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ORIGINAL ARTICLE

# School Achievement and Depressive Symptoms in Adolescence: The Role of Self-efficacy and Peer Relationships at School

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**Abstract**
Depressive symptoms are common during adolescence. Failure at school often relates to low self-efficacy that, in turn, is associated with depressive symptoms. Several studies have supported the role of friends in counteracting depression in adolescence. The present study tested a mediation model in which the indirect effect between school achievement and depressive symptoms, mediated by perceived self-efficacy, was moderated by peer relationships at school. Self-report questionnaires were administered to 1004 adolescents aged 14 to 18 years ($M = 15.5$; $SD = 1.2$). The moderated mediation model showed that the mediation of self-efficacy in the relation between school achievement and depressive symptoms was moderated by peer relationships. Higher self-efficacy was associated to lower depressive symptoms, in particular in adolescents with more school friends. Conversely, the magnitude of this association is weaker for those with fewer school friends. Programs aimed at reducing psychological malaise should focus on fostering positive relationships among classmates.

**Keywords** Depressive symptoms · School achievement · Self-efficacy · Adolescence · Peer relationships at school · Moderated mediation

## Introduction

During adolescence, significant physical, emotional, cognitive, and social transitions occur simultaneously. At this time, physical transformations and sexual and neurophysiological maturation radically change adolescents' relationships with themselves and with others and alter their social roles [1]. While for many adolescents these changes are positive, for others, they are a source of apprehension and stress.

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### Depressive Symptoms in Adolescence

Although the experience of depressive moods and symptoms is common during adolescence [2, 3], most adolescents pass through this developmental period without salient psychological problems or severe depressive disorders [4]. In fact, anxiety states and depressive feelings are part of human nature, as they play—at transient and moderate levels—an adaptive role [5]: on the one hand, anxiety may trigger the subject to cope with a difficult situation or danger; on the other hand, depression may defensively withdrawal the subject from a reality with which he or she feels unable to cope. Mostly, these feelings relate to specific moments or areas of life; but in particular conditions they can become uncontrollable, permanent, and generalized.

By nature, developmental transitions—including the transition into adolescence—can give rise to contradictory feelings: while such transitions are often experienced with enthusiasm and energy, they may also arouse anxiety and mobilize depressive defence mechanisms [6]. The literature stresses that rates of depressive symptoms increase from early adolescence onwards [7]. These symptoms are especially represented by cognitive features such as rumination, loss of interest in daily activities, negative

self-evaluation, sleep and eating disorders, and feelings of emptiness, irritability, or boredom. Such depressive symptoms should not be overlooked, since depression is the second leading cause of death in persons aged 15 to 29 years [8, 9].

Adolescents' emotional and relational problems, including depressive symptoms, can be attributed to a variety of causes; these causes may be internal, relating to personality [10], or they may relate to social connections and opportunities or constraints, in particular socio-cultural contexts [11, 12]. Depressive feelings in adolescents are often associated to low self-esteem and poor social skills (as well as biological and hereditary factors [13, 14]). In the teenage years, self-image and self-esteem, as well as social and relational skills, undergo profound change [1]. Finally, the literature demonstrates gender differences in depression, with girls twice as likely to be depressed as boys [3, 15–17].

## School Achievement and Depressive Symptoms

An important transition that typically occurs during adolescence is the change of school. This transition imposes new cognitive demands on adolescents, who must establish new relationships with teachers and classmates. In Italy, adolescents on a typical school path begin secondary school at age 14 and stay at this school for 5 years. During this transition, the teenagers change teachers, classmates, and subjects of study [18]. For these reasons, the school transition can represent a period of great discontinuity.

School is a privileged context for both structuring a positive self-image and acquiring social and emotional skills to protect against depressive symptoms. However, the demands of a school transition can introduce elements of discontinuity with respect to past experiences, and many students who undergo such a transition experience feelings of failure, uncertainty, anxiety, and depression [19].

Many studies have stressed that school achievement is an important source of well-being that protects against depressive symptoms [20]. In fact, adolescents who are successful in their studies generally experience satisfaction and self-confidence and receive positive feedback from parents, teachers, and classmates. In contrast, adolescents who struggle at school often demonstrate a lack of self-respect, low self-esteem, and low self-efficacy, and may be the targets of social reproach.

Poor school performance can be considered a precursor to depression during adolescence, because learning and success at school are major developmental tasks in this developmental period [21]. As school performance is considered an important predictor of future success [22], it is of great importance for teenagers and their psychological well-being.

## The Mediational Role of Self-efficacy

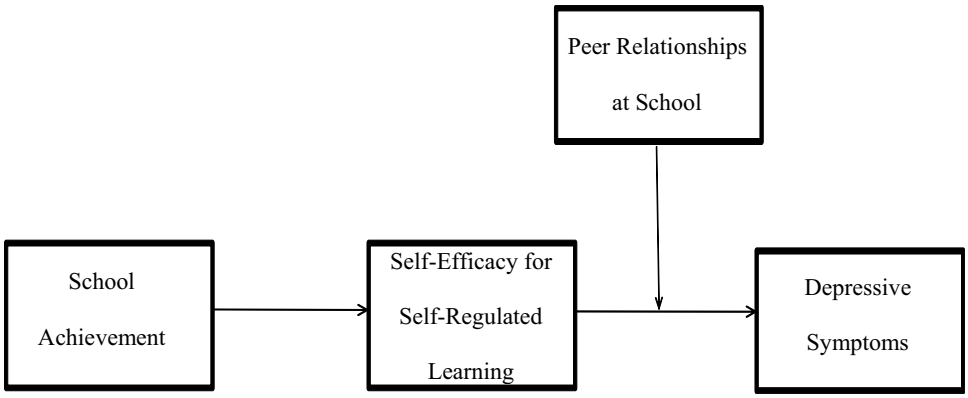
A crucial factor in adolescents' emotional well-being is their belief in their capacity to face change and challenge [23]. Such beliefs have been labelled *self-efficacy beliefs*. According to Bandura [24], self-efficacy consists in the belief that one can organize and effectively orchestrate a series of actions to appropriately deal with new situations, trials, and challenges. According to social cognitive theory, poor self-efficacy, rather than experience of failure, relates to depressive feelings and a lack of belief in oneself and one's abilities [23]. According to this theory, persons with high self-efficacy are likely to experience failure as a challenge that deepens their commitment and perseverance to achieving their goals, without triggering depressive symptoms; in contrast, for those with low self-efficacy, failure can produce feelings of helplessness and lowered motivation, leading them to abandon their activity. In this theoretical framework, the relation between academic achievement and depressive feelings is not direct; rather, it is mediated by academic self-efficacy, or the belief that one is able to regulate one's own learning [25].

## The Moderating Role of Peer Relationships at School

Several empirical studies have supported the idea that friends play a role in counteracting depression and anxiety, especially in adolescence [26]. In particular, good relationships with classmates have been found to foster a good learning climate and to help adolescents feel accepted and supported when dealing with challenging development tasks in school and friendship. This finding applies strongly in Italy, where the school system requires students to attend class with the same 20 to 25 peers for the entire day and the entire 5-year duration of secondary school. Thus, for Italian teenagers, good relationships with classmates can foster a relaxed and collaborative atmosphere; in contrast, poor relationships can increase stress, create a competitive and hostile climate, and give rise to depressive symptoms [27].

Based on the literature and the aforementioned arguments, we presumed that school achievement would counter adolescents' depressive symptoms through high academic self-efficacy, especially in adolescents with positive relationships with classmates. To our knowledge, this study represented one of the first attempts to investigate the associations between school grades, depressive symptoms, self-efficacy, and relationships with classmates. Although some researchers have highlighted the positive empirical association between school achievement and low depressive symptoms [28]; school achievement and

**Fig. 1** The theoretical model




academic self-efficacy [29]; self-efficacy and low depression [23]; and friendship and depressive symptoms [3, 30], few, if any, have simultaneously addressed these different relations.

Our hypothesized model (Fig. 1) predicted that the mediation role of self-efficacy for self-regulated learning in the relation between school achievement and depressive symptoms would be moderated by peer relationships at school, after controlling for age and biological sex. Specifically, we expected that school achievement (as measured through grades) would generate more self-efficacy for self-regulated learning that would, in turn, generate fewer depressive symptoms, particularly in the context of many peer relationships at school. Conversely, we hypothesized that few peer relationships at school would decrease the protective effect of self-efficacy for self-regulated learning on depressive symptoms.

## Method

### Participants

Participants were 1004 adolescents aged 14 to 18 years ($M = 15.5$; $SD = 1.2$; 590 girls, 414 boys) who were recruited from 40 classes of 5 high schools in northwest Italy. Of these, 29.5% ($n = 296$) were in 9th grade, 31.5% ($n = 316$) were in 10th grade, 18.3% ($n = 184$) were in 11th grade, 15.6% ($n = 157$) were in 12th grade, and the remaining 5.1% ($n = 51$) were in 13th grade. Regarding the type of school, 71.5% ($n = 718$) were attending a lyceum, 17.2% ($n = 173$) were enrolled in a technical high school, and 11.3% ($n = 113$) were studying at a vocational high school. With respect to parents' employment, 56.5% of mothers and 87.6% of fathers were employed full-time. As regards parents' level of education, 53.2% of mothers and 45.2% of fathers had a high school diploma, and 16% of mothers and 20% of fathers had a higher degree.

### Measures and Procedure

An anonymous self-report paper-and-pencil questionnaire was completed by participants during the school day. The questionnaire was administered by trained researchers and teachers were not present. For participants younger than 18 years, the researchers obtained written informed consent from parents and school authorities; participants aged 18 years gave their own consent.[1]

#### Depressive Symptoms

Depressive symptoms were evaluated using an 18-item scale based on the Beck Depression Inventory-II (BDI-II [31]). The BDI-II has previously been used to assess depressive symptoms among adolescents [32] and it has been validated for this purpose [33]. Participants rate the frequency of depressive feelings during the prior 2 months on a 4-point Likert scale ranging from 1 (*not at all*) to 4 (*a lot*). In the present study, Cronbach's alpha was 0.92.

#### School Achievement

Grades in several subjects (i.e., humanities, science, and languages) were measured using four items rated on a metric scale from $< 4$ to $> 8$ [34, 35]. In Italy, grades are assigned on a 10-point scale but they typically fall between 4 and 8. An example item was: "What grade do you usually get in literary subjects?" Cronbach's alpha was 0.80.

#### Self-efficacy for Self-regulated Learning.

Self-efficacy for self-regulated learning was measured using the Children's Perceived Self-Efficacy developed by Bandura [36]. This scale is comprised of 11 items and was adapted

[1] The study was approved by the Department of Human and Social Sciences, University of Valle d'Aosta, protocol #6 on January 19th, 2015.

**Table 1** Correlations among variables

| | 1 | 2 | 3 | 4 | 5 | 6 | *M* | *SD* |
|---|---|---|---|---|---|---|---|---|
| 1. Age | 1 | | | | | | 15.52 | 1.21 |
| 2. Biological sex | −0.04 | 1 | | | | | – | – |
| 3. School achievement in grades | −0.08** | −0.09** | 1 | | | | 27.47 | 2.81 |
| 4. Self-efficacy for self-regulated learning | −0.07* | −0.13** | 0.38** | 1 | | | 32.52 | 4.89 |
| 5. Depressive symptoms | 0.07* | −0.29** | −0.09** | −0.20** | 1 | | 38.28 | 11.26 |
| 6. Peer relationships at school | −0.17** | 0.03 | 0.07* | 0.14** | −0.23** | 1 | 3.12 | 0.70 |

*Note* Biological sex was coded as 0 = girls and 1 = boys

*$p < 0.05$, **$p < 0.01$

for Italian students by Pastorelli et al. [37]. Using the scale, participants report their sense of efficacy in self-regulating their learning practice on a 4-point Likert scale ranging from 1 (*not at all*) to 4 (*a lot*). An example item is: "How well can you concentrate on studying without getting distracted?" In the present study, Cronbach's alpha was 0.81.

### Peer Relationships at School

A single item was used to assess the number of classmates with whom the adolescents felt comfortable. The item was scored on a 4-point Likert scale ranging from 1 (*nobody*) to 4 (*everybody*). This item is particularly important because of the specific nature of intimacy and support that characterizes positive social relationships [38].

## Data Analysis

First, descriptive statistics and correlations among the variables were computed. Hypotheses relating to the moderated mediation model (Fig. 1) were tested using Hayes' PROCESS SPSS-macro [39, 40]. Specifically, PROCESS was used to test a mediation model in which the indirect effect of school achievement on depressive symptoms, mediated by self-efficacy for self-regulated learning, was conditioned (i.e., moderated) by a third variable of peer relationships at school. The measure provided an index of moderated mediation that assessed the equality of the conditional indirect effects [41]. The significance of this index indicated that the conditional indirect effects were statistically different at different levels of the moderator. A bootstrapping procedure was used to build the 95% confidence interval to evaluate the statistical significance of the effects. As this procedure does not assume a normal distribution, it is therefore a robust method. Bootstrap 95% confidence intervals (with a 5000 bootstrap samples) were computed for the direct and conditional indirect effects to evaluate whether they included 0. Specifically, effects were deemed statistically significant with $p < 0.05$ when 0 was not contained in the 95% confidence interval (lower-upper [40]). It is worth noting that, given the non-experimental nature of the data, the term "effect" is not used here to refer to causal relations among variables [40]. The moderated mediation model was tested while controlling for age and biological sex. In order to generate a fully standardized solution, all variables were standardized in advance, using the procedure suggested by Aiken and West [42].

**Table 2** Moderated mediation analysis: the effect of school achievement on self-efficacy for self-regulated learning

| | *Beta* | *t* | *p* | Bootstrapping CI95% | |
|---|---|---|---|---|---|
| | | | | LL | UL |
| Age | −0.05 | −1.59 | −0.11 | −0.10 | 0.01 |
| Biological sex | −0.10 | −3.43 | <0.001 | −0.16 | −0.04 |
| School achievement in grades | 0.37 | 12.52 | <0.001 | −0.31 | 0.42 |

*Note* Biological sex was coded as 0 = girls and 1 = boys

## Results

### Correlations Among Variables

Means, standard deviations, and intercorrelations among the study variables are presented in Table 1. Biological sex (coded as 0 = female, 1 = male) was negatively related to school achievement, self-efficacy for self-regulated learning, and depressive symptoms; girls reported higher school grades, higher self-efficacy for self-regulated learning, and more depressive symptoms. Age was negatively related to grades, self-efficacy for self-regulated learning, and peer relationships at school, and positively related to depressive symptoms. School achievement was positively related to self-efficacy for self-regulated learning and peer relationships at school, and negatively related to depressive symptoms. Self-efficacy for self-regulated learning was negatively related to depressive symptoms and positively related to peer

**Table 3** Moderated mediation analysis: peer relationships at school as moderator of the relation between self−efficacy for self-regulated learning and depressive symptoms

| | *Beta* | *t* | *p* | Bootstrapping CI95% | |
|---|---|---|---|---|---|
| | | | | LL | UL |
| Age | 0.01 | 0.31 | 0.76 | −0.05 | 0.07 |
| Biological sex | −0.31 | −10.62 | <0.001 | −0.36 | −0.25 |
| School achievement in grades | −0.02 | −0.73 | 0.46 | −0.08 | 0.04 |
| Self-efficacy for self-regulated learning | −0.21 | −6.73 | <0.001 | −0.27 | −0.15 |
| Peer relationships at school | −0.19 | −6.53 | <0.001 | −0.25 | −0.13 |
| Self-efficacy*Peer relationships | −0.07 | −2.70 | 0.007 | −0.12 | −0.02 |

*Note* Biological sex was coded as 0 = girls and 1 = boys

**Table 4** Decomposition of Effects of the Moderated Mediation Analysis

| Decomposition of effects | | Bootstrapping CI95% | |
|---|---|---|---|
| | | LL | UL |
| Direct effect | −0.02 | −0.08 | 0.04 |
| Conditional indirect effects | | | |
| Low peer relationships | −0.05 | −0.09 | −0.02 |
| Medium peer relationships | −0.08 | −0.11 | −0.05 |
| High peer relationships | −0.10 | −0.14 | −0.07 |
| Index of moderated mediation | −0.03 | −0.05 | −0.01 |

relationships at school. Finally, depressive symptoms were negatively related to peer relationships at school.

### Moderated Mediation Model

Our hypothesized model (Fig. 1) assumed that the mediation of self-efficacy for self-regulated learning in the relation between school achievement and depressive symptoms would be moderated by peer relationships at school. We expected that the indirect effect of school achievement on depressive symptoms, through self-efficacy for self-regulated learning, would be conditioned by different levels of peer relationships at school.

Self-efficacy for self-regulated learning was significantly predicted by school achievement, after controlling for age and biological sex (Table 2).

The interaction between self-efficacy for self-regulated learning and peer relationships at school was significant (Table 3), indicating that peer relationships moderated the effect of self-efficacy on depressive symptoms.

More importantly for our hypotheses, the decomposition of effects revealed that the indirect effect of school achievement on depressive symptoms through self-efficacy for self-regulated learning was conditioned by different levels of the moderator, peer relationships at school (Table 4). In fact, the index of moderated mediation was significant, $b = 0.03$, $p < 0.05$. The model as a whole was also tested via Structural Equation Modelling following suggestions of Hayes & Preacher [43] using the software M-Plus 8.3. The model showed an overall satisfactory fit, chi-square (3) = 8.09, $p = 0.04$, RMSEA = 0.04, RSMR = 0.03, CFI = 0.97, TLI = 0.94.

A simple slopes analysis of conditioned indirect effect illustrated the variance in the strength of the relation between self-efficacy for self-regulated learning and depressive symptoms according to different levels of peer relationships at school (Fig. 2). Specifically, the protective role of self-efficacy on depressive symptoms was stronger in the presence of many peer relationships at school, whilst it was weaker in the context of fewer peer relationships at school.[2]

## Discussion

Our study detected the presence of depressive symptoms among participants, confirming that such symptoms are common during adolescence and the more specific depression mood is experienced by 30–40% of adolescents in school [2, 3, 44]. Experience of depressive symptoms in this developmental period relates to an increased risk of mood disorder and suicide [23]. But if depressive mood is much more frequent, it can lead to more severe depressive episodes [44]. Therefore, these symptoms should not be overlooked. According to previous studies, girls report more depressive symptoms than boys [3, 15–17], showing greater vulnerability to depressive feelings.

[2] In order to test possible alternative models, we checked whether biological sex and age could be further moderators. No interaction effect of biological sex and age was significant; however, peer relationships at school remained a significant moderator. Furthermore, we also tested for possible three-way interactions (i.e., self-efficacy*biological sex*peer relationships; self-efficacy*age*peer relationships); again, the only significant interaction effect was the two-way interaction between self-efficacy and peer relationships at school.

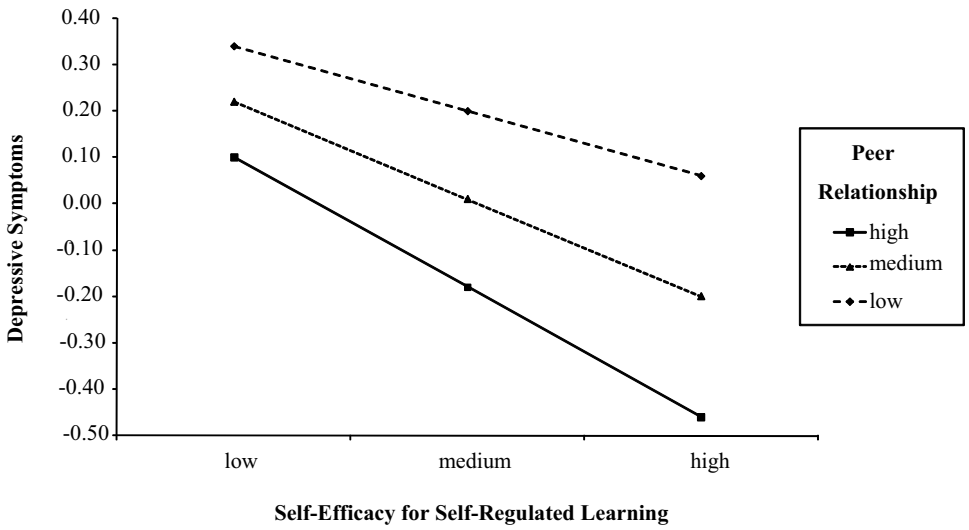



**Fig. 2** The relation between self-efficacy for self-regulated learning and depressive symptoms moderated by peer relationships at school

The present study found that school achievement related to fewer depressive symptoms and that, conversely, lower self-reported grades related to more depressive symptoms; these results align with the findings of previous studies [45]. Nevertheless, the results of the present study show that the relation between school achievement and depressive symptoms is mediated by self-efficacy for self-regulated learning: the more success students achieve at school, the more they perceive themselves as capable, in control of their school and study tasks, and able to face difficulties. These students seem also less psychologically distressed, in terms of depressive symptoms.

Thus, our results suggest that it is not outcome (i.e., grades and school achievement), but the perception of being able to overcome scholastic challenges, that permits students to contact fewer depressive symptoms. These findings are in line with the results of previous studies that have shed light on the relevant role of self-efficacy in promoting scholastic success and decreasing feelings of discomfort in performance situations, thus representing an important protective factor that strengthens resilience and, in turn, increases well-being [46].

The added value of this study consists in its finding of the moderating role of peer relationships at school in the relation between self-efficacy for self-regulated learning and depressive symptoms. Higher self-efficacy was associated to lower depressive symptoms, in particular in adolescents with more school friends. Conversely, the magnitude of this association is weaker for those with fewer school friends. The mean age of our participants was 15 years, and the role of classmates was found to be most important during the first year of high school, presumably because this year represents a critical transition point. Indeed, the first year can be very stressful for adolescents [47, 48], due to the higher potential for course failure (i.e., lower grades) and the nature of the student–teacher relationships as less impersonal and formal than those in middle school [19]. Students with lower academic self-efficacy and fewer sources of social support may be relatively more susceptible to the depressive consequences of school failure. Thus, interpersonal relationships seem to play an important role, as adolescents with close friends among their classmates tend to cope more successfully with school failure.

The findings of the present study have several implications for intervention and prevention programs. The results suggest that programs aimed at reducing psychological malaise and promoting psychological well-being should be focused on not only improving students' self-efficacy but also promoting positive relations among classmates. This is especially true in Italy, in which—similar to many European countries—students spend many hours at school with the same classmates. Accordingly, it is important that students' belief in their capacity to face changes and challenges at school is supported and enhanced, and it is also important to remember that students' perceived exclusion and loneliness could be a risk factor for depressive symptoms, especially during adolescence—a developmental stage in which relationships with peers become significant for both individual and social well-being. Therefore, the school represents a privileged context for the prevention of depressive feelings.

Teachers should promote and encourage the formation of study groups among students or introduce group activities during class time. Doing so would enable students to increase their self-efficacy and academic success (via comparison with and reinforcement from peers), develop an accurate assessment of their study skills, and protect themselves from isolation and depression (which are commonly encountered at school). Moreover, the implementation of group activities during school hours would bring students together and encourage them to form friendships.

Naturally, the present study has some limitations. As the research design was cross-sectional and correlational, further investigation is needed to confirm the hypothesized relations and assess their stability over time. Nevertheless, the highlighted relations among the investigated variables could provide strong indications for practice. For instance, it seems useful and profitable to work on improving self-efficacy and social relationships in an attempt to reduce depression in adolescents. Such practices may be most influential in group interventions, rather than individual treatment programs, as the former would likely impact a larger number of students. Another limitation regarding our sample is that, while it was large, it was not representative of the general population. Future studies should test the replicability of our findings in other contexts. Finally, as we used self-reports of grades, there is a possibility that the results were biased. However, the students were informed of the nature of the research, and the anonymous nature of the data would have greatly reduced the risk of social desirability bias. However, some of the variables investigated in the present study are based on subjective self-perception, like self-efficacy which is the personal belief of being able to organize and effectively orchestrate a series of actions to appropriately deal with new situations, trials, and challenges [24]. Therefore, self-report measures represent an adequate tool for investigating such a variables. However, upcoming studies could complement the peer relationship construct with peer report measures.

Despite these limitations, the study represents a significant contribution to our knowledge of the relation between self-efficacy and depression during adolescence, emphasizing the important role of good interpersonal networks in the classroom (and at school, more generally) in preventing psychological distress.

## Summary

Experience of depressive symptoms is common during adolescence. Many studies have stressed that school achievement is an important source of well-being that protects against depressive symptoms [20]. In contrast, adolescents who struggle at school often demonstrate a lack of self-respect, low self-esteem, and low self-efficacy, and may be the targets of social reproach. Thus, failure at school often relates to low self-efficacy for self-regulated learning that, in turn, is associated with depressive symptoms. Several studies have supported the idea that friends play a role in counteracting depression and anxiety, especially in adolescence [26]. The present study tested a mediation model in which the indirect effect between school achievement and depressive symptoms, mediated by self-efficacy for self-regulated learning, was conditioned (i.e., moderated) by a third variable of peer relationships at school, in a sample of Italian adolescents. Results showed that the mediation of self-efficacy for self-regulated learning in the relation between school achievement and depressive symptoms was found to be moderated by peer relationships at school. Higher self-efficacy for self-regulated learning was associated to lower depressive symptoms, in particular in adolescents with more school friends. Conversely, the magnitude of this association is weaker for those with fewer school friends. The results suggest that programs aimed at reducing psychological malaise and promoting psychological well-being should focus on not only improving students' self-efficacy but also fostering positive relationships among classmates. Therefore, the school represents a privileged context for the prevention of depressive feelings. Teachers should promote and encourage the formation of study groups among students or introduce group activities during class time. Moreover, the implementation of group activities during school hours would bring students together and encourage them to form friendships.

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