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Protective factors and resilience in adolescents: The mediating role of self-regulation



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ABSTRACT

The main goal of this study was to explore the mediating role of self-regulation in the relationship between protective factors and resilience. The sample was composed of 393 adolescents who attended secondary education. Participants were assessed using the Healthy Kids Resilience Assessment to collect information about four protective factors—school, home, community and peer environment—and resilience. Two dimensions of self-regulation—goal setting and impulse control—were assessed using the Short Self-Regulation Questionnaire. The results indicated that home, community and peer environment predicted significantly the levels of resilience of the students. Home environment was the main resilience predictor. Goal setting and impulse control abilities were also predictors of resilience but no evidence was found for a mediating effect of the self-regulation dimensions on the relationship between protective factors and resilience. Results are discussed and implications for prevention from a developmental perspective are presented.

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Factores de protección y resiliencia en adolescentes: la autorregulación como variable mediadora

RESUMEN

El objetivo principal de este estudio fue explorar el papel mediador de la autorregulación en la relación entre los factores protectores y la resiliencia. La muestra se compone de 393 adolescentes de cursos de bachillerato. Los participantes fueron evaluados mediante el *Healthy Kids Resilience Assessment* para recoger información sobre cuatro factores protectores—entorno escolar, entorno familiar, entorno de la comunidad y entorno entre pares—y resiliencia. Dos dimensiones de la autorregulación—establecimiento de objetivos y control de los impulsos—se evaluaron utilizando el *Short Self-Regulation Questionnaire*. Los resultados indicaron que el ambiente familiar, de la comunidad y entre iguales predijo significativamente los niveles de resiliencia de los estudiantes. El entorno familiar fue el principal predictor de la resiliencia. El establecimiento de objetivos y la capacidad de control de impulsos también fueron predictores de la resiliencia, pero no se encontraron pruebas de un efecto mediador de las dimensiones de la autorregulación sobre la relación entre los factores de protección y resiliencia. Se discuten los resultados y se presentan implicaciones para la prevención desde una perspectiva del desarrollo.

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Palabras clave:

Factores de protección

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Adaptation to adversity is a priority research topic due to its importance to mental health promotion and risk behaviour prevention in children and adolescents. The study of resilience, which can be broadly defined as the dynamic process through which positive outcomes are achieved in the context of adversity (Masten, 2001, 2014), can provide educators and governments with information about the resources that can be mobilised

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to promote positive outcomes in adverse environments (UNICEF, 2013).

The effect of risk and protective factors on the resilience levels of the individuals has been widely studied. According to Rutter (1985), risk factors are all stressful life events, such as poverty, family breakdown, experience of some form of violence, emotional loss, disease, unemployment, wars, disasters, or other factors that theoretically increase the likelihood of the onset of a problem or maintain the problem. However, research has shown that mere exposure to risk factors, even in substantial number, does not necessarily translate into risk behaviours (Dillon et al., 2007), given that most people are able to deal with risk quite satisfactorily (Bonanno, Galea, Bucciarelli, & Vlahov, 2007). In fact, several studies actually tend to focus on the effects of the promotion of protective factors, shifting the attention from risks to actions and strategies that are effective in the promotion of positive psychological adjustment and development (Masten, 2001; Rutter, 1985, 2012; Zolkoski & Bullock, 2012). Protective factors are the individual characteristics or contextual/external conditions that work as dynamic mechanisms that help children and young people to resist or to balance the risks to which they are exposed to (Rutter, 1985, 2012). Personality traits, perseverance, determination, self-efficacy, creativity, coherence, and self-awareness are some internal attributes that are positively related to resilience (e.g., Affi & Macmillan, 2011; Smokowski, Reynolds, & Bezrucko, 1999; Waaktaar, Christie, Borge, & Turgersen, 2004). Family support, positive appraisals, and quality interaction with parents (Affi & Macmillan, 2011; Carbonell et al., 2002; Smokowski et al., 1999; Vanderbilt-Adriance & Shaw, 2008), good interpersonal relations (Carbonell et al., 2002; Sameroff & Rosenblum, 2006), teacher and school support (Brooks, 2006; Smokowski et al., 1999), as well as community relationships and resources (Davies, Thind, Chandler, & Tucker, 2011; Sameroff & Rosenblum, 2006) are some of the most studied external protective factors.

A personal competence that looks particularly relevant to the resilience levels of individuals is their self-regulation ability (Dishion & Connell, 2006; Gardner, Dishion, & Connell, 2008). In a recent review, Dillon et al. (2007) point out a number of factors at the personal level that are strongly correlated with the development of resilience. These factors include the ability to: (a) operate a scheme to acknowledge, interpret, and predict potentially dangerous situations that occur in the social context; (b) develop a set of goals and regulate his/her behaviour in order to pursue these goals over time and in different contexts; and (c) promote positive beliefs about his/her self-regulatory capacity, to put his/her decisions into practice by using adequate skills and solve functional problems. Most of these abilities are essentially self-regulation abilities, a process in which individuals take an active role shaping their own destiny even in contexts characterized by a high psychosocial risk (Dishion & Connell, 2006; Masten & Coatsworth, 1998). Despite this evidence, few studies explore the mediating role of self-regulation in the relationship between protective factors and resilience. Therefore, this study aims to explore the existence of this mediating effect in a sample of adolescents, in order to contribute to a broader perspective about the relationship between protective factors and resilience, considering family-, peer-, school-, and community-related factors.

From Protective Factors to the Mediating Role of Self-regulation in Resilience

Although different definitions of self-regulation exist in the literature (for a review, see Martin & McLellan, 2008), most of them seem to share the idea that this is an ability that involves the capacity to maintain effort and orientation toward a desired

objective, while controlling the immediate impulses that arise (Martin & McLellan, 2008; Neal & Carey, 2005). Successful adaptation to challenges appears then to depend on how individuals manage their emotions, think constructively, regulate and direct their behaviour, control automatic impulses, and act on the environment to change or decrease the sources of stress (Compas, Connor-Smith, Saltzman, Harding Thomsen, & Wadsworth, 2001). Therefore, the study of self-regulation can be particularly relevant to understanding the resilience levels of the individuals, if we take into account the necessity of managing these personal challenges to construct an adjusted life pathway (Buckner, Mezzacappa, & Beardslee, 2009; Gestsdottir & Lerner, 2008; Lengua, 2002). Therefore, self-regulation exerts an effect in the adaptation to adversity, given that it is a process in which individuals take an active role in the activation, monitoring, inhibition, and/or adaptation of their behaviour, emotions, and cognitive strategies to achieve the desired goals (Gestsdottir & Lerner, 2008; Moilanen, 2007).

Some individual and environmental factors, either related with family, peers, or community, are also positively related to self-regulation. Despite the consensus about self-regulation as a stable characteristic throughout age (Buckner et al., 2009; Shoda, Mischel, & Peake, 1990), research has shown that it tends to be higher in girls (Buckner et al., 2009; García del Castillo & Dias, 2009; McCabe & Brooks-Gunn, 2007).

Family environment–family structural conditions, but especially affect, parental responsiveness, and control strategies and the exposure to adjusted models–has also an important impact on children's and adolescents' self-regulation skills (Choe, Olson, & Sameroff, 2013; Colman, Hardy, Albert, Raffaelli, & Crockett, 2006; Karreman, van Tuijl, van Aken, & Dekovic, 2006; Moilanen, Shaw, & Fitzpatrick, 2010). At social level, some studies indicate a negative correlation between self-regulation and peer rejection, problematic or antisocial behaviours with peers (Tangney, Baumeister, & Boone, 2004; Trentacosta & Shaw, 2009), but a positive correlation with the involvement and inclusion in the community (Stenseng, Belsky, Skalicka, & Wichstrøm, 2014; Stillmand & Baumeister, 2013). At school level, self-regulation has been positively related to school achievement (Boekaerts, 2005; Duckworth & Seligman, 2005; McClellan & Cameron, 2011; Zimmerman, 1990) and higher levels of self-regulation have been found in students from regular or non-vocational courses when compared to students who attend vocational courses (Jonker, Elferink-Gemser, Toering, Lyons, & Visscher, 2010; Koning & Boekaerts, 2005).

To summarise, individual and environmental factors, related either with school, home, community, or the group of peers, contribute to the development both of self-regulation and resilience in adolescents. Self-regulation also plays a central role in the development of resilience, given its importance in the mobilisation of resources in adverse environments, by setting goals and controlling impulses. In order to contribute to a broader understanding of the dynamics between the protective factors and resilience in adolescence, the goals of this study were twofold:

1. To test the existence of age, gender, and course-related differences in protective factors (school, family, community, and peers environment), self-regulation, and resilience.
2. To investigate if self-regulation mediates the relationship between protective factors (school, family, community, and peer environment) and resilience.

Method

Participants

The initial sample included 404 students, but 11 participants did not complete at least one measure and were therefore discarded

Table 1
Age and Gender Distribution for the Students Who Attended Vocational and Regular High School Courses (N = 393).

	Vocational		Regular	
	n	%	n	%
<i>Gender</i>				
Female	121	55.5	106	60.6
Male	94	43.1	67	38.3
N/I	3	1.4	2	1.1
<i>Age</i>				
M (SD)	16.56 (1.13)		15.67 (0.68)	

Note. N/I = no information provided about gender.

from the study. Therefore, the final sample included 393 students in grades 10 ($n = 323$, 188 girls), 11 ($n = 49$, 25 girls) and 12 ($n = 21$, 14 girls), from three high schools located in northern Portugal. Participants were aged between 14 and 21 years old ($M_{age} = 16.16$, $SD = 1.05$). The participants attended either vocational courses ($n = 218$, 55.5%) or high school regular courses ($n = 175$, 44.5%). Students from vocational courses were older than students from regular courses, $t(383) = -9.55$, $p < .001$ (see Table 1). No association was found between gender and course type, $\chi^2(1) = 0.924$, $p = .321$.

Measures

Healthy Kids Resilience Assessment (HKRA; Constantine, Bernard, & Diaz, 1999). The adaptation of the HKRA (version 6.0) to the Portuguese population (Martins, 2007) was used. HKRA assesses four types of protective factors—school environment, home environment, community environment and peer environment—as well as resilience traits of high school students. The four types of protective factors are assessed with 33 items (nine items for each of the three first subscales and six items for the peer environment subscale). Items assess the existence of caring relationships, high expectations, and meaningful opportunities for participation in school, home, and community and the existence of caring relationships and high expectation messages among peers. Resilience is assessed with 18 items that cover six aspects: cooperation and communication, self-efficacy, empathy, problem-solving competences, self-knowledge, and goals and aspirations. Items are rated on a 4-point scale and the scale scores are calculated by taking the total sum of the items and dividing it by the number of items in each subscale. Regarding the reliability of the adaptation for the Portuguese population, the internal consistency coefficients were high for the resilience ($\alpha = .84$), school environment ($\alpha = .83$), home environment ($\alpha = .75$) and community environment ($\alpha = .82$) subscales. The internal consistency of the items that composed the peer environment subscale was slightly lower ($\alpha = .66$), which can be attributable to the low number of items of the subscale (Martins, 2007).

Short Self-Regulation Questionnaire (SSRQ; Carey, Neal, & Collins, 2004). Self-regulation was assessed using the SSRQ, which is originally composed of 31 items scored on a 5-point Likert scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Previous research (Carey et al., 2004) indicated that the SSRQ was a one-dimension measure that represented overall self-regulation capacity. However, subsequent research (Neal & Carey, 2005) found evidence for a two-factor structure that represented two self-regulation dimensions: impulse control and goal setting. The Portuguese version also found evidence for this two-factor structure (García del Castillo & Dias, 2009). The Portuguese version comprises 29 items, from which 15 belong to the goal setting subscale ($\alpha = .85$) and 14 to the impulse control subscale ($\alpha = .82$).

Socio-demographic questionnaire. An additional questionnaire was used to collect information about demographic

variables—gender, age, school grade—and education pathways—school and type of high school course attended (vocational vs. regular high school).

Procedure

Informed consent from school boards and parents of all students who attended the classes that were included in the sample were gathered prior to data collection. All students who were authorized by their parents and who were present in the day of data collection participated in the study voluntarily. Data were anonymised and confidentiality was assured. Participants completed questionnaires in classroom groups and received no material compensation for their participation.

Statistical Analyses

After screening the data for missing values, differences in the protective factors (school, home, community, and peer environment), self-regulation (goal setting and impulse control), and resilience were examined using a series of independent samples t -tests.

To test the hypothesis that self-regulation mediates the relationship between protective factors (predictors) and resilience levels in adolescents (outcome variable), we used the analytic strategy outlined by Baron and Kenny (1986). According to this strategy, three conditions should be present to detect a mediation effect: (1) the predictor is correlated with the outcome variable and the mediator; (2) the mediator predicts the outcome variable; and (3) the association between the predictor and the criterion variable diminishes or disappears when the mediator variable is controlled in the analysis. Therefore, Pearson correlation coefficients and a set of hierarchical regression analyses were performed to test for mediation. The following steps were followed in two regression models (one for each self-regulation dimension): (a) resilience was regressed on the protective factors in a first step; (b) self-regulation dimensions (impulse control and goal setting) were added separately to each model in a second step.

Results

Missing Values

Only 278 (70.7%) of the participants provided complete data on the SSRQ and 302 (76.8%) provided complete data on the HKRA. Therefore, 29.3% of the participants had at least one missing value on SSRQ and 23.2% at least one missing value on the HKRA. Participants with missing data and participants with complete data did not differ in terms of age, gender, grade, and course type. Therefore, the missing values in the item scores were replaced by the mean score of each item. After data imputation, complete data were obtained for the 393 participants in all measures.

Differences according to Gender and Course Type

Table 2 shows means and standard deviations for all four protective factors, the two self-regulation dimensions, and resilience, as well as differences in these variables according to gender and course type (regular or vocational).

Girls obtained higher scores for home and peer environment than boys. Girls also reported higher impulse control abilities and resilience levels than boys. No differences between boys and girls were found for school and community environment or goal setting abilities.

Regarding the course type, students from vocational courses had lower levels of self-regulation (both goal setting and impulse

Table 2
Differences in Protective Factors, Self-regulation and Resilience according to Gender and Course Type.

Variables	Full Sample M (SD)	Gender (N=388)		t	p	Course Type (N=393)		t	p
		Girls M (SD)	Boys M (SD)			Regular M (SD)	Vocational M (SD)		
School environment	1.67 (0.60)	1.68 (0.57)	1.67 (0.62)	0.13	.898	1.58 (0.63)	1.74 (0.56)	-2.68	.008
Home environment	2.12 (0.48)	2.16 (0.48)	2.06 (0.49)	1.99	.048	2.18 (0.49)	2.07 (0.47)	2.39	.018
Community environment	1.86 (0.67)	1.90 (0.67)	1.81 (0.68)	1.38	.169	1.87 (0.67)	1.86 (0.68)	0.08	.934
Peers environment	1.98 (0.45)	2.03 (0.43)	1.91 (0.49)	2.69	.008	1.99 (0.45)	1.97 (0.46)	0.27	.791
Goal setting	56.40 (7.50)	56.99 (7.26)	55.68 (7.76)	1.70	.090	57.52 (6.96)	55.51 (7.81)	2.66	.008
Impulse control	49.32 (8.61)	50.56 (8.53)	47.62 (8.51)	3.35	.001	50.86 (8.79)	48.09 (8.28)	3.21	.001
Resilience	2.09 (0.43)	2.15 (0.42)	2.02 (0.43)	2.91	.004	2.17 (0.41)	2.02 (0.43)	3.32	.001

control abilities) and resilience than students from regular courses. Students from regular courses reported better home environment but students from vocational courses reported better school environment (see Table 2). No differences between students from regular and vocational courses were found for community and peer environment.

Relationship between Age, Protective Factors, Self-regulation, and Resilience

Bivariate correlations between the study variables are presented in Table 3. Age had a negative correlation with impulse control, indicating that older students had less impulse control than younger students. No other variable had statistically significant correlations with age.

Resilience correlated positively with all four protective factors—school, home, community, and peer environment—, as well as with goal setting and impulse control. All these correlation coefficients were moderate, varying between .30 and .52. Regarding the relationship between resilience and the protective factors, the highest correlation coefficient was obtained between resilience and home environment, followed by community environment.

The first self-regulation dimension, goal setting, correlated positively with all four protective factors, although the magnitude of the coefficients was low. However, the second self-regulation dimension—impulse control—correlated significantly only with home and community environment. However, these correlation coefficients between the two self-regulation dimensions and the protective factors were generally low (see Table 3).

The Mediating Role of Self-regulation in the Relationship between Protective Factors and Resilience

According to the criteria set forth by Baron and Kenny (1986), for a mediation effect to be present, the predictor(s) should be related both with the outcome variable and with the possible mediator(s). As can be seen in Table 3, all four protective factors (predictor variables) are significantly correlated with resilience levels (outcome variable) and with goal setting abilities of students (mediator 1). The protective factors home and community environment were

Table 3
Pearson Product Moment Correlation Coefficients between Protective Factors, Self-regulation Dimensions and Resilience.

Variables	1	2	3	4	5	6	7
1. School environment	-						
2. Home environment	.34***	-					
3. Community environment	.44***	.37***	-				
4. Peers environment	.46***	.37***	.35***	-			
5. Goal setting	.12 [†]	.28***	.16**	.12 [†]	-		
6. Impulse control	.01	.26***	.11 [†]	.01	.49***	-	
7. Resilience	.37***	.52***	.46***	.39***	.43***	.30***	-
8. Age	.04	-.06	.03	.03	-.07	-.16**	-.01

[†] $p < .05$, ** $p < .01$, *** $p < .001$.

also significantly correlated with the impulse control abilities of students (mediator 2).

The second criteria by Baron and Kenny (1986) established that the mediator(s) should predict the outcome variable. In this study, both goal setting ($\beta = 0.43$, $p < .001$) and impulse control ($\beta = 0.30$, $p < .001$) abilities were statistically significant predictors of resilience.

The final criteria for establishing a mediation effect indicates that the association between the predictor and the outcome variable should diminish or disappear when the mediator is controlled in the analysis. The results of the regression analyses to test for this condition of mediating effect are presented in Table 4. In model 1, the four protective factors were inserted as predictors of the resilience levels in a first step, and the goal setting abilities (mediator 1) were inserted in a second step. Home, community, and peer environment were significant resilience predictors in the first step, but not school environment. Home environment was the predictor with the strongest weight on the resilience level of the adolescents (see Table 4). When goal setting abilities were added to the model, all three predictors remained significant (see Table 4). Therefore, goal setting abilities do not seem to mediate the relationship between resilience and home, community, and peer environment, but are an independent predictor of the resilience levels achieved by adolescents.

In model 2, the four protective factors were inserted as predictors of the resilience levels in a first step, and the impulse control abilities (mediator 2) were added in a second step. Similarly to model 1, home, community, and peer environment were statistically significant resilience predictors in the first step. With the addition of impulse control abilities in the second step, all three predictors remained significant (see Table 4). These results also indicate that impulse control abilities do not mediate the relationship between protective factors and resilience, but are themselves an independent predictor of resilience.

Discussion

The first goal of this study was to investigate the existence of group differences in protective factors, resilience, and self-regulation dimensions. Results indicated that girls and students from regular (non-vocational) courses experienced better home

Table 4
Regression Analysis for Testing the Meditational Effects of the Self-regulation Dimensions in the Relationship between Protective Factors and Resilience.

Model/Step	Predictors	R ²	ΔR ²	B	SE(B)	β
<i>Model 1</i>						
Step 1	School environment	.38	-	0.06	0.03	0.09
	Home environment			0.32	0.04	0.36***
	Community environment			0.16	0.03	0.25***
	Peers environment			0.12	0.04	0.12**
Step 2	School environment	.46	.08***	0.06	0.03	0.08
	Home environment			0.25	0.04	0.28***
	Community environment			0.15	0.03	0.23***
	Peers environment			0.12	0.04	0.13**
	Goal setting			0.02	0.002	0.29***
<i>Model 2</i>						
Step1	School environment	.38	-	0.06	0.03	0.09
	Home environment			0.32	0.04	0.36***
	Community environment			0.16	0.03	0.25***
	Peers environment			0.12	0.04	0.12**
Step 2	School environment	.42	.04***	0.07	0.03	0.10
	Home environment			0.27	0.04	0.30***
	Community environment			0.15	0.03	0.24***
	Peers environment			0.13	0.04	0.14**
	Impulse control			0.01	0.002	0.19***

* $p < .05$, ** $p < .01$, *** $p < .001$.

environments and had higher resilience levels and impulse control. These results are consistent with previous research, which reported lower self-regulation skills for boys and students who attended vocational courses (Buckner et al., 2009; García del Castillo & Dias, 2009; Jonker et al., 2010; Koning & Boekaerts, 2005; McCabe & Brooks-Gunn, 2007). Nevertheless, the existence of gender-related differences in resilience is not consensual in the literature, with some studies indicating that girls and boys react differently to adversity and others concluding that no differences between adolescent girls and boys exist (for a review, see Coleman & Hagell, 2007).

This study reports a disadvantaged pattern of results in home environment, self-regulation, and resilience for students attending vocational courses. The finding that in our sample older students had fewer impulse control abilities may also be related to the fact that vocational courses' students were significantly older than the regular courses' students. Another important result is related to the fact that, although students from vocational courses reported a better school environment, i.e., more caring relationships, high expectations, and opportunities for meaningful participation in school, than students from regular courses, their resilience levels were lower. This result can be better understood if we look at the individual contribution of protective factors to resilience in the regression models presented in Table 4. In fact, home environment has the highest effect on resilience, whereas school environment shows no predictive power. This can indicate that providing good school environments may not be sufficient to improve the resilience levels of the students if they are immersed in home environments lacking supportive interpersonal relationships.

The second and main goal of this study was to test if the self-regulation dimensions—goal setting and impulse control—are mediators in the relationship between the four protective factors and adolescents' resilience levels. Moderate correlations were obtained between the protective factors and adolescents' resilience. However, the results from linear regression modelling indicated that, overall, home environment was the best resilience predictor, followed by community and peer environment. The fact that home environment, namely the interpersonal relationships that are experienced in the family context, is closely related to resilience in children and adolescents is a common conclusion in the literature (e.g., Vanderbilt-Adriance & Shaw, 2008). Family ties and the existence of supportive relationships and modelling within family members are frequently referred and valued by adolescents when

investigating how they face adversity (Smokowski et al., 1999). Interpersonal relationships and participation in the group of peers and community are protective factors less studied than the interactions established within the family or home setting, although some previous studies have pointed out the importance of friends influence (e.g., Smokowski et al., 1999) and community support relationships and resources (e.g., Davies et al., 2011) in individuals' resilience levels. Our results support these findings, highlighting the need for promoting positive interactions in peer and community environments to help adolescents face adversity. A surprising result was that school environment did not predict adolescents' resilience levels, because some studies have suggested that meaningful relationships between students and caring adults, the communication of high expectations for academic performance, and the maximization of the opportunities for meaningful participation of students in the school environment can foster resilience (e.g., Brooks, 2006). Our results provide a broader understanding of the role of school environment in resilience, suggesting that promotion of supportive relations and opportunities in schools should be accompanied by the fostering of the same quality of relationships and opportunities for participation in other life contexts of adolescents, taking into account an ecological perspective of human development.

Another finding from this study was that protective factors were weakly correlated with self-regulation dimensions (goal setting and impulse control abilities). In fact, only home environment had a correlation higher than .20 with both self-regulation dimensions. The importance of family environment to the emergence of self-regulation abilities is extensively mentioned in the literature (Choe et al., 2013; Colman et al., 2006; Moilanen et al., 2010) and our results reinforce the importance of this protective factor not only in the overall adaptation to adversity (i.e., resilience) but also in the development of goal setting and impulse control abilities.

Our final finding was that, although goal setting and impulse control abilities are significant predictors of adolescents' resilience, these self-regulation dimensions did not mediate the relationship between protective factors and resilience. This means that home, community, and peer environments exert a direct effect on resilience and not an indirect effect mediated by self-regulation. In this sense, home, community, and peer environment should be considered external factors and self-regulation should be understood as an internal factor that contributes to the development of high levels of resilience in adolescents.

Limitations and Implications for Future Research and Practice

Our findings should be considered in the scope of some limitations that are present in this study. Firstly, the sampling procedure and the number of missing values limit the generalisability of the results. Future studies should use a larger and stratified sample. Secondly, there is much discussion about the adequate measures to evaluate self-regulation in adolescence. Much of the research in this domain translates models from adults to adolescents, generating theoretical and methodological discussion about the adequacy of the transposition of the measures used to assess adults to adolescents' assessment. Despite these limitations, this might be one of the first studies exploring the mediating role of self-regulation in the relationship between protective factors and resilience.

These data are also particularly interesting for intervention, once they highlight the importance of an ecological intervention to promote resilience. As part of the individual intervention, resilience is a multidimensional process that should be promoted with the involvement of parents, peers, and community.

Conflict of Interest

The authors of this article declare no conflict of interest.

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References

- Affi, T. O., & Macmillan, H. L. (2011). Resilience following child maltreatment: a review of protective factors. *Canadian Journal of Psychiatry*, *56*, 266–272.
- Baron, R., & Kenny, D. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic and statistical considerations. *Journal of Personality and Social Psychology*, *51*, 1173–1182. <http://dx.doi.org/10.1037/0022-3514.51.6.1173>
- Boekaerts, M. (2005). Self-regulation: With a focus on the self-regulation of motivation and effort. In I. E. Sigel, & K. A. Renninger (Eds.), *Handbook of child psychology, Volume 4: Child psychology in practice* (6th ed., pp. 345–377). New York: Wiley.
- Bonanno, G. A., Galea, S., Bucciarelli, A., & Vlahov, D. (2007). What predicts psychological resilience after disaster? The role of demographics, resources, and life stress. *Journal of Consulting and Clinical Psychology*, *75*, 671–682. <http://dx.doi.org/10.1037/0022-006X.75.5.671>
- Brooks, J. E. (2006). Strengthening resilience in children and youths: Maximizing opportunities through the schools. *Children and Schools*, *28*, 69–76. <http://dx.doi.org/10.1093/cs/28.2.69>
- Buckner, J. C., Mezzacappa, E., & Beardslee, W. R. (2009). Self-Regulation and Its Relations to Adaptive Functioning in Low Income Youths. *American Journal of Orthopsychiatry*, *79*, 19–30. <http://dx.doi.org/10.1037/a0014796>
- Carbonell, D. N., Reinherz, H. Z., Giaconia, R. M., Stashwick, C. K., Paradis, A. D., & Beardslee, W. R. (2002). Adolescent protective factors promoting resilience in young adults at risk for depression. *Child and Adolescent Social Work Journal*, *19*, 393–412. <http://dx.doi.org/10.1023/A:1020274531345>
- Carey, K. B., Neal, D. J., & Collins, S. E. (2004). A psychometric analysis of the self-regulation questionnaire. *Addictive Behaviors*, *29*, 253–260. <http://dx.doi.org/10.1016/j.addbeh.2003.08.001>
- Choe, D. E., Olson, S. L., & Sameroff, A. J. (2013). Effects of early maternal distress and parenting on the development of children's self-regulation and externalizing behavior. *Development and Psychopathology*, *25*, 437–453. <http://dx.doi.org/10.1017/S0954579412001162>
- Coleman, J., & Hagell, A. (2007). *Adolescence, risk and resilience: Against the odds*. Chichester, West Sussex: John Wiley & Sons.
- Colman, B., Hardy, S. A., Albert, M., Raffaelli, M., & Crockett, L. (2006). Early predictors of self-regulation in middle childhood. *Infant and Child Development*, *15*, 421–437. <http://dx.doi.org/10.1002/icd.469>
- Compas, B. E., Connor-Smith, J. K., Saltzman, H., Harding Thomsen, A. H., & Wadsworth, M. E. (2001). Coping with stress during childhood and adolescence: Progress, problems and potential in theory and research. *Psychological Bulletin*, *127*, 87–127. <http://dx.doi.org/10.1037/0033-2909.127.1.87>
- Constantine, N. A., Benard, B., & Diaz, M. (1999). *Measuring Protective Factors and Resilience Traits in Youth: The Healthy Kids Resilience Assessment*. Paper presented at the Seventh Annual Meeting of the Society for Prevention Research. New Orleans. Retrieved from <http://crahd.phu.org/papers/HKRA-99.pdf>
- Davies, S. L., Thind, H. R., Chandler, S. D., & Tucker, J. A. (2011). Enhancing resilience among young people: the role of communities and asset-building approaches to intervention. *Adolescent Medicine: State of the Art Reviews*, *22*, 402–440.
- Dillon, D., Chivite-Matthews, N., Grewal, I., Brown, R., Webster, S., Weddell, E., . . . & Smith, N. (2007). *Risk, protective factors and resilience to drug use: Identifying resilient young people and learning from their experiences*. London: Home Office.
- Dishion, T. J., & Connell, A. (2006). Adolescents' resilience as a self-regulatory process: Promising themes for linking intervention with developmental science. In B. M. Lester, A. Masten, & B. McEwen (Eds.), *Resilience in children* (pp. 125–138). Boston: New York Academy of Sciences.
- Duckworth, A. L., & Seligman, M. E. (2005). Self-discipline outdoes IQ in predicting academic performance of adolescents. *Psychological Science*, *16*, 939–944. <http://dx.doi.org/10.1111/j.1467-9280.2005.01641.x>
- García del Castillo, J. A., & Dias, P. C. (2009). Auto-regulação, resiliência e consumo de substâncias na adolescência: Contributos da adaptação do Questionário Reduzido de Auto-regulação. *Psicologia, Saúde e Doenças*, *10*, 205–216.
- Gardner, T., Dishion, T., & Connell, A. (2008). Adolescent self-regulation as resilience: resistance to antisocial behavior within the deviant peer context. *Journal of Abnormal Child Psychology*, *36*, 273–284. <http://dx.doi.org/10.1007/s10802-007-9176-6>
- Gestsdottir, S., & Lerner, R. M. (2008). Positive development in adolescence: The development and role of intentional self regulation. *Human Development*, *51*, 202–224.
- Jonker, L., Elferink-Gemser, M. T., Toering, T. T., Lyons, J., & Visscher, C. (2010). Academic performance and self-regulatory skills in elite youth soccer players. *Journal of Sport Sciences*, *28*, 1605–1614.
- Karreman, A., van Tuijl, C., van Aken, M. A., & Deković, M. (2006). Parenting and self-regulation in preschoolers: A Meta-analysis. *Infant and Child Development*, *15*, 561–579. <http://dx.doi.org/10.1002/icd.478>
- Koning, E., & Boekaerts, M. (2005). Determinants of students' school-identification in secondary vocational education. *European Journal of Psychology of Education*, *20*, 289–308. <http://dx.doi.org/10.1007/BF03173558>
- Lengua, L. J. (2002). The contribution of emotionality and self-regulation to the understanding of children's response to multiple risk. *Child Development*, *73*, 144–161. <http://dx.doi.org/10.1111/1467-8624.00397>
- Martin, J., & McLellan, A. (2008). The educational psychology of self-regulation: A conceptual and critical analysis. *Studies in Philosophy and Education*, *27*, 433–448. <http://dx.doi.org/10.1007/s11217-007-9060-4>
- Martins, M. H. (2007). *Resiliência: para além da adversidade e do risco* [Resilience: beyond adversity risk]. Paper presented at the II Congress on Family, Health and Illness: Models, Research and Practice in Health contexts. University of Minho, Braga, Portugal.
- Masten, A. S. (2001). Ordinary magic: Resilience processes in development. *American Psychologist*, *56*, 227–238.
- Masten, A. S. (2014). Global perspectives on resilience in children and youth. *Child Development*, *85*, 6–20. <http://dx.doi.org/10.1111/cdev.12205>
- Masten, A. S., & Coatsworth, J. (1998). The development of competence in favorable and unfavorable environments: Lessons from research on successful children. *American Psychologist*, *53*, 205–220.
- McCabe, L. A., & Brooks-Gunn, J. (2007). With a little help from my friends? Self-regulation in groups of young children. *Infant Mental Health Journal*, *28*, 584–605. <http://dx.doi.org/10.1002/imhj.20155>
- McClellan, M. M., & Cameron, C. E. (2011). Self-regulation and academic achievement in elementary school children. *New Directions for Child and Adolescent Development*, *133*, 29–44. <http://dx.doi.org/10.1002/cd.302>
- Moilanen, K. L. (2007). The Adolescent Self-Regulatory Inventory: The development and validation of a questionnaire of short-term and long-term self-regulation. *Journal of Youth and Adolescence*, *36*, 835–848. <http://dx.doi.org/10.1007/s10964-006-9107-9>
- Moilanen, K., Shaw, D. S., & Fitzpatrick, A. (2010). Self-regulation in early adolescence: relations with mother-son relationship quality and maternal regulatory support and antagonism. *Journal of Youth and Adolescence*, *39*, 1357–1367. <http://dx.doi.org/10.1007/s10964-009-9485-x>
- Neal, D. J., & Carey, K. B. (2005). A follow-up psychometric analysis of the Self-Regulation Questionnaire. *Psychology of Addictive Behaviors*, *19*, 414–422. <http://dx.doi.org/10.1037/0893-164X.19.4.414>
- Rutter, M. (1985). Resilience in the face of adversity: Protective factors and resistance to psychiatric disorder. *British Journal of Psychiatry*, *147*, 598–611. <http://dx.doi.org/10.1192/bjp.147.6.598>
- Rutter, M. (2012). Resilience as a dynamic concept. *Development and Psychopathology*, *24*, 335–344. <http://dx.doi.org/10.1017/S0954579412000028>
- Sameroff, A. J., & Rosenblum, K. L. (2006). Psychosocial Constraints on the Development of Resilience. *Annals of the New York Academy of Sciences*, *1094*, 116–124. <http://dx.doi.org/10.1196/annals.1376.010>
- Shoda, Y., Mischel, W., & Peake, P. K. (1990). Predicting adolescent cognitive and social competence from preschool delay of gratification: Identifying diagnostic conditions. *Developmental Psychology*, *26*, 978–986. <http://dx.doi.org/10.1037/0012-1649.26.6.978>
- Smokowski, P. R., Reynolds, A. J., & Bezrucko, N. (1999). Resilience and protective factors in adolescence: An autobiographical perspective from disadvantaged youth. *Journal of School Psychology*, *37*, 425–448. [http://dx.doi.org/10.1016/S0022-4405\(99\)00028-X](http://dx.doi.org/10.1016/S0022-4405(99)00028-X)
- Stenseng, F., Belsky, J., Skalicica, V., & Wichstrøm, L. (2014). Social exclusion predicts impaired self-regulation: A 2-year longitudinal panel study including the transition from preschool to school. *Journal of Personality*, <http://dx.doi.org/10.1111/jopy.12096> [Epub ahead of print]

- Stillmand, T. F., & Baumeister, R. F. (2013). **Social rejection reduces intelligent thought and self-regulation.** In N. DeWall (Ed.), *The Oxford Handbook of Social Exclusion*. New York: Oxford University Press.
- Tangney, J. P., Baumeister, R. F., & Boone, A. L. (2004). High self-control predicts good adjustment, less pathology, better grades, and interpersonal success. *Journal of Personality, 72*, 271–322. <http://dx.doi.org/10.1111/j.0022-3506.2004.00263.x>
- Trentacosta, C. J., & Shaw, D. S. (2009). **Emotional self-regulation, peer rejection, and antisocial behavior: Developmental associations from early childhood to early adolescence.** *Journal of Applied Developmental Psychology, 30*, 356–365.
- UNICEF. (2013). *Actions for children and youth resilience. Guide for governments.* Panama: UNICEF.
- Vanderbilt-Adriance, E., & Shaw, D. S. (2008). Protective Factors and the Development of Resilience in the Context of Neighborhood Disadvantage. *Journal of Abnormal Child Psychology, 36*, 887–901. <http://dx.doi.org/10.1007/s10802-008-9220-1>
- Waaktaar, T., Christie, H. J., Borge, A. I., & Turgersen, S. (2004). How can young people's resilience be enhanced? Experiences from a clinical intervention project. *Clinical Child Psychology and Psychiatry, 9*, 167–183. <http://dx.doi.org/10.1177/1359104504041917>
- Zimmerman, B. J. (1990). Self-regulated learning and academic achievement: An overview. *Educational Psychologist, 25*(1), 3–17. http://dx.doi.org/10.1207/s15326985ep2501_2
- Zolkoski, S. M., & Bullock, L. M. (2012). Resilience in children and youth: A review. *Children and Youth Services Review, 34*, 2295–2303. <http://dx.doi.org/10.1016/j.childyouth.2012.08.009>