



Research paper

An examination of the association between risk of depression and academic performance according to weight status in adolescents: DADOS study

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ABSTRACT

Background: The early identification of emotional and psychological problems during adolescence seems helpful to improve academic performance (AP). However, the association between risk of depression and AP, as well as the role of health-related factors in this association remain to be elucidated. Therefore, the aims of this study were to analyze the association between risk of depression and AP in adolescents; to examine this association according to weight status; and to test the mediating role of weight status in this association.

Methods: A sample of 265 adolescents (125 girls) aged 13.9 ± 0.3 years old from the DADOS (Deporte, Adolescencia y Salud) study was included in the analyses. Risk of depression was self-reported through the Behavior Assessment System for Children and Adolescents. AP was assessed through academic grades and the Spanish version of the Science Research Associates Test of Educational Ability. Weight status was assessed by body mass index (BMI) (kg/m^2) and dichotomized according to the international age- and sex-specific BMI cut-offs (non-overweight vs. overweight).

Results: Linear regression analyses showed an inverse association between risk of depression and academic grades (all $p < 0.05$). Further linear regressions analyzing risk of depression and AP (dependent variable) stratified by weight status showed stronger associations among overweight adolescents. Additionally, mediation analyses revealed that weight status acted as a mediator of this association.

Limitations: The cross-sectional design prevents from interfering causal relationships.

Conclusions: Educational institutions should promote the early identification of depression as well as the promotion of healthy weight status as strategies to enhance AP in adolescents.

1. Introduction

Adolescence is a period of life in which many important biological, psychological, and social changes occur (Patton and Viner, 2007). Mental health problems tend to increase during this age span (Avenevoli et al., 2015), being depression the most prevalent mental disorder (Gotlib and Joormann, 2010). In fact, depression has been suggested to rise from 5% in early adolescence to 20% by the end of the period (Thapar et al., 2012). This mental health disorder is characterized by emotion dysregulation, lack of pleasure, suicidal behaviors, and concentration problems, which in turn may influence several aspects of adolescents' life (Gotlib and Joormann, 2010).

Depressive symptomatology has been associated with brain-related alterations and cognitive impairment (Zhang et al., 2018), affecting

academic performance (AP) in high school students (Hishinuma et al., 2012). Previous studies suggested that screening for depression during adolescence through self-reported instruments may help to ensure timely identification in order to prevent potential long-term emotional, social, and economic burden (Forman-Hoffman and Viswanathan, 2018). Among its benefits, the early identification of depression may be helpful for improving AP in the young population (Riglin et al., 2014). Nevertheless, as far as we know, prior studies have investigated the association between depression and AP, but none of them analyzed the risk of developing depression before its diagnosis (Hishinuma et al., 2012; Khesht-Masjedi et al., 2019; Riglin et al., 2014).

Overweight and obesity, ongoing worldwide concerns, are major risk factors for the development of multiple diseases (Ng et al., 2014). In fact, an emerging body of evidence suggests that weight status during

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adolescence may influence both risk of depression (Rao et al., 2020) and AP (He et al., 2019). For instance, a previous meta-analysis concluded that overweight adolescents had higher risk of depression than their non-overweight peers (Rao et al., 2020). Likewise, the meta-analysis developed by He et al. (2019) showed an inverse association between overweight status and AP. Despite this fact, to the best of our knowledge, only one previous study based on the influence of sports participation in 1036 high school students has considered weight status as a confounder in the association between depression and AP (Gore et al., 2001).

Collectively, a better understanding of the link between the risk of developing depression and AP, as well as the influence of weight status on this association, could help to shape our knowledge about possible correlates of AP in order to enhance it during adolescence, which is a critical period for cognition and brain development. Therefore, the aims of the present study were: (i) to analyze the association between risk of depression and AP in a sample of adolescents; (ii) to examine this association according to weight status categories (i.e., non-overweight vs. overweight); and (iii) to test the mediating role of weight status in the association between risk of depression and AP.

2. Methods

2.1. Study design and participants

The present study is part of the DADOS (Deporte, ADOlescencia y Salud) study, which is a 3-year longitudinal research project (from 2015 to 2017) aimed to investigate the influence of physical activity on health, cognition, and psychological well-being through adolescence. The results presented in this study belong to baseline data obtained between February and May of 2015. A convenience sampling technique was used to require participants. For that purpose, advertising leaflets about the research project were sent to secondary schools and sports clubs located in Castellon province (Spain), which included basic information and the general DADOS study inclusion criteria (i.e., to be enrolled in second grade of secondary school and without diagnosed physical or neurological chronic diseases). Volunteers who met the inclusion criteria (as reported by participants' parents or guardians) contacted the research group and were included in the study. A total of 265 adolescents (125 girls) completed the baseline assessment with valid data for all the analyzed variables.

Adolescents and their parents or guardians were informed of the nature and characteristics of the study, and all provided written informed consent. The DADOS study protocol was designed in accordance with the ethical guidelines of the Declaration of Helsinki 1964 (last revision of Fortaleza, Brazil, 2013) and approved by the Research Ethics Committee of Universitat Jaume I of Castellon (Spain).

2.2. Risk of depression

The Behavior Assessment System for Children and Adolescents (BASC) Questionnaire (Reynolds and Kamphaus, 2004), in the S3 self-report Spanish version for adolescents aged 12–18 years (González et al., 2004) was used to assess risk of depression (reliability: $\alpha = 0.81$). BASC-S3 consists of statements rated as true or false. Risk of depression score was calculated by transforming raw scores into standard T-scores with an average of 50 and standard deviations of 10 points. This variable was dichotomized into 'non-risk' of developing depression (< 60) and 'at risk' of developing depression (≥ 60) according to the cut-off point established by Reynolds and Kamphaus (2004).

2.3. Academic performance (AP)

AP was assessed through the final academic grades from first grade of secondary school, provided by each school's secretary office. They were based on a ten-point scale (0 indicates the lowest achievement and 10 indicates the highest achievement). Grade point average (GPA) score

and individual grades for the following subjects were included in the analyses: social sciences, natural sciences, math, language, and physical education. GPA score was defined as the average of the scores achieved by students in all subjects.

The Spanish version of the Science Research Associates Test of Educational Ability (TEA) was used to measure academic abilities (Thurstone and Thurstone, 2004). This test provides general measures of three areas of intelligence and skills of learning: verbal (command of language), numeric (speed and precision in performing operations with numbers and quantitative concepts), and reasoning (the skill to find logical order in sets of numbers, figures, or letters). Scores for the three areas were obtained by adding positive answers. Overall score was calculated by adding the three areas scores (verbal + numeric + reasoning). Based on the age range of our sample, level three of the TEA questionnaire was used (reliability: verbal $\alpha = 0.74$, numeric $\alpha = 0.87$, reasoning $\alpha = 0.77$, and overall score $\alpha = 0.89$).

2.4. Weight status

Weight status was measured through body mass index (BMI), calculated as weight/height square (kg/m^2). Body weight was measured to the nearest 0.1 kg using an electronic scale (SECA 861 - Hamburg, Germany). Body height was measured to the nearest 0.1 cm using a wall-mounted stadiometer (SECA 213 - Hamburg, Germany). Weight and height were measured in duplicate, following the standardized procedures, and average measures were used for the data analyses. Adolescents were classified as overweight (including overweight and obese) or non-overweight, according to the international age- and sex-specific BMI cut-offs proposed by Cole and Lobstein (2012).

2.5. Covariates

Pubertal stage was self-reported using standardized pictures according to the five stages described by Tanner and Whitehouse (1976), based on external primary and secondary sex characteristics. The degree of development was assessed through two components: pubic hair growth for boys and girls, plus breast development in girls and genital development in boys. A 5-point maturity rating (from 1 to 5) was used for each component, in which stage 1 corresponded to the prepubertal state and stage 5 to the mature state. The highest rating of the two components was used for data analyses.

Socioeconomic status (SES) was reported by the Family Affluence Scale (FAS), developed by Currie et al. (2008). It was used as a proxy of SES (ranging from 0 to 8), which is based on material conditions in the family such as car ownership, bedroom occupancy, computer ownership, and home internet access.

2.6. Statistical analysis

Descriptive characteristics are presented as mean \pm standard deviation or percentages for continuous and categorical variables, respectively. All variables were checked for normality using both graphical (normal probability plots) and statistical (Kolmogorov-Smirnov test) procedures. For descriptive purposes of the sample, sex differences were assessed using *t*-test for continuous variables and chi-square for categorical variables. As preliminary analyses showed no significant interactions of sex with risk of depression in relation to AP (all $p > 0.10$), all analyses were performed for the whole sample.

Multiple linear regression was used to analyze the association between risk of depression and AP adjusting for sex, pubertal stage, SES, and BMI. Risk of depression was entered as the independent variable and each AP indicator (i.e., academic grades and academic abilities) was entered as the dependent variable in separate models. Additionally, we conducted linear regression models to examine the association between risk of depression and AP by weight status categories, adjusting for sex, pubertal stage, and SES.

Boot-strapped mediation procedures were performed to examine whether the association between risk of depression and AP variables was mediated by weight status, controlling for sex, pubertal stage, and SES. The PROCESS SPSS Macro version 2.16.3, Model 4, with 5.000 bias-corrected bootstrap samples and 95% confidence intervals (CIs) was used for these analyses (Hayes, 2013). Mediation was assessed by the indirect effect of the risk of depression score (independent variable) on AP (variables individually entered as the dependent variables) through weight status (mediator variable entering BMI as continuous variable) (Fig. 3). The total (c path), direct (c' path), and indirect effects (paths a*b) are presented in Table 3. Indirect effects (paths a*b) with CIs not including zero were interpreted as statistically significant, which can be so regardless of the significance of the total effect (the effect of the risk of depression score on AP) and the direct effect (the effect on AP when both risk of depression score and weight status are included as predictors) (Hayes, 2013). Percentage of mediation (P_M) was calculated as [(indirect effect/total effect) × 100], in order to know how much of the total effect was explained by the mediation when the following assumptions were achieved: the total effect is larger than the indirect effect and with the same direction of the effect (Hayes, 2013). All the analyses were performed using the IBM SPSS Statistics for Windows version 22.0 (Armonk, NY: IBM Corp), and the level of significance was set as *p* < 0.05.

3. Results

Descriptive characteristics of the study sample are presented in Table 1. Participants were 13.9 ± 0.3 years old and showed mean BMI of 20.3 kg/m² (13% with overweight/obesity). Girls showed higher risk of depression score than boys (47.5 vs. 44.9; *p* = 0.009), and girls were more likely to be at risk of depression than boys (8% vs. 2%; *p* = 0.028). Overall, girls and boys showed similar values for all the AP indicators (all *p* > 0.05), except for numeric ability, in which boys obtained higher

Table 1
Descriptive characteristics of the study sample.

	All N = 265	Boys N = 140	Girls N = 125	<i>p</i>
Physical characteristics				
Age (years)	13.9 ± 0.3	13.9 ± 0.3	13.9 ± 0.3	0.971
Pubertal stage (II - V) (%)	8/33/49/ 10	10/32/44/ 14	6/35/54/5	–
Weight (kg)	54.2 ± 9.2	54.5 ± 9.6	53.9 ± 8.8	0.564
Height (cm)	163.1 ± 7.9	164.6 ± 8.6	161.4 ± 6.7	0.001
Body mass index (kg/m ²)	20.3 ± 2.7	20.0 ± 2.5	20.6 ± 2.9	0.060
Overweight/Obesity (%)	34 (13)	16 (11)	18 (14)	0.470
Socioeconomic status (0 - 8)	4.2 ± 1.4	4.0 ± 1.3	4.4 ± 1.4	0.037
Risk of depression				
Risk of depression score	46.1 ± 8.3	44.9 ± 6.0	47.5 ± 10.2	0.009
At risk of depression (%)	13 (4.9)	3 (2.1)	10 (8.0)	0.028
Academic performance				
Academic grades (0 - 10)				
Social sciences	7.0 ± 1.6	7.0 ± 1.6	7.1 ± 1.6	0.579
Natural sciences	7.0 ± 1.7	6.9 ± 1.7	7.1 ± 1.7	0.443
Math	6.9 ± 1.6	7.0 ± 1.6	6.8 ± 1.6	0.311
Language	6.8 ± 1.5	6.6 ± 1.5	6.9 ± 1.5	0.141
Physical education	8.1 ± 1.1	8.0 ± 1.1	8.1 ± 1.1	0.468
Grade point average	7.1 ± 1.3	7.1 ± 1.3	7.2 ± 1.3	0.324
Academic abilities				
Verbal ability (0 - 50)	18.7 ± 5.3	19.1 ± 5.9	18.2 ± 4.6	0.144
Numeric ability (0 - 30)	13.4 ± 4.7	14.8 ± 4.6	12.0 ± 4.5	<0.001
Reasoning ability (0 - 30)	16.5 ± 5.8	16.1 ± 5.6	17.0 ± 6.1	0.203
Overall score (0 - 110)	48.7 ± 12.6	50.0 ± 12.8	47.2 ± 12.3	0.066

Note. Values are mean ± standard deviation or frequency (%). Differences between sex were examined by *t*-test or chi-square test. Values in bold indicate significant results.

scores than girls (14.8 vs. 12.0; *p* < 0.001).

Table 2 shows the association between risk of depression and AP, after adjusting by sex, pubertal stage, SES, and BMI. According to academic grades, risk of depression score was inversely associated with social sciences, natural sciences, math, language, physical education, and GPA (all *p* < 0.05). No associations were found between risk of depression score and academic abilities indicators (all *p* > 0.05).

Fig. 1 and Fig. 2 show the stratified multiple linear regression analysis between risk of depression score and AP indicators by weight status categories (i.e., non-overweight vs. overweight), adjusting by sex, pubertal stage, and SES. Fig. 1 shows that risk of depression score was inversely associated with academic grades in math, language, and GPA (*β* ranged from -0.453 to -0.159, all *p* < 0.05), with a stronger association among overweight adolescents. Regarding academic abilities, Fig. 2 shows that risk of depression score and academic abilities were not significantly associated (all *p* > 0.05).

Simple mediation analyses' results are presented in Fig. 3 and Table 3, which show that risk of depression score indirectly influenced some AP variables through weight status, controlling for sex, pubertal stage, and SES. Risk of depression score was almost significantly associated with weight status (path *a*) and weight status was inversely and significantly associated with some AP indicators (path *b*) (i.e., social sciences, natural sciences, math, language, GPA, numeric ability, and overall score in academic abilities). A significant total effect (path *c*) was observed for risk of depression with all academic grades. The direct effect (path *c'*) of risk of depression score on AP when weight status was included in the model was significant for all academic grades. Regarding academic abilities, the total effect (path *c*) and the direct effect (path *c'*) were not significant. There was a significant indirect relationship (path *a*b*) of risk of depression score with social sciences, natural sciences, math, language, and GPA when weight status was included as mediator. No significant indirect relationship (path *a*b*) was found between risk of depression score and academic abilities when weight status was included as mediator. This indicates that weight status mediated the relationship between risk of depression and academic grades. The total effect of risk of depression score on AP explained by weight status ranged from 9% to 14% in the academic grades of natural sciences, social sciences, math, language, and GPA.

4. Discussion

The main findings of the present study indicate that risk of depression in adolescents is inversely associated with AP, revealing a stronger association among overweight adolescents compared to the non-overweight peers. Moreover, our results show that the inverse association between risk of depression and AP is mediated by weight status.

Table 2
Linear regression analyses between risk of depression score and academic performance indicators in adolescents (N = 265).

Academic performance	Risk of depression score			
	R ²	B	<i>β</i>	<i>p</i>
Academic grades				
Social sciences	0.069	- 0.028	- 0.145	0.018
Natural sciences	0.055	- 0.029	- 0.143	0.020
Math	0.080	- 0.037	- 0.193	0.002
Language	0.098	- 0.044	- 0.239	0.000
Physical education	0.012	- 0.019	- 0.142	0.024
Grade point average	0.089	- 0.032	- 0.206	0.001
Academic abilities				
Verbal ability	0.020	- 0.029	- 0.045	0.472
Numeric ability	0.106	- 0.039	- 0.068	0.253
Reasoning ability	0.004	- 0.014	- 0.020	0.755
Overall score	0.033	- 0.081	- 0.054	0.386

Note. *B* = non-standardized regression coefficient. *β* = standardized regression coefficient. Analyses were adjusted by sex, pubertal stage, socioeconomic status, and body mass index. Values in bold indicate significant results.

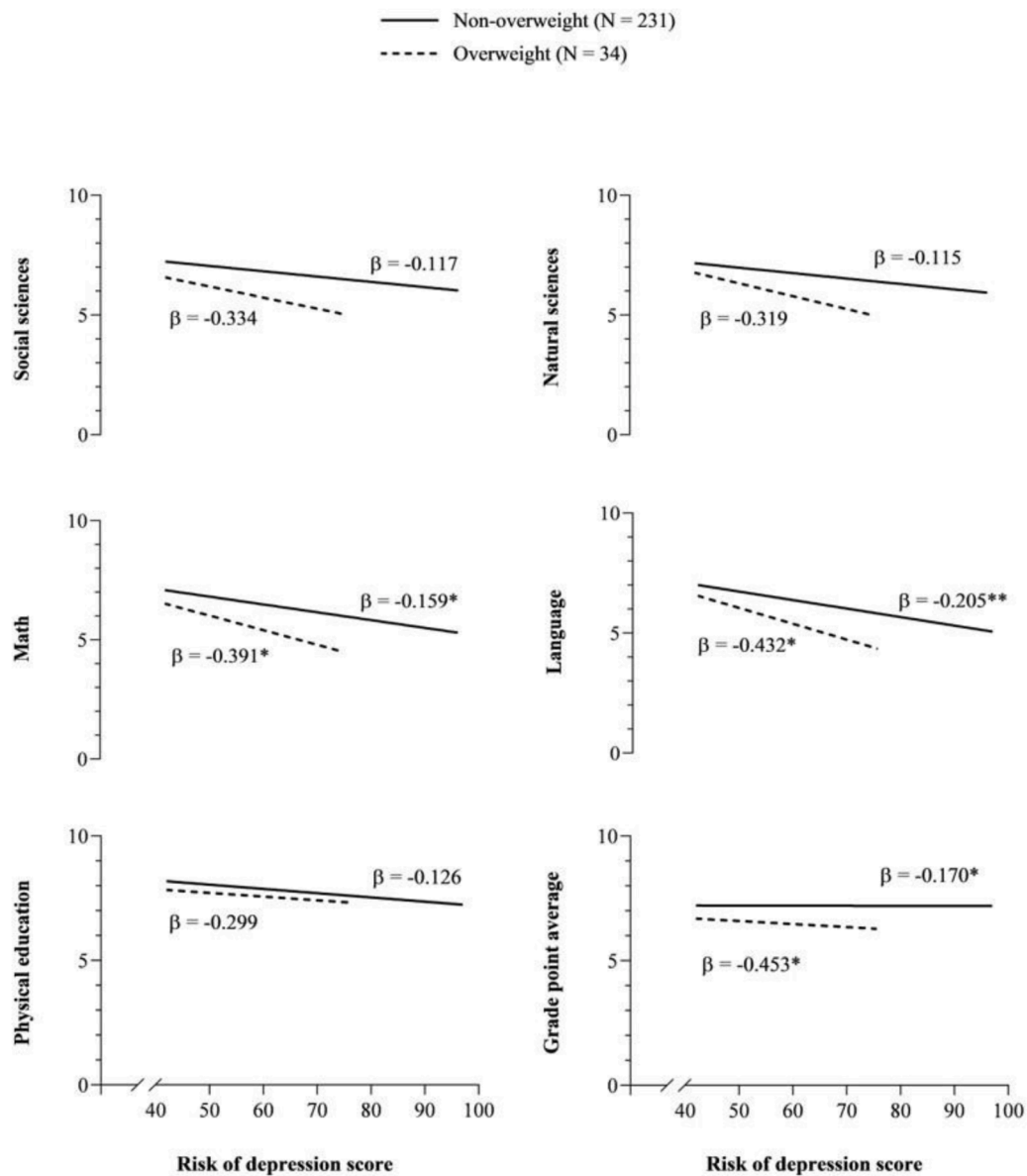


Fig. 1. Multiple linear regression analysis between risk of depression score and academic grades in non-overweight and overweight adolescents. Analyses were adjusted by sex, pubertal stage, and socioeconomic status. β =standardized regression coefficient. * $p < 0.05$; ** $p < 0.01$.

These results highlight the value of the early identification of risk of depression due to its association with AP in adolescents, adding new knowledge about the negative influence of the excess of body weight on this association.

The results of our study seem to be partially in line with the previous studies analyzing the association between depressive symptoms and AP, in which diagnosed depression was inversely associated with school attainment in the young population (Hishinuma et al., 2012; Khesht-Masjedi et al., 2019; Riglin et al., 2014). Therefore, our findings suggest that being at risk of developing depression has already a negative impact on AP during adolescence. A possible justification of these results could be explained by the symptomatology of depression, which may start before the diagnosis. Indeed, adolescents at risk of depression may have a diminished ability to think or concentrate, a gradually loss of interest in social and school activities, or increased feelings of worthless (American Psychiatric Association, 2013), which in turn may impair adolescents' cognitive abilities and self-perception, adversely affecting their AP.

The stratified analysis by weight status examining the association

between risk of depression and AP revealed a stronger association among overweight adolescents compared to non-overweight. In addition, our mediation analyses suggested that risk of depression contributes to adolescents' AP through weight status. These findings partially concur with prior research showing the key role of weight status on risk of depression and AP in adolescents. In fact, in a recent meta-analysis Rao et al. (2020) indicated that obese adolescents have higher risk of developing depression. Likewise, in a large meta-analysis including 60 studies from children and adolescents across the world, He et al. (2019) reported an inverse association between weight status and AP.

To our knowledge, this is the first study investigating the association between risk of depression and AP considering weight status, which hampers direct comparisons. Consequently, we speculate that there are two possible explanations for the specific association between risk of depression and AP based on weight status, which are related to behavioral factors (Milaneschi et al., 2019) and neurocognitive mechanisms (Liang et al., 2014; Reinert et al., 2013). For instance, some behavioral factors commonly adopted by overweight and obese adolescents, such as sedentary patterns, lower sleep duration, and higher consumption of

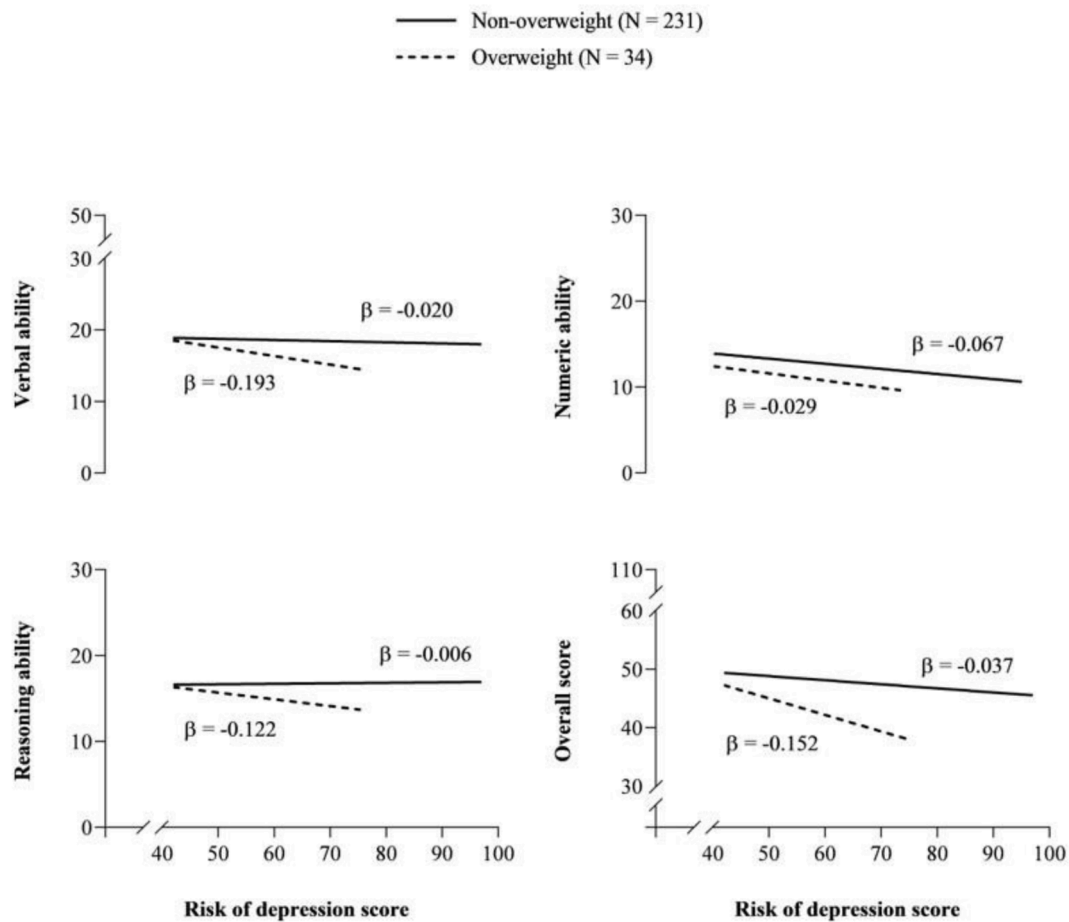


Fig. 2. Multiple linear regression analysis between risk of depression score and academic abilities in non-overweight and overweight adolescents. Analyses were adjusted by sex, pubertal stage, and socioeconomic status. β =standardized regression coefficient.

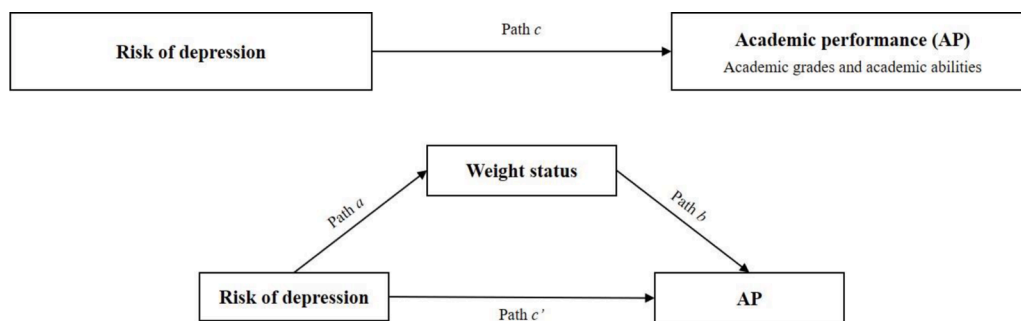


Fig. 3. Simple mediation model of risk of depression (independent variable) on academic performance indicators (dependent variable) through weight status measured by body mass index as continuous variable (mediator variable). Path a: association between independent and mediator variables; Path b: association between mediator and dependent variables; Path c: overall association between independent and dependent variables; Path c': unmediated direct effect of independent variable on dependent variable.

caloric food may increase depressive symptoms and negatively affect AP (Milaneschi et al., 2019). Additionally, neuroscientific studies suggest that obesity affects the neural structures and functions of the brain related to learning processes, which may be reflected in depression symptomatology and lower AP (Liang et al., 2014; Reinert et al., 2013).

In the analyses of the present study, risk of depression was associated with academic grades, but not with academic abilities. These divergent results for AP indicators may be partially explained by several issues. Academic grades are the result of the student progression for each subject scored by different teachers through exams and tasks during an academic year, while academic abilities are assessed by a standardized test in a single time-point trial (Baker, 2006). Additionally, unlike academic abilities' test, which mainly requires good cognitive skills, the multidimensional nature of academic grades also involves emotional

and social factors (i.e., effort, teacher influence, attitude) (Petrides et al., 2005). Similarly, it is likely that teachers assign better grades to healthier adolescents because of their higher school attendance and commitment to long-term educational goals (Lê-Scherban et al., 2014; Pan et al., 2013).

The early identification of depressive symptoms is of vital importance during adolescence in order to provide personalized assistance aimed to improve mental health and AP. Given the influence of weight status on this association, healthy lifestyle promotion programs designed to improve weight status may help to reduce the risk of developing depression and to enhance AP in adolescents, with its subsequent benefits. In fact, a successful AP during adolescence is considered a strong predictor of physical and mental health in adult life (Gottfredson and Deary, 2004).

Table 3

Total, direct, and indirect effects, *a* and *b* pathways, of the simple mediation analyses investigating weight status as a mediator between risk of depression and academic performance indicators in adolescents (*N* = 265).

	Total effect (<i>c</i>)	Direct effect (<i>c'</i>)	Path <i>a</i>	Path <i>b</i>	Indirect effect (<i>ab</i>)	BC 95% CI lower; upper	P _M (%)
Academic grades							
Social sciences	−0.033 (0.012)**	−0.028 (0.012)*	0.038 (0.020)	−0.122 (0.037)**	−0.005 (0.003)	−0.011; −0.001	14
Natural sciences	−0.033 (0.012)**	−0.028 (0.012)*	0.038 (0.020)	−0.122 (0.039)**	−0.005 (0.003)	−0.012; −0.001	14
Math	−0.041 (0.012)***	−0.037 (0.012)**	0.038 (0.020)	−0.104 (0.036)**	−0.004 (0.003)	−0.010; −0.001	10
Language	−0.048 (0.011)***	−0.044 (0.011)***	0.038 (0.020)	−0.112 (0.035)**	−0.004 (0.003)	−0.011; −0.001	9
Physical education	−0.020 (0.008)*	−0.019 (0.008)*	0.038 (0.020)	−0.031 (0.026)	−0.001 (0.002)	−0.005; 0.001	–
Grade point average	−0.035 (0.009)***	−0.032 (0.009)***	0.038 (0.020)	−0.093 (0.029)**	−0.004 (0.002)	−0.009; −0.001	10
Academic abilities							
Verbal	−0.036 (0.040)	−0.030 (0.040)	0.038 (0.020)	−0.152 (0.126)	−0.006 (0.006)	−0.021; 0.003	–
Numeric	−0.049 (0.034)	−0.041 (0.034)	0.038 (0.020)	−0.233 (0.107)*	−0.009 (0.006)	−0.026; 0.001	–
Reasoning	−0.025 (0.044)	−0.015 (0.044)	0.038 (0.020)	−0.249 (0.139)	−0.010 (0.007)	−0.026; 0.001	–
Overall	−0.110 (0.094)	−0.086 (0.094)	0.038 (0.020)	−0.634 (0.295)*	−0.024 (0.018)	−0.068; 0.001	–

Results showed as unstandardized coefficients (standard error, SE) and BC 95% CI based on 5000 bootstraps. All analyses were adjusted for sex, pubertal stage, and socioeconomic status. Statistically significant indirect effects indicating that 0 is not in the 95% CI of the indirect effect are presented in bold.

BC: bias corrected; CI: confidence interval; P_M: percentage of mediation.

p* < 0.05; *p* < 0.01; ****p* < 0.001.

5. Limitations and strengths

The current study has some limitations that should be mentioned. First, the cross-sectional design of our analyses prevents us from inferring causal relationships. Second, the psychological state of the participants was not examined through the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-V) (American Psychiatric Association, 2013); thus, participants with clinical depression may have been included in the study. Third, biological factors closely linked to overweight/obesity, such as genetic characteristics (Goodarzi, 2018), were not considered. In addition, although this study has been carried out in a relatively large age-matched sample of adolescents from Spain, this fact could also limit the generalizability of our findings. Alongside these limitations, the main strength of this study was its novelty, being the first one investigating the relationship between the risk of developing depression and AP in adolescents, testing if weight status categories have an impact in this association, and also examining if weight status mediates this association. Additional strengths comprise the use of validated and standardized tests to assess the main variables of this study, and the inclusion of maturational development and SES as covariates, which are relevant given its relation with depression (Goodman et al., 2003; McGuire et al., 2019) and AP (Donnelly et al., 2016; Navarro et al., 2015).

6. Conclusions

Our findings revealed that the risk of developing depression was inversely associated with AP in adolescents. Moreover, excessive weight status may have a negative influence in this association, appearing to be a mediator in the inverse association between risk of depression and AP in adolescents. We consider that the understanding of the association between the early identification of mental health problems and AP is of great interest for families, educators, and policy makers, in order to support the promotion of psychological well-being and the prevention of academic failure among adolescents. Moreover, the identification of modifiable key factors involved in the association between mental health issues and AP, such as healthy lifestyles, may open new prevention and intervention strategies from a public health and educational perspective.

Conflicts of interest

The authors have no conflicts of interest to disclose.

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Contributors

D.M-U was involved in the design of the study. I.M-C, M.A-R, M.R-B-V, and D.M-U were involved in the data collection, analysis, and critical revision. I.M-C wrote the first draft of the manuscript. All authors contributed to and have approved the final manuscript.

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