causing an increase in the determination coefficient ($\Delta R^2=0.35, p<.01$).

To interpret the form of these interactions we conducted several post hoc analyses. For the Dependence \times Stressors interaction we estimated T2 anxiety for both low and high levels of dependence (one standard deviation below and above the mean). As Fig. 2a shows, the association between stressors and T2 anxiety symptoms was higher among participants high in dependence, $\beta=.21, t(98)=2.51, p=.014$, than among participants low in dependence, $\beta=-.08, t(123)=-.84, ns$. For the Abandonment \times sex interaction we estimated the regressive path from abandonment to T2 anxiety in women and men separately. As Fig. 2b displays, this association was higher for women, $\beta=.19, t(249)=2.99, p=.003$, than for men, for whom it was no significant, $\beta=-.16, t(122)=-1.57, ns$. Finally, the same procedure was used to examine the Dependence \times sex interaction. In this case, and as displayed in Fig. 2c, the association between dependence and T2 anxiety was higher for men, $\beta=.27, t(122)=3.26, p=.014$, than for women, $\beta=.01, t(249)=0.20, ns$.

Discussion

The present study aimed to test the hypotheses that propose EMS, both alone and in interaction with stressful events, as predictors of future depressive and anxiety symptoms in

Fig. 1 EMS \times Stressors \times Sex interactions in the prediction of depressive symptoms

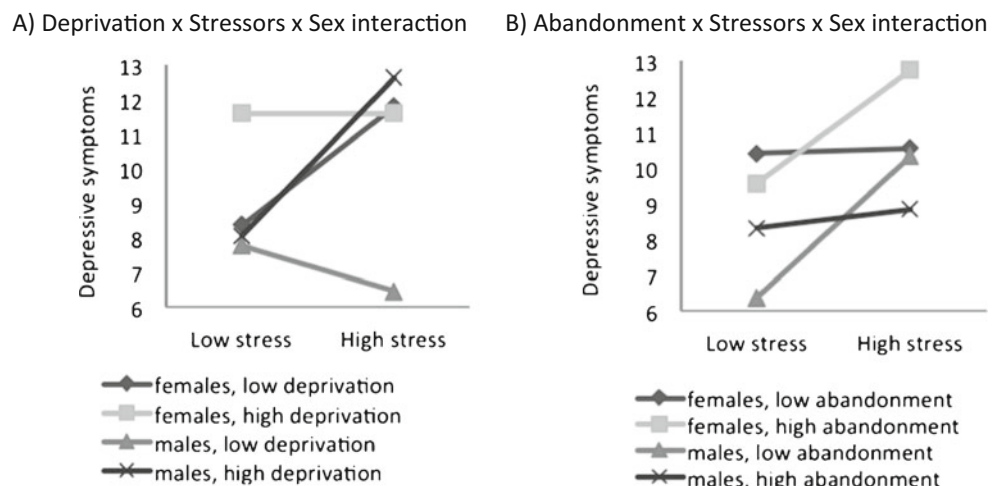


Table 4 Summary of hierarchical regression analysis for sex, stressful events, and EMS predicting anxiety symptoms and its interaction effects

	B	SE	β	T	Change in R^2
Step 1					$R^2=0.26$, $F(1,368)=128.84^{**}$
Anxiety T1	0.34	0.05	0.36	6.80 ^{**}	
Step 2					$\Delta R^2=0.31$, $\Delta F(5,363)=5.50^{**}$
Sex effect	-0.55	0.35	-0.07	-1.57	
Stressful events	0.87	0.34	0.12	2.56*	
Abandonment	-0.19	0.48	-0.03	-0.40	
Vulnerability to harm	0.95	0.45	0.13	2.12*	
Dependence	1.34	0.45	0.18	3.00*	
Step 3					$\Delta R^2=0.35$, $\Delta F(7,356)=2.74^*$
Sex \times Stressors	0.08	0.35	0.01	0.24	
Abandonment \times Stressors	-0.25	0.46	-0.03	-0.54	
Vulnerability \times Stressors	0.02	0.43	0.00	0.04	
Dependence \times Stressors	1.19	0.46	0.16	2.61*	
Abandonment \times Sex	-1.40	0.46	-0.19	-3.01*	
Vulnerability \times Sex	0.40	0.43	0.05	0.92	
Dependence \times Sex	1.33	0.44	0.18	2.99*	
Step 4					$\Delta R^2=0.04$, $\Delta F(3,353)=0.72$
Abandon. \times Stressor \times Sex	-0.60	0.45	-0.08	-1.34	
Vulnera. \times Stressors \times Sex	0.88	0.42	0.01	0.21	
Depende. \times Stressors \times Sex	0.43	0.45	0.06	0.94	

* $p < .05$; ** $p < .001$

undergraduate students. Moreover, this model was expected to be different for men and women. The main findings are described below.

Early Maladaptive Schemas and Depressive Symptoms

In this study, only the emotional deprivation schema was directly associated with an increase in depressive symptoms. This result is consistent with previous studies that indicate that emotional deprivation represents a risk factor for depression (Eberhart et al. 2011; Lumley and Harkness 2007).

Findings regarding the diathesis stress model were limited to the emotional deprivation and abandonment schemas, and displayed different patterns in men and women. For emotional deprivation, in men the association between stressors and depressive symptoms was significant only for those high in emotional deprivation, showing the typical diathesis effect, whereas women high in emotional deprivation tended to score high on depressive symptoms, regardless of whether they experienced stressful events or not. It is interesting to note that this result for women is very similar to that obtained by Calvete and colleagues, who also found that women with maladaptive schemas tended to display high levels of depression independently of stress levels (Calvete et al. 2007). In contrast, the results for men are consistent with the cognitive diathesis-stress models' proposal that depression only emerges when stressors are added to preexisting cognitive vulnerability (Abramson et al. 1989; Beck 1976).

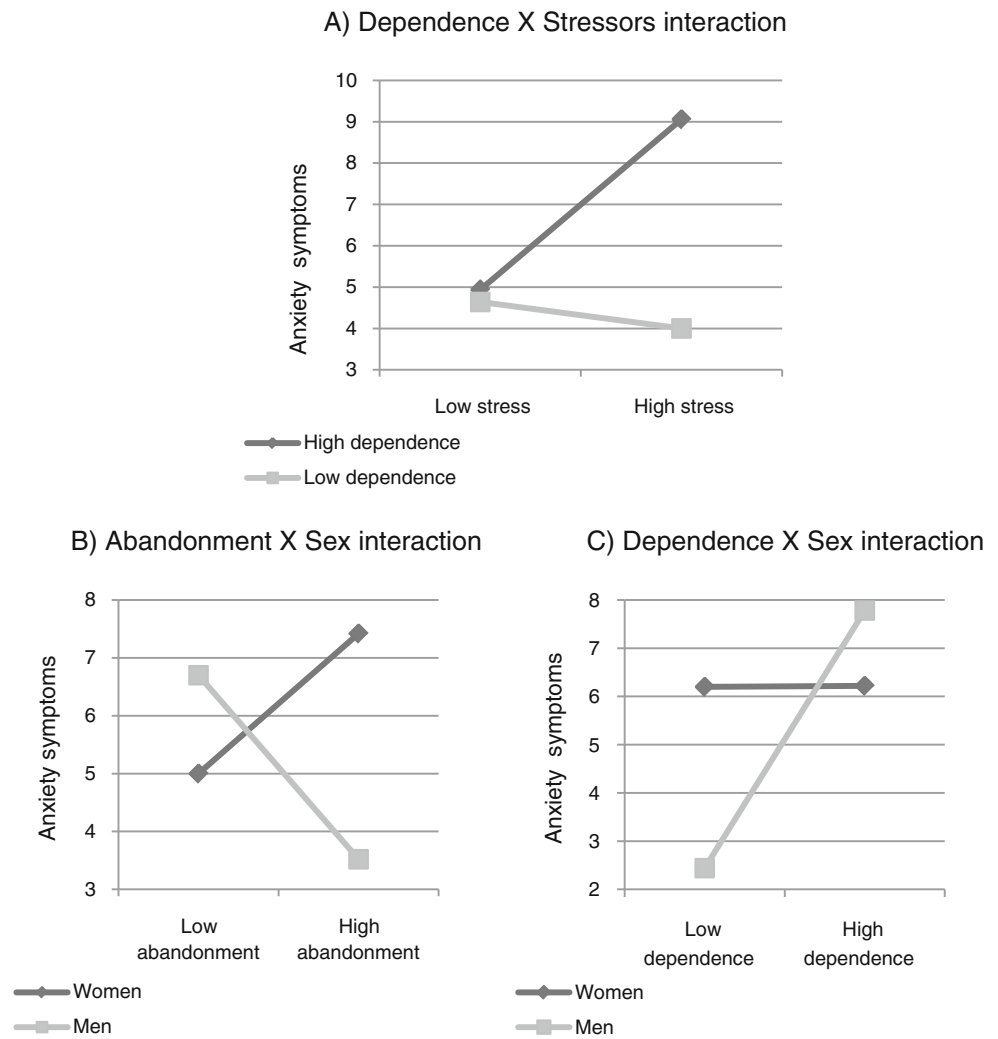
The pattern of associations for the abandonment schema was different. In this case, women displayed the typical diathesis-stress effect, with those women high in abandonment experiencing more depression under conditions of high stress, whereas men high in abandonment showed similar levels of depressive symptoms independently of the number of stressors.

Contrary to our expectations and to previous literature (e.g. Calvete et al. 2005; Lumley and Harkness 2007), the defectiveness and failure schemas did not predict depressive symptoms. A tentative explanation lies in the longitudinal design of this study, which makes it more difficult to find statistical associations between EMS and symptoms over time. In fact, in the present study, the above-mentioned schemas were actually correlated with T1 depressive symptoms despite the fact they were not able to predict an increase over time. Longitudinal relationships between schemas and symptoms may be complex. For instance, a growing number of studies show that the relationship between cognitive variables and depression can be bidirectional so that schemas could act not only as predictors, but also as outcomes of depression (Hankin et al. 2008; Mezulis et al. 2010).

Early Maladaptive Schemas and Anxiety Symptoms

Two EMS, vulnerability to harm and dependence, predicted increases in anxiety symptoms. This result is consistent with many previous studies (e.g., Glaser et al. 2002;

Fig. 2 Interactions between EMS and stressors and between EMS and sex in the prediction of anxiety symptoms



Lumley and Harkness 2007; Schmidt et al. 1995; Welburn et al. 2002), and with the specificity hypothesis (Beck 1976). That is, individuals believing that danger is imminent, or feeling unable to cope with everyday responsibilities in a competent manner tend to experience anxiety symptoms.

Findings of this study also indicate that the role of some schemas was moderated by sex. Namely, the association between dependence and anxiety was significant only for men, suggesting that this schema may be more problematic for men. Differences in socialization may lead men, who are often associated with stereotyped traits of autonomy and efficacy, to consider dependence especially undesirable (Cross and Madson 1997). In contrast, as women are more oriented towards social relations and endorsing beliefs involving dependency they may find this schema more socially appropriate for themselves, which ultimately causes them less anxiety (Calvete and Cardenoso 2005; Prinstein and Aikins 2004).

Sex differences were also present in the case of the abandonment schema but with a different pattern. The

perceived instability of significant others was associated with greater anxiety only in women. A tentative explanation for this result may be that men react with emotions different from anxiety when they believe that they are going to be abandoned by others. For instance, they might tend to react with anger instead of anxiety, as previous research has suggested that anger is more predominant in men than in women (Calvete and Orue 2011; Hankin and Abramson 2001; Sadeh et al. 2011; Verona et al. 2007).

Dependence was the only schema that interacted with the number of stressors to predict anxiety. In accordance with the diathesis-stress model, the number of stressors predicted an increase in anxiety only in those participants who scored high on dependence.

General Conclusions

Several previous studies have provided support for the association between EMS and symptoms of depression and anxiety. Nevertheless, the majority of these studies have been cross-sectional and, with few exceptions (e.g.,

Eberhart et al. 2011), none of them has tested the interaction between EMS, stressful events, and sex.

Significantly, the present study shows that emotional deprivation and abandonment moderate the impact of stressors on depressive symptoms, but that this moderation is different in men and women. Identifying EMS \times Stressors interactions is important because it supports the assumptions of the Schema Therapy model (Young et al. 2003). Namely, it implies that EMS may remain relatively latent until activated by stressful life events. Most important, the results of this study suggest that such interactions are different for men and women; some EMS may be particularly problematic for women whereas other EMS most seriously affect men. In fact, and consistent with the study of Welburn et al. (2002), in the present study women scored higher on failure and abandonment, whereas men scored higher on emotional deprivation. However, as this is the first study testing gender differences in the moderating role of EMS, these results have to be interpreted cautiously. Moreover, the male sample in this study is significantly smaller than the female sample (32.9% vs 67.1% respectively).

As expected in accordance with the specificity hypothesis (Beck 1976), a different pattern of schemas was associated with each psychological disorder. That specificity had already been demonstrated at the level of automatic thoughts (e.g., Calvete and Connor-Smith 2005; Schniering and Rapee 2004) but fewer studies had focused at the schema level (e.g. Lumley and Harkness 2007; McGinn et al. 2005).

To sum up, it can be concluded that some EMS may be activated by stressful events, leading to the development of depressive and anxiety symptoms in undergraduate students. Moreover, the power of these core structures to predict future symptoms seems to be content-specific and moderated by sex.

Limitations and Future Directions

Although the present study provides valuable information about the role of EMS as predictors of depressive and anxiety symptoms, it is not without limitations. First, it was based on an undergraduate student sample, and the findings may not be reproducible in clinical populations that have permanently activated EMS (Young 1999). Therefore, it is extremely important that future studies address this issue by testing moderation effects in clinical samples. Moreover, a ‘priming’ task, like that proposed by Persons and Miranda (1992) in the dependent-mood hypothesis, might be used to activate cognitive structures in non-clinical samples.

In addition, measuring the schemas only at T1 may have excluded the possibility of testing whether symptoms and stressors influence the cognitive structures and not vice versa. Indeed, it has been found that both distress and stressors can modify cognitive style (e.g. Calvete 2011b).

Young himself has questioned the stability of EMS, suggesting that life experiences may modify schemas (Young et al. 2003). A recent study showed stress generation to be the mechanism through which EMS impact depressive symptoms (Eberhart et al. 2011). Therefore, to test these possible transactional relationships, future studies should measure stressors, schemas and distress symptoms at different times. Ideally, a three wave design with longer periods in between would be recommended. The period of 5 months between T1 and T2 presents another limitation in the present study because it does not leave enough time for stressful events to happen or cognitive structures to change.

Finally, future studies should control for the previous experience of having suffered a mood or anxiety disorder, as that has been shown to increase the likelihood of relapse and to influence the stability of EMS (Riso et al. 2006).

Implications

In conclusion, the results of this study show that certain early maladaptive schemas are risk factors for the development of depressive and anxiety symptoms in undergraduate students. In particular, schemas related to the expectation that the need for emotional support will not be adequately satisfied and the perceived instability of others may lead to depressive symptoms, whereas schemas related to the fear of an imminent threat, and the belief that one is not able to handle daily responsibilities may lead to anxiety symptoms. Some of these schemas will only predict symptoms in the presence of stressful events and will act differently for men and women.

Because the first year of university is a period in which the likelihood of experiencing stressful events increases, stress prevention programmes should include strategies to identify and change those specific maladaptive schemas originated in childhood and comprising emotional and cognitive factors. These programmes should be particularly sensitive to gender issues that can make some schemas more relevant for women (e.g., abandonment) than for men (e.g., dependence).

In sum, the present study adds knowledge on the complexity of the dynamics between EMS and stressors, showing relevant gender differences that can be incorporated to prevention programmes for students.

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