Revista Brasileira de Psiquiatria. 2018;40:290–295
Brazilian Journal of Psychiatry
Brazilian Psychiatric Association
 I doi:10.1590/1516-4446-2017-2434

ORIGINAL ARTICLE

Is emotional functioning related to academic achievement among university students? Results from a cross-sectional Iranian sample

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Objective: Whereas several studies have predicted academic achievement (AA) as a function of favorable cognitive factors and low negative emotional functioning (such as depression and anxiety), little is known about its associations with cognitive-emotional states of positive emotional functioning, such as social satisfaction. The present study sought to evaluate associations of AA with dimensions of negative and positive emotional functioning.
Method: This cross-sectional study enrolled 275 students (mean age, 21.24 years; 66.1% females), who completed questionnaires covering sociodemographic parameters and AA scores, as well as measures of loneliness and depression (representing negative emotional functioning) and social satisfaction (representing positive emotional functioning).
Results: Lower scores for negative and higher scores for positive emotional functioning were associated with higher AA scores. Multiple regression analysis showed that AA was predicted independently by both low negative and high positive emotional functioning. No gender differences were observed.
Conclusions: The pattern of results observed in this study suggests that opposing dimensions of emotional functioning are independently related to AA. Students, educators, and health professionals dealing with students should focus both on increasing social satisfaction and on decreasing feelings of loneliness and depression.

Keywords: Negative emotions; positive emotions; students; academic achievement; loneliness; depression; social satisfaction

Introduction

Academic achievement (AA; understood as an aspect of intellectual achievement[1]) is a major concern for university students and for their families alike, as success and failure usually have far-reaching consequences at both private and professional levels. Not surprisingly, the World Health Organization (WHO) has listed academic failure and scholastic demoralization as risk factors for mental disorders (cf. Brüne[2]).

At a theoretical level, the search for factors that might underpin AA can be divided into foci that are primarily cognitive and on those that are primarily emotional. Cognitive factors include intelligence and conscientiousness,[1] but also memory processes, as, by definition, a well-performing memory is an important contributor to AA.[3]

However, while cognitive processes are clearly implicated in AA, both everyday experience and a large body of literature point to the importance of emotional processes. Early findings indicated that, among children, poor school performance is associated with symptoms of depression (particularly among girls) and a poor self-concept[4]; among university students, more severe symptoms of anxiety and depression are associated with lower AA.[5-7]

In the present study, we focused on two opposing dimensions of emotional functioning – specifically on depression and loneliness as proxies for negative emotional functioning and on social satisfaction as a proxy for positive emotional functioning. These two emotional dimensions were chosen for the following reasons. First, depression has a negative impact on cognitive processes, such as perception and memory[8,9]; accordingly, we anticipated that symptoms of depression would be associated with lower AA. Second, symptoms of depression and feelings of loneliness are linked,[10-12] and feelings of loneliness together with social isolation have been associated with an increased risk of major depressive disorder and suicide attempts.[13-16] In this respect, we also note that the WHO (cf. Brüne[2]) has identified loneliness as a risk factor for mental disorder. Likewise, feelings of loneliness and poor cognitive functioning are related, at least among

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Submitted Aug 08 2017, accepted Sep 05 2017, Epub Mar 12 2018.

elderly adults.[17-21] We expected that such links would also be observable among university students, with a negative association between loneliness scores and AA.

Regarding social satisfaction as a proxy for positive emotional functioning, higher levels of social satisfaction should be associated with lower scores for depression and loneliness and higher AA. In the present context, social satisfaction was interpreted in terms of high rates of social interaction with, and good relations with, family members, peers, and other people (see questionnaire on social satisfaction below). Furthermore, at least among adolescents, those engaged in positive relationships tend to have stronger and better adapted emotional well-being, self-beliefs, prosocial values, and social interactions compared to those reporting low engagement in peer relationships.[22] Importantly, DeRosier & Lloyd[23] showed that, among children, social adjustment was related to higher academic outcomes.

There is evidence that university students often experience somatic and psychological issues.[5-7] Many cross-sectional studies have shown that university students are at increased risk of reporting high pain scores,[24] symptoms of depression,[24-27] anxiety,[25,26] insomnia,[24,28] and stress.[25,26,29,30]

Verger et al.[31] investigated the occurrence of psychiatric disorders at six French universities and observed 12-month prevalence rates of 8.9% for major depressive disorder; 15.7% for anxiety disorders; and 8.1% for substance use disorders. This study confirmed that psychiatric disorders are prevalent among university students, and that academic failure during the first academic year in particular may be closely related to psychiatric disorders. Interestingly, the occurrence of anxiety disorders was associated with paternal precarious employment status or paternal unemployment, suggesting that both economic constraints and the relationship with the family are of utmost importance.

We learn in particular from the studies of Wilding et al.[25,32] that relationship issues seem to have a negative impact on AA, pointing to the significance of social interactions. In this respect, as already outlined above, loneliness or the feeling of being excluded from peers and the surrounding social system is considered a major risk factor for psychiatric disorders and suicidal ideation.[33,34] Dramatically, De Catanzaro[35] and Joiner et al.[13] showed that suicidal behavior (planned, attempted, and failed suicides; suicidal ideation) was related to the subjective feeling of being worthless and a burden on the social community, along with perceived low odds of finding a romantic partner and reproducing.

Lastly, Bor et al.[36] showed that adolescent mental health problems have increased over the last three decades. Specifically, relative to males, females are more prone to build up and base their self-esteem on social feedback, shifting them to a greater dependence on social interactions for self-esteem and mental stability.[37] Therefore, it is conceivable that, compared to their male counterparts, females will record higher scores for feelings of depression and loneliness, and lower scores for social satisfaction.[5,36,38]

In summary, previous studies have shown that AA is not purely a matter of cognitive performance, but also involves emotional processes. Furthermore, while the association between AA and negative emotional functioning – such as depression, anxiety, and loneliness – has been studied extensively,[5-7] the association with positive emotional functioning has not. Accordingly, the aim of the present study was to shed more light on these dimensions. We believe our findings will have the potential to improve counseling of students with respect to both low AA and poor emotional functioning.

The following two hypotheses and one research question were formulated. First, we expected that higher scores for depression and loneliness and lower scores for social satisfaction would be associated with lower AA scores. Second, we expected more extensive emotional issues to be more strongly associated with lower AA among female than among male students. Third, we established as an exploratory question whether negative emotional functioning (depression, loneliness) or positive emotional functioning (social satisfaction) would be the most clear predictor of AA scores.

Methods

Procedure

At the end of the spring semester of 2015 and during the examination period, undergraduate students at the medicine and nursing programs of the Ardabil University of Medical Sciences, Ardabil, Northwestern Iran, were approached and asked to participate in a study of AA, depression, loneliness, and social satisfaction. Participants were informed about the study aims and the anonymous and confidential handling of the data. Next, they signed a written informed consent form and completed a booklet of questionnaires covering sociodemographic data, symptoms of depression and loneliness, and social satisfaction. The booklet was completed within 15-20 minutes and sealed in an envelope after completion. The Institutional Review Board of the Ardabil University of Medical Sciences (Ardabil, Iran) approved the study, which was conducted in accordance with the rules laid down in the Declaration of Helsinki.

Sample

A total of 324 students were invited to participate, and 275 took part in the study. The inclusion criteria were: age between 18 and 25 years; being a student of the Ardabil University of Medical Sciences; being willing and able to complete the questionnaires and to show their certificate, which contained their overall scores in the spring exams; and provision of written informed consent. The exclusion criteria were: failure to complete the written informed consent; and signs of psychosis or suicidal ideation.

Tools

Sociodemographic data

Participants reported their age, gender, university major, and marital status.

Loneliness

Loneliness was assessed with the UCLA Loneliness Scale,[39] which consists of the following three items: "How often do you feel that you lack companionship?"; "How often do you feel left out?"; and "How often do you feel isolated from others?" Each item was answered on a 3-point scale (1 = hardly ever; 2 = some of the time; 3 = often). The UCLA Loneliness Scale has shown satisfactory reliability and both concurrent and discriminant validity.[39] In the present study, it showed acceptable internal reliability (Cronbach's alpha = 0.89; average inter-item correlation = 0.72). The scores for each item were added to produce a loneliness scale from 3 to 9, with higher scores indicating a greater degree of loneliness. The cutoff point for loneliness was $\geqslant 6$, as in previous studies.[40]

Symptoms of depression

The Persian version[41] of the Beck Depression Inventory (BDI)[42] was completed to measure depressive symptoms. The BDI samples self-reported symptoms of depression. The questionnaire consists of 21 items and asks about different criteria for depression, such as depressed mood, appetite problems, sleep problems, and suicidal thoughts. Each item has at least four possible responses reflecting a range of intensity (e.g., for sadness: 0 = "I do not feel sad"; 1 = "I feel sad"; 2 = "I am sad all the time and I can't snap out of it"; 3 = "I am so sad or unhappy that I can't stand it"). The higher the score, the greater the severity of depressive symptoms (Cronbach's alpha = 0.88).

Social satisfaction

This self-administered questionnaire consisted of 43 questions and assessed three different dimensions: a) social satisfaction with family members (e.g., "I love my father"; "I love my mother"; "I love my sibling(s)"; "I regularly call/text my parents"; "My siblings are curious to know how my studies are going"); b) social satisfaction with peers/friends (e.g., "I meet my peers everyday"; "I chat (text, skype) with my friend(s) everyday"; "My peers always ask me how I am"); and c) social satisfaction with other people (e.g., "I easily strike up conversations with people on the bus/train"; "I know the name(s) of local shop vendor(s)"; "I say hello to students passing by in the hallway!"), as well as providing an overall score for social satisfaction (Cronbach's alpha = 0.89). Answers were given on 5-point Likert scales ranging from 0 (= totally disagree) to 4 (= totally agree), with higher sum scores reflecting a higher social satisfaction.

Academic achievement (AA)

AA was reported as the mean score of all exams; performance ranged from 1 to 20, and, accordingly, the global AA score did as well. In the present study, the mean achievement score was 15.36 (standard deviation [SD] = 1.83; Table 1).

Statistical analysis

As preliminary calculations, a series of t-tests were run to check for mean differences between medical students and nursing students. All t-values were < 1.01 and p-values > 0.59; accordingly, the university program pursued (medicine vs. nursing science) was not included as a confounder.

First, a series of Pearson's correlations was performed with the dimensions achievement score, loneliness, depression, and social satisfaction. Next, a series of t-tests were performed to check for gender differences. Additionally, scores for depression and loneliness were *z*-transformed and collapsed to form an overall score of negative emotional functioning. Last, to predict achievement scores, a multiple regression analysis (stepwise forward) was performed with achievement score as the dependent variable, and negative emotional functioning, positive emotional functioning, age, and gender as predictors.

The nominal level of significance was set at alpha < 0.05. All computations were carried out in SPSS version 24.0.

Results

Of 324 students approached, 275 (84.87% response rate; mean age = 21.24 years; SD = 1.84) took part in the study: 93 males (mean age = 21.90 years; SD = 2.17) and 182 females (mean age = 22.01 years; SD = 1.87; $t_{273} = 1.34$, p = 0.45, d = 0.14). Of these, 135 were medical students and 140 were nursing students.

Table 1 gives the correlation coefficients and descriptive statistics for loneliness, depression, social satisfaction, and AA scores (accordingly, statistical indices are not repeated in the text).

Table 1 Pearson's correlation coefficients between and descriptive statistics for achievement scores, loneliness, depression, and social satisfaction

		Dimensions							Descriptive statistics
		1	2	3	4	5	6	7	Mean (standard deviation)
1	Achievement scores	-	-0.26*	-0.18†	0.24*	0.22*	0.22†	0.28*	15.36 (1.83)
2	Loneliness		-	0.44*	-0.29*	-0.06	-0.26*	-0.25*	44.92 (5.15)
3	Depression			-	-0.49*	-0.22‡	-0.24*	-0.36*	23.24 (9.23)
4	Satisfaction with family				-	0.56*	0.45*	0.85*	56.32 (15.89)
5	Satisfaction with peers					-	0.54*	0.86*	52.43 (15.01)
6	Satisfaction with other people						-	0.74*	24.01 (9.05)
7	Overall social satisfaction score							-	132.76 (33.92)

* $p < 0.001$; † $p < 0.01$; ‡ $p < 0.05$.

Table 2 Multiple linear regression model (stepwise forward) to predict achievement scores as a function of loneliness, depression, and social satisfaction

Dimension/Variables	Coefficient	Standard error	Coefficient β	*t*	p-value	R	R^2	Durbin-Watson coefficient
Achievement scores								
Intercept	25.15	0.421	-	34.78	0.000	0.56	0.314	1.70
Negative emotional functioning	-0.72	0.014	-0.300	7.35	0.009			
Positive emotional functioning	0.91	0.006	0.237	4.95	0.005			

Negative emotional functioning alone: R = 0.36; R^2 = 0.132
Positive emotional functioning alone: R = 0.43; R^2 = 0.182

Excluded variables: age, gender

Lower scores for depression and loneliness, as well as higher scores on all dimensions of social satisfaction, were associated with higher achievement scores. Higher loneliness scores were associated with higher depression scores and with lower scores on all dimensions of social satisfaction. Higher depression scores were associated with lower scores on all dimensions of social satisfaction.

No significant mean differences between female and male participants were found for depression, loneliness, social satisfaction, or AA scores (all t-values < 1.13, all p-values > 0.43).

Table 2 gives the results of multiple linear regression analysis, performed with AA as dependent variable and negative and positive emotional functioning, age, and gender as predictors.

Scores for negative emotional functioning predicted achievement scores negatively and positive emotional functioning predicted achievement scores positively while age and gender were excluded from the equation. Table 2 also shows that the two predictors (negative and positive emotional functioning), together, explained 31.4% of the variance in AA scores, while the single factors (negative emotional functioning: 13.2%; positive emotional function: 18.2%) were not statistically powerful enough to explain AA scores independently from each other.

Discussion

The key findings of the present cross-sectional study were that, in a sample of university students, lower scores of negative emotional functioning (represented by depression and loneliness) and higher scores of positive emotional functioning (represented by social satisfaction) were associated with higher AA. Furthermore, both emotional dimensions independently predicted AA. This study expands upon previous research, insofar as positive emotional functioning was also taken into account.

Two hypotheses and one research question were formulated, and each of these will now be considered in turn.

Our first hypothesis was that lower scores for depression and loneliness, as proxies for negative emotional functioning, and higher scores for social satisfaction, as a proxy for positive emotional functioning, would be associated with higher AA scores. This was confirmed, which is in line with previous findings,[8-12,17-19,23,25,31,32,43] although the present study expanded on past research in that dimensions of social perception and social interaction were included, in a sample of university students making the transition from late adolescence to adulthood. Furthermore, we refined our test of the hypothesis by running a multiple regression analysis (Table 2), which revealed that lower scores for the negative emotional functioning proxies and higher scores for the positive emotional functioning proxy were independent predictors of AA scores, as noted above.

Unfortunately, the data provided by this study were insufficient to illuminate the underlying mechanisms, though we can offer the following speculative interpretation. Previous research has shown that AA depends on the effective functioning of working memory, that working memory capacity is limited,[44] and that negative emotional functioning, such as anxiety, has a negative impact on working memory.[44] Additionally, symptoms of depression and poor memory performance have been found to be associated,[8,9] while an association between depression and loneliness has also been demonstrated.[10,11] DeRosier & Lloyd[23] observed that, at least among children and adolescents, social adjustment and school achievement are related, while Verger et al.[31] found, among university students, that occurrence of psychiatric disorders and academic failure were associated. This speculative interpretation is also consistent with the tendency for humans to be very sensitive to their social circumstances, such as the feeling of being excluded from or not accepted by significant others, such as peers and family members.[13,15,16] Specifically, loneliness and impaired cognitive performance are associated, as found in some studies carried out in older adults.[17-21]

To conclude, though highly speculative, our interpretation is that, when students were burdened by issues of loneliness and low social satisfaction, their academic attainment was also adversely affected. In line with this analysis, the WHO has reported that academic failure and loneliness are both risk factors for and associated with mental disorders.[2]

On the other hand, we were also able to show that high social satisfaction was associated with AA. We believe that this pattern of results fits well with past studies which indicated a positive association between social satisfaction and academic performance among children[45-47] and adolescents,[22,48,49] while, to the best of our knowledge, the present study is the first to examine this relationship in university students.

Our second hypothesis was that, compared to males, females would record higher scores for emotional processes. This was rejected. Accordingly, the present results are not consistent with previous findings indicating that females have a higher prevalence of depression than males.[36,38,50] Again, while the available data cannot elucidate the underlying mechanisms, it is unlikely that university students are representative of the young adult population in general. However, previous research has also indicated that students can suffer from a broad range of mental health problems.[24,26,27,51,52] Thus, as regards the lack of gender differences, we believe further studies could determine the replicability of the pattern of results found herein.

Finally, regarding our research question, it turned out that both negative and positive emotional functioning predicted AA scores independently (Table 2), although the pattern of results also showed that both negative and positive emotional functioning were needed to predict best AA scores. Further, when comparing their relative contributions (negative emotional functioning: 13.2% of the variance of AA scores; positive emotional function: 18.2% of the variance of AA scores), one might conclude that social satisfaction as a proxy of positive emotional functioning seems to have a higher importance compared to negative emotional functioning.

Despite these intriguing results, several limitations warn against an overgeneralization of our findings. First, by definition, the cross-sectional design of the study precludes any certainty about the direction of influence; while it seems plausible that feelings of depression, loneliness, and low social satisfaction have a negative impact on staying focused on studying and preparing for exams, it is also conceivable that previous poor results could contribute to depression, loneliness, and low social satisfaction. Second, and in this respect, it is also entirely possible that further latent but unassessed dimensions, such as (test) anxiety[43] and motivation, could have biased two or more dimensions in the same or opposite directions. Specifically regarding anxiety, Ahmadpanah et al.[43] showed that higher test anxiety scores were related to both low emotional intelligence and limited academic success. This is a real possibility, given that the regression model left 68.6% of the variance in achievement scores unexplained. In this regard, the concept of sluggish cognitive tempo (SCT) was recently introduced as a newer direction of research to describe and to explain low school and academic performance among children, adolescent and adults.[53-55] Briefly, the concept of SCT describes a cluster of symptoms characterized by dreaminess, mental fogginess, hypoactivity, sluggishness, and a slow working speed. Most importantly, Becker et al.[56] were able to show that, among adult university students, higher SCT scores were uniquely related to loneliness, depression, and problems in emotion regulation. Accordingly, we suggest that the concept of SCT be introduced in future studies dealing with students' academic performance and negative and positive emotional functioning. Third, we did not assess the precise timing of potential influences on AA; specifically, we were not able to determine whether feelings of depression, loneliness, and social satisfaction affected encoding, storage, or retrieval of knowledge during preparation for exams or during the exam situation itself. In this respect, Ahmadpanah et al.[43] showed that test anxiety was a general concern among university students and was lower when students had better skills to monitor their feelings, i.e., when their emotional intelligence was higher. Fourth, data were gathered from only one university, and only self-reports were available. Accordingly, the quality of data might have been biased.

In conclusion, the pattern of results obtained herein suggests that both positive and negative dimensions of emotions are associated with AA. Accordingly, students, educators, and health professionals dealing with students should focus both on increasing social satisfaction and on decreasing feelings of loneliness and depression.

Acknowledgements

We thank Nick Emler (University of Surrey, Surrey, UK) for proofreading the manuscript.

Disclosure

The authors report no conflicts of interest.

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