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The association between stress and emotional states in adolescents: The role of gender and self-esteem

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ABSTRACT

This cross-sectional study investigated gender differences on domains of stress, self-esteem and emotional states (depression and anxiety) as well as the association between stress, self-esteem and emotional states using a sample of Norwegian adolescents ($N = 1508$). The results showed that girls had significantly higher mean scores on all stress domains and on emotional states compared with boys. Conversely, boys scored significantly higher on self-esteem. The hierarchical multiple regression analysis showed a significant association between increasing stress related to peer pressure, home life, school performance and adult responsibility and higher levels of emotional states. Moreover, the associations between stress and emotional states were not moderated by gender. A strong, inverse association was found between self-esteem and emotional states. A weak moderation effect of self-esteem was found on the association between stress related to peer pressure, romantic relationships, school performance and emotional states. The identification of the potential protective role of self-esteem in relation to adolescents' emotional outcomes represents an important step toward developing preventive interventions for children and adolescents.

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1. Introduction

Of all life-stages adolescence is arguably the one most marked by rapid and potentially tumultuous transition, including biological, social, and psychological changes as well as shifting self-concepts (Byrne, Davenport, & Mazanov, 2007). Investigating the association between stress, self-esteem and emotional outcomes as well as gender differences on these constructs are helpful for health promotion as well as preventive strategies during adolescence.

Research has established that overall levels of stress tend to increase from preadolescence to adolescence (Rudolph, 2002). A growing body of research confirms that girls during adolescence experience higher levels of stress than boys; this is specifically related to interpersonal stressors, including negative events and problems related to, e.g., peers, romantic relationships, and family (Hampel & Peterman, 2006; Hankin, Mermelstein, & Roesch, 2007). Girls are also found to exhibit more emotional problems in adolescence than boys, including symptoms of depression and anxiety. This gender difference seems to increase in middle to late adoles-

cence (Compas, Connor-Smith, & Jaser, 2004; Kim, 2003; Ranta et al., 2007). Conversely, boys seem to score higher on self-esteem during adolescence (Baldwin & Hoffmann, 2002; Frost & McKelvie, 2004).

Evidence suggests that adolescent exposure to multiple independent and cumulative stressors, especially those in an interpersonal context (Rudolph, 2002), is related to psychological symptomatology of clinical significance, including symptoms of depression (Charbonneau, Mezulis, & Hyde, 2009; Compas et al., 2004; Garber, 2006; Shih, Eberhart, Hammen, & Brennan, 2006; Waaktaar, Borge, Fundingsrud, Christie, & Torgersen, 2004) and anxiety (Kim, Conger, Elder, & Lorenz, 2003; McLaughlin & Hatzenbuehler, 2009). In this regard, girls appear to be more vulnerable to the negative psychological health effects of stress than boys (Charbonneau et al., 2009; Hankin et al., 2007). Studies also provide evidence that stressful life experiences predict increases in psychological problems over time (Carter, Garber, Ciesla, & Cole, 2006; Hankin et al., 2007; Waaktaar et al., 2004).

Self-esteem is a large part of adolescents' self-understanding and is likely to be a fluctuating and dynamic construct, susceptible to internal and external influences during adolescence (Abela, Webb, Wagner, Ho, & Adams, 2006; Baldwin & Hoffmann, 2002). Self-esteem is widely recognized as a central aspect of

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psychological functioning during adolescence. Previous studies have found clear inverse associations between self-esteem and symptoms of depression (Orth, Robins, & Meier, 2009; Orth, Robins, & Roberts, 2008) and anxiety (Boden, Fergusson, & Horwood, 2008; Kim, 2003). Especially in the face of challenging life circumstances, individuals with high self-esteem are assumed to have better coping resources and are thus protected against the deleterious consequences of stressful life events (and, conversely, individuals with relatively low self-esteem are more vulnerable to this effect) (Orth et al., 2009). However, previous research testing the moderating effect of self-esteem has yielded inconsistent results, addressing a need for further investigation on this issue, Orth et al. (2008, 2009) have addressed these issues in more detail.

The present research adds to the literature in several ways. As described in the introduction, stress, self-esteem and emotional outcomes are highly related constructs and likely to show changes during adolescence because of the many transitions that occur during this time. In light of developmental shifts and gender differences in the salience and impact of various social contexts, developing a more thorough understanding of the association between stress, self-esteem and emotional states may require distinguishing among different specific domains of stress (McMahon, Grant, Compas, Thurm, & Ey, 2003). Orth et al. (2009) further emphasise that self-esteem might have a buffering effect only for specific subtypes of stressful events, addressing the need to test the potential moderating role of self-esteem on different domains of stress in more detail.

Based on the empirical findings presented above, the aim of this study is threefold.

- (1) To investigate gender differences on domains of stress and on state depression and anxiety, and self-esteem. We assumed that girls scored higher on stress, depression and anxiety, and that boys scored higher on self-esteem.
- (2) To investigate the association between the predictor variables of stress and self-esteem and the outcome of state depression and anxiety. It is expected that stress is positively and self-esteem negatively related to state depression and anxiety.
- (3) To investigate the potential moderation effect of self-esteem and gender on the relationship between each of the stress domains and the outcome of state depression and anxiety. Based on previous empirical findings, we expected that a moderation effect would be found.

2. Methods

2.1. Participants

A total of 2341 students attending public schools from six municipalities in the middle of Norway were asked to participate in the study (693 from elementary school and 1648 from secondary school). Of these participants, 1862 completed questionnaires were returned for an overall response rate of 79.5%. Missing responses were mainly due to the lack of cooperation of classes or students being absent when the questionnaire was administered. In the present study the sample was restricted to pupils in junior and senior high schools, and the data analysis was therefore undertaken for $n = 1508$ (81%); 769 (51.1%) were girls and 735 (48.9%) were boys (gender was not identified for four participants). Participants ranged in age from 13 to 18 years, and the mean age for the entire sample was 14.86 (SD = 1.51), 14.76 for boys (SD = 1.46) and 14.95 for girls (SD = 1.55). There was no significant gender difference in age.

2.2. Procedures

Permission to carry out the study was obtained from The Norwegian Social Science Data Services (NSD), with consent granted from both the municipalities and the schools. Passive consent from the participants was allowed because no identity data was collected. The adolescents and the parents received an information letter that briefly explained the purpose of the study. In all stages of the data collection, it was emphasized that participation was voluntary, anonymous, and confidential, and that the participants were free to withdraw from the study. Administration of the questionnaire was completed in whole class groups during September and October of 2006. Researchers on the project were present during the data collection and provided instruction and supervision on how to complete the questionnaire.

2.3. Instruments

Adolescent stress was assessed using the Adolescent Stress Questionnaire (ASQ-N). This was originally a 58-item scale with items concerning common adolescent stressors rated on a 5-point Likert scale: 1 = *not at all stressful (or is irrelevant to me)* to 5 = *very stressful*. The ASQ has been continuously developed and validated since the mid 1990s (Byrne et al., 2007), and the instrument has been translated and tested for use in a Norwegian adolescent sample (Moksnes, Byrne, Mazanov, & Espnes, *in press*) reflecting nine dimensions of stress. However, because of strong correlations between some of the stress domains, only seven were included in the present study: peer pressure, home life, romantic relationships, school attendance, school performance, adult responsibility, and financial pressure. Sum scores were calculated where higher scores reflecting higher levels of stress.

State anxiety was measured using the Spielberger State-Trait Anxiety Inventory (STAI: Spielberger, 1983). The questionnaire consisted of 20 items rated on a 4-point Likert scale ranging from 1 = *not at all* to 4 = *very much so*. The sum of the scale in the present study ranged from 20 to 79, where a higher sum score indicates more symptoms of anxiety.

State depression was measured using a non-clinical depression scale appropriate for measuring (state) non-clinical depressive attributes (see Byrne et al., 2007). It consisted of a short, 15-item questionnaire that measured the respondents' levels of current depressive moods. Item choice was informed by reference to commonly experienced depressive features outlined in the Diagnostic and Statistical Manual–Fourth Edition TR (DSM: American Psychiatric Association, 2000). Reference was also made to the Zung Self Rating Depression Scale (Zung, 1965). The items were measured on a 5-point Likert Scale ranging from 0 = *never* to 4 = *always*. The sum scores of the scale in the study ranged from 0 to 60, where a higher sum score indicated more symptoms of depression.

Self-esteem was measured using the Rosenberg Self-Esteem Scale (RSE: Rosenberg, 1965), a 10-item questionnaire measuring global self-esteem on a 4-point Likert scale, ranging from 0 = *strongly disagree* to 3 = *strongly agree*. The sum score in the present study ranged from 0 to 30, where a higher sum score indicated higher self-esteem.

2.4. Statistics

All the statistical analyses were carried out using the Statistical Package for Social Sciences (SPSS) version 14.0 for Windows (SPSS Inc., Chicago, IL, 2003). The data file originally had 1862 cases. Those who were older than 18 or younger than 13 years old were excluded ($n = 354$), leaving 1508 cases remaining in the analysis. The response rate was good, and only a small number of cases

(6–9%) missed one or two responses across each of the scales in the study. Missing variables were treated according to the guidelines set out by Mazanov and Byrne (2008). For respondents with up to 10% missing responses within a scale, the missing responses were replaced with modes. For respondents missing more than 10% of the responses within a scale, no score was calculated. 'Missing' was treated listwise in the analyses.

Cronbach's alphas were computed to estimate the internal consistency of all instruments used. Descriptive statistics including means and standard deviations were calculated for the continuous variables and independent samples *t*-test was used to compare means between genders. Effect sizes with Cohen's *d* was used, where small ($d = 0.20$), medium ($d = 0.50$), and large ($d = 0.80$) (Cohen, 1988). Pearson product-moment correlation was used to test bivariate associations between variables in the study. Hierarchical multiple regression analyses controlled for gender and age were used to evaluate the association between the predictor variables of stress and self-esteem and the criterion variables of state depression and anxiety. The moderation effect was tested with two-way interaction effects between gender \times stress and stress \times self-esteem. The variables in the interaction terms were centred before being entered in the regression analysis. There were no indications of multicollinearity, with VIF values <10 and tolerance ranging between .36 and .92 for the regression model with depression and between .33 and .92 for the regression model with anxiety (Tabachnik & Fidell, 2007). The predictor variables were included in five steps: (1) gender, (2) age, (3) stress (4) self-esteem and (5) stress \times gender, stress \times self-esteem. *p*-Values $\leq .05$ were considered statistically significant.

3. Results

3.1. Gender differences on stress, self-esteem and emotional states

The results presented in Table 1 show that girls scored significantly higher on all the stress domains. Girls also had significantly higher mean scores on state depression and anxiety, while boys scored significantly higher on self-esteem. The effect sizes show that the gender differences were weak to moderate. The results presented in Table 2 show significant and medium to strong correlations between all the stress domains, but none of the variables indicated significant multicollinearity ($r > .90$) (Tabachnik & Fidell, 2007). The correlations between the stress domains and the adolescents' scores on state depression, anxiety, and self-esteem were moderate to strong, where all stress domains showed significant and positive correlations with depression and anxiety and significant and negative correlations with self-esteem. Self-esteem was inversely correlated with both state anxiety and depression. Age showed weak correlations with all the scales, indicating that the adolescents' scores on stress, self-esteem and emotional states did not differ remarkably with age.

3.2. Relationships between stress, self-esteem and emotional states

Results following the last step of the multivariate hierarchical regression analysis for variables predicting state depression and anxiety are presented in Table 3. When looking at the model with depression, gender added a significant increment in R^2 when entered in the first step, but showed a non-significant

Table 1
Gender differences on stress, self-esteem and emotional states.

	Girls mean (SD)		Boys mean (SD)		Range	<i>t</i> -Value	Cohen's <i>d</i>
Peer pressure	17.56	(7.50)	14.43	(6.22)	8–40	8.26***	.45
Home life	23.39	(10.07)	19.45	(8.07)	10–50	7.84***	.43
Romantic relationships	8.80	(4.73)	7.44	(3.76)	4–20	5.73***	.32
School attendance	11.89	(4.68)	10.92	(4.55)	5–25	3.77***	.21
School performance	11.54	(4.11)	9.77	(4.16)	5–25	7.66***	.43
Adult responsibility	8.25	(3.37)	6.85	(3.04)	3–15	7.92***	.44
Financial pressure	9.64	(4.31)	7.97	(3.67)	4–20	7.57***	.42
Depression	19.41	(12.28)	14.23	(11.18)	0–60	8.20***	.44
Anxiety	37.63	(10.65)	35.18	(10.56)	20–79	4.27***	.23
Self-esteem	17.75	(5.33)	20.14	(5.23)	0–30	–8.21***	.45

Note:
*** $p \leq .001$.

Table 2
Correlation between age, stress, self-esteem and emotional states.

	PP	HL	RR	SA	SP	AR	FP	Age	Depression	Anxiety	Self-esteem
Peer pressure PP	–	.69**	.62**	.63**	.59**	.62**	.67**	–.10*	.52**	.45**	–.38**
Home life HL	.71**	–	.44**	.66**	.62**	.60**	.70**	–.03	.51**	.41**	–.34**
Romantic relationships RR	.63**	.58**	–	.49**	.45**	.42**	.51**	.03	.34**	.25**	–.21**
School attendance SA	.62**	.67**	.50**	–	.69**	.66**	.60**	–.01	.43**	.33**	–.25**
School performance SP	.55**	.58**	.39**	.73**	–	.67**	.57**	.03	.44**	.31**	–.22**
Adult responsibility AR	.56**	.60**	.38**	.62**	.65**	–	.63**	.09*	.44**	.36**	–.25**
Financial pressure FP	.66**	.72**	.56**	.65**	.55**	.58**	–	–.02	.45**	.37**	–.30**
Age	–.12**	.01	.04	.00	.04	.17**	.06	–	–.03	–.10**	–.09*
Depression	.50**	.52**	.36**	.54**	.51**	.52**	.47**	.11**	–	.54**	–.51**
Anxiety	.46**	.42**	.31**	.46**	.39**	.41**	.38**	.02	.71**	–	–.63**
Self-esteem	–.40**	–.37**	–.24**	–.36**	–.33**	–.34**	–.34**	–.09*	–.64**	–.62**	–
Cronbach's α	.87	.89	.82	.74	.84	.76	.82		.94	.91	.86

Note: Correlations for boys are above the diagonal and correlations for girls are below the diagonal. The Cronbach's alphas refer to the whole sample.

* $p \leq .05$.
** $p \leq .01$.

Table 3
Summary of the hierarchical regression analysis for variables predicting emotional states.

	Depression				Anxiety			
	B	SE B	β	ΔR^2	B	SE B	β	ΔR^2
Constant	12.26	2.94			50.51	2.83		
Step 1. Gender	.65	.52	.03	.05***	-.97	.49	-.05	.01***
Step 2. Age	.31	.16	.04	.00	-.26	.16	-.04	.00
Step 3. Peer pressure	.18	.10	.11	.34***	.22	.09	.15 ⁺	.24***
Home life	.21	.07	.16**		.13	.07	.11	
Romantic relationships	.02	.12	.01		-.04	.12	-.02	
School attendance	.07	.12	.03		-.05	.12	-.02	
School performance	.28	.10	.12**		.03	.10	.02	
Adult responsibility	.32	.18	.09		.36	.17	.11 ⁺	
Financial pressure	.03	.15	.01		.02	.15	.01	
Step 4. Self-esteem SE	-.81	.05	-.37***	.13***	-.97	.05	-.49***	.21***
Step 5. Gender \times peer pressure	-.23	.12	-.11	.02***	-.17	.12	-.09	.02***
Gender \times home life	-.10	.09	-.07		-.11	.09	-.08	
Gender \times romantic relationships	.06	.16	.02		.07	.15	.02	
Gender \times school attendance	.24	.18	.07		.41	.17	.13 ⁺	
Gender \times school performance	-.03	.15	-.01		-.01	.14	-.00	
Gender \times adult responsibility	.24	.23	.05		-.06	.22	-.01	
Gender \times financial pressure	.09	.20	.03		-.04	.19	-.01	
Peer pressure \times SE	-.03	.01	-.12**		-.03	.01	-.12**	
Home life \times SE	.00	.01	.02		.01	.01	.03	
Romantic relationships \times SE	-.01	.01	-.02		-.03	.01	-.08 ⁺	
School attendance \times SE	.01	.02	.01		.00	.02	.01	
School performance \times SE	.01	.01	.01		.03	.01	.08 ⁺	
Adult responsibility \times SE	-.02	.02	-.03		-.01	.02	-.01	
Financial pressure \times SE	-.01	.02	-.00		.01	.02	.01	
R ²				.53				.46

Note: Results from the final regression equation.

Reference category – boys.

ΔR^2 : Change in R^2 for each subsequent step.

⁺ $p \leq .05$.

** $p \leq .01$.

*** $p \leq .001$.

association with state depression, when controlling for the other variables. Age was not significantly associated with state depression. Stress added a significant increment R^2 when added in step three, where stress of home life and school performance were significantly and positively associated with state depression controlled for the other variables in the final step. Self-esteem was significantly and inversely related to depression. The moderation effects of gender \times stress and self-esteem \times stress were added in the final step. Self-esteem was found to moderate the association between peer pressure stress and state depression. However, the moderation effect was marginal, accounting for a small increment in R^2 .

In the regression model predicting anxiety, gender was entered in the first step and made a significant increment in R^2 , but showed a non-significant association with anxiety when controlling for age, stress and self-esteem in the final step. Age was not a significant predictor of state anxiety. The stress factors added a significant increment to the model in step three, where stress of peer pressure and adult responsibility were significantly and positively related to anxiety controlled for the other variables in the final step. Self-esteem was strongly and inversely associated with anxiety. When adding the moderation effects in step five, this added a significant but weak increment to the model. A significant moderation effect of gender was found in relation to school attendance, indicating that the association between school attendance and anxiety is impacting differently in boys and girls. Further, self-esteem moderated the association between stress related to peer pressure, romantic relationships and school performance and the outcome of anxiety. However, none of the moderator effects were strong, indicating that the strength of the association between stress and state anxiety is not highly dependent on self-esteem.

4. Discussion

The findings of the present study present a more comprehensive picture of domain specific stress, self-esteem and emotional states in adolescents than the previous literature on the area. In line with the hypothesis, the results showed that girls scored significantly higher on all stress domains where the effect sizes were mainly weak to moderate (Cohen, 1988). The results found support from other studies (Hankin et al., 2007; Rudolph, 2002). Girls may have a greater psychological and emotional investment in interpersonal success and are more concerned about possible negative evaluation by peers than are boys (Rose & Rudolph, 2006; Rudolph, 2002). Further, the finding that girls reported higher stress related to school performance and increasing adult responsibility also support previous findings (Byrne et al., 2007). However, these findings are not consistent across studies, underscoring the importance of investigating domain specific stressors (Rudolph, 2002).

In line with our hypothesis, the findings clearly showed that girls scored higher on state depression and anxiety and boys scored higher on self-esteem, where the effect sizes were small to moderate (Cohen, 1988). During adolescence there is an increase in self-consciousness, and self-esteem is a large part of adolescents' self-understanding. The relationship between gender and self-esteem has been well-researched and studies have typically revealed that boys have a higher self-esteem than girls during adolescence (Baldwin & Hoffmann, 2002; Frost & McKelvie, 2004). The finding that adolescent girls reported higher scores on state depression and anxiety than boys is also in line with previous research (Compas et al., 2004; Kim, 2003; Ranta et al., 2007), showing that girls may be especially vulnerable during the adolescent period and indicate a need to identify potential problems and to provide support especially to girls.

The results supported our hypothesis that stress in everyday life was related to negative emotional states. When controlled for the other variables, stress of home life and school performance were positively associated with state depression, and stress of peer pressure and adult responsibility were positively related to state anxiety. However, in contrast to what we suggested in our hypothesis, the only moderator effect of gender was found on the association between stress of school attendance and state anxiety, where a stronger association was found for girls than for boys. Thus, overall, the results show that each of the stressors has similar impact on boys' and girls' emotional outcome. Relations between stressors and symptoms of depression and anxiety in childhood and adolescence have been well established in cross-sectional and prospective longitudinal studies (Kim et al., 2003; Shih et al., 2006). In line with the present result, previous studies have suggested that stress within an interpersonal context may be especially strongly related to emotional distress. However, in contrast to previous findings, the strength of these associations did not differ remarkably between boys and girls (Charbonneau et al., 2009; Hankin et al., 2007; Rudolph, 2002; Shih et al., 2006).

In line with our suggestions, the results showed that self-esteem was strongly and negatively related to state depression and anxiety, controlled for the effect of stress. The findings thus support the strong, protective role of self-esteem in association with adolescents' psychological health, despite the experience of stressful events. The results further showed that self-esteem moderated the association between stress related to peer pressure, romantic relationships and school performance and increases in negative emotional states. However, it should be noted that the moderation effects did not explain much of the variance in the outcome variables. From this point of view, it seems inappropriate to overstate the substantive significance of the present moderation effects. Support for the inverse association between self-esteem and negative emotional outcomes has been shown in previous findings (Boden et al., 2008; Kim, 2003; Orth et al., 2008; Trzesniewski et al., 2006). However, previous research testing the moderating effects of self-esteem has yielded highly inconsistent results (Orth et al., 2009).

Self-esteem is shaped by individuals' appraisals of their own self and how they are perceived by significant others, and is likely to vary during adolescence as a function of individual and environmental factors (Abela et al., 2006; Baldwin & Hoffmann, 2002; Kim et al., 2003). In line with the findings of the present study, it would be logical to assume that facilitating self-esteem in adolescence is crucial for promoting positive psychological functioning (Kim, 2003; Wilburn & Smith, 2005). An important focus for preventive intervention is also to increase children's abilities to cope effectively with stress and improve skills in problem solving, emotion regulation, and access to adequate social support. This may increase resilience in the face of stress and promote positive psychological functioning among adolescents.

The study should be interpreted with some limitations in mind. Since the present study employed a cross-sectional design, it is not possible to determine causal direction among the variables, and the associations found are possible to represent a series of reciprocal relations (Kim et al., 2003; McMahon et al., 2003). This implies that one must remain open to alternative explanations for the findings. Moreover, all findings were based on self-reports. The results therefore do not allow for firm conclusions with regard to clinical emotional affects. Nevertheless, we believe that the results are relevant for levels of emotional affect that represent a significant impairment in the individual's psychological well-being (Orth et al., 2009). It is also accepted that adolescents as young as 11–15 years old are able to give detailed and reliable information in questionnaires (Haugland & Wold, 2001). The large sample size of the present study can protect against the influences of potential random error related to self-reporting (Rothman, 2002).

In conclusion, girls reported higher mean scores on all stress domains and higher mean scores on state depression and anxiety compared with boys. Boys scored higher on self-esteem. A clear association was found between increasing stress of home life and school performance and higher levels of state depression. Stress of peer pressure and adult responsibility were positively associated with state anxiety. Self-esteem was strongly and inversely associated with both state depression and anxiety, and weak support was found for self-esteem moderating the association between domain specific stress and emotional states. However, further elaboration of the associations is warranted. In particular, longitudinal research of reciprocal and dynamic relations among stressors, self-esteem and emotional outcomes are suggested. The identification of the link between stressful life events, self-esteem and emotional states represents an important step toward developing preventive interventions for children and adolescents targeting stress-related health problems.

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