Article

Adaptation and Validation of a Measure of Students' Adaptive and Maladaptive Ways of Coping With Academic Problems

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Abstract

Little research has, to date, explored students' coping in the academic domain. Yet, children and adolescents frequently refer daily academic difficulties as a common source of stress. The ways children respond to academic demands have the potential to make a difference in their learning and achievement. Therefore, the availability of a measure of academic coping is of critical importance to expand educational research and practice in this area. The current study adapted and validated the Portuguese language version of the Multidimensional Measure of Coping (MMC). Cognitive interviewing, confirmatory factor analysis, and measurement invariance testing using calibration and validation samples provided sound support for the validity of the MMC to measure academic coping among Portuguese elementary and middle school students. Furthermore, the external and discriminant validity of the scale was established based on the relations found between adaptive and maladaptive coping and their differential functionality for academic performance.

Keywords

academic coping, resilience at school, motivation, validation, measurement invariance

Academic Coping

Research on stress and coping has evidenced that besides negative major life events, people have to cope regularly with critical normative stressful events. In fact, in stress and coping research, a long tradition of models focused the effects of major life events (such as death, divorce, relocation) on the development of psychological and physical symptoms. An alternative approach to stress highlights the role of daily living stressors or *daily hassles* (Lazarus & Folkman, 1984), and the notions of *everyday coping* (Wolchik & Sandler, 1997) and *everyday resilience* (Martin, 2013). Daily stressors are more proximal and frequent, taking place in the immediate context of thought, feeling, and action (Lazarus & Folkman, 1984), potentially playing a larger direct role in subsequent maladaptive adjustment than major life events, which are more distal and less frequent.

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When reporting on daily stressors, children and adolescents generally refer four common sources of stress that tend to be the same across age and gender: parents, siblings, school, and friends (e.g., Spirito, Stark, Grace, & Stamoulis, 1991). The present study addresses specifically the ways children cope with daily academic stressors. Research has documented that difficulties in the academic sphere (such as workload, difficulties in learning, or not doing well in tests) seem to have a large impact on children and adolescents' lives (Burnett & Fanshawe, 1997; Spirito et al., 1991). To our knowledge, there are no measures devoted to assessing academic coping in Portuguese-speaking countries.

Students' Academic Coping, Achievement, and Perceived Competence

Distinct ways of coping with academic difficulties may facilitate or hinder students' learning and performance. Coping adaptively supports students' continued participation in learning activities, thus providing opportunities to acquire knowledge. By contrast, avoiding challenging academic material deprives students from optimal learning opportunities.

Research supports that the ways in which children respond to academic demands has the potential to make a difference to their learning and achievement across elementary through high school (Causey & Dubow, 2010; Leung & He, 2010; Skinner, Pitzer, & Steele, 2016; Skinner & Wellborn, 1997; Suldo, Dedrick, Shaunessy-Dedrick, Fefer, & Ferron, 2015; Swanson, Valiente, Lemery-Chalfant, & O'Brien, 2011). Given the importance of productive and unproductive ways of coping with academic stressors to academic functioning and performance, it is important to investigate the factors that allow students to cope constructively (Boekaerts, 1993; Dweck, 2006; Lemos, 2002; Skinner & Pitzer, 2012).

Self-perceptions and self-regulatory skills in the academic domain, such as self-esteem, perceived academic competence, and self-monitoring have been emphasized as personal resources that may play a critical role in shaping how students cope (e.g., Elliot & Dweck, 2005; Skinner, Pitzer, & Steele, 2013). For example, positive self-perceptions (e.g., "I feel I am very good at school work") strengthen students' confidence, serving as a resource for coping. By contrast, perceptions of lack of competence (e.g., "I worry about whether I can do the schoolwork") amplify the significance of the distressing implications regarding a stressful event for one's ability and represent a liability when students are dealing with problems.

Development and Elaboration of the Original Multidimensional Measure of Coping (MMC)

The MMC was developed under a larger model on coping as a process of motivational resilience (Skinner et al., 2013) and its effects on engagement or disaffection, learning, and achievement. Besides negative major life events that were traditionally prevalent in coping research, more recently, researchers also considered the ways people cope with "everyday stress" in different life domains (Wolchik & Sandler, 1997). The MMC was elaborated to capture the repertoire of ways of coping that children and adolescents may use when facing obstacles and setbacks typically present in the academic domain. After an extensive review of the literature on coping, the authors identified several families of coping based on their shared functional properties (Skinner, Edge, Altman, & Sherwood, 2003). Then, they selected the more representative five adaptive (Strategizing, Help Seeking, Comfort Seeking, Self-Encouragement, and Commitment) and six maladaptive (Confusion, Escape, Concealment, Self-Pity, Rumination, Projection) ways of coping used by children and adolescents in the academic domain. The MMC is an English language scale, composed of 11 subscales each comprising five items (Table 1).

Table 1. Definition of the Ways of Coping Provided by the Multidimensional Measure of Coping.

Way of coping	Definition	Item example
Adaptive ways		
Strategizing	Attempts to figure out what to do to solve problems or prevent them in future encounters	"I try to figure out how to do better next time"
Help Seeking	Going to teachers or other adults for instrumental aid in understanding material or in figuring out how to learn more effectively	"I get some help to understand the material better"
Comfort Seeking	Turning to others for emotional reassurance, consolation, or cheer	"I talk about it with someone who will make me feel better"
Self-Encouragement	Attempts to regulate one's flagging emotions by bolstering confidence and optimism	"I tell myself I'll do better next time"
Commitment	Attempts to remind oneself why challenging academic work is personally important and worth the effort	"I think about how this is important for my own goals"
Maladaptive ways		
Confusion	Stress reaction in which thoughts or next steps become unclear or disorganized	"When I run into a problem on an important test, I get all confused"
Escape	Attempts to mentally avoid or remove oneself from difficulties and poor outcomes	"When something bad happens in school, I quit thinking about it"
Concealment	Attempts to prevent others from finding out about the occurrence of negative	"I don't let anybody know about it"
Self-Pity	Feeling sorry for oneself and one's tribulations	"I ask myself, 'Why is this always happening to me?'"
Rumination	Preoccupation with the negative or anxious features of a stressful situation	"When something bad happens at school, I can't get it out of my head"
Projection	Blaming other people for the negative outcome	"I say it was the teacher's fault"

Source. Skinner, Pitzer, and Steele (2013, pp. 805-806).

The validation study of the original MMC (Skinner et al., 2013) used data from 1,020 American students aged 8 to 13 years and confirmed that the sets of items for each way of coping were structurally unidimensional and internally consistent. In addition, the theoretically expected multidimensional structure, for both sets of adaptive and maladaptive ways of coping, was confirmed.

The Current Study

The MMC proved to be a useful tool in the pursuit of important questions such as the assessment of students' coping with academic challenges and setbacks and to advance research on their differential functionality for students' engagement, learning, and performance (Skinner et al., 2013, 2016). However, no psychometrically validated version is available for Portuguese-speaking countries.

The present study assessed the structure and psychometric properties of the MMC in a sample of Portuguese students (M_{age} = 12.22 years). Most of the students (91.3%) were aged 9 to 14 years. In a preliminary study, the equivalence of the MMC items' meaning and comprehension in the Portuguese version was examined, as this could not be assumed a priori due to issues of cultural transferability (Harkness, Villar, & Edwards, 2010; Smith, 2004).

The study examined the factorial validity of the MMC ways of coping using confirmatory factor analysis (CFA) and explored the correlations among the ways of coping. Furthermore, the study investigated the functional relations of ways of coping to academic outcome variables

(academic achievement) and to personal motivation variables (perceived competence). The examination of these relations additionally contributes to establishing discriminant validity of the various ways of coping as well as the external validity of the scale. According to the literature, we expected that student academic achievement and student appraisals of competence would positively correlate with adaptive coping, whereas maladaptive coping would show the opposite pattern of connections.

Method

Procedure

Participants were invited to integrate the study on a voluntary basis. The study was approved by the ethics committee of the Faculty of Psychology and Educational Sciences of the University of Porto, Portugal, and by the Ministry of Education of Portugal. Parents and students were informed about the goals and procedures of the study. All participants returned a signed informed parental consent to take part in the study. Students and parents were given the opportunity to opt out of the study at any point. Throughout data collection and analysis, participants' anonymity and data confidentiality were guaranteed. Face-to-face individual interviews were conducted in the school context by trained interviewers. Students answered the questionnaires in the classroom setting.

Cultural Equivalence Study

To ensure the quality and accuracy of the MMC Portuguese version, the adaptation of the scale was performed through a rigorous cultural and linguistic translation procedure. The questionnaire was first translated, and then back-translated by a native English-speaking researcher. The Portuguese version was validated by experts (a) to obtain information about the degree of construct overlap across language and culture groups (interpretative equivalence; Johnson, 1998) and (b) to evaluate whether the operationalization of the construct makes sense and is legitimate in our educational system, and then pretested with children of the same age range. Cognitive testing was used for empirically studying the way in which children mentally processed and responded to the questionnaire and how social and cultural backgrounds might influence the meaning and relevance of the items for the respondent (Willis, 2005). The cultural equivalence study was conducted in congruence with the main guidelines for translating and adapting tests (International Test Commission, 2017).

Participants. This cultural equivalence study used an independent convenience sample of 30 Portuguese students (Grades 4, 6, and 9) from public and private schools in the north of Portugal.

Measures

    Cognitive interview. The cognitive interview protocol consisted of a set of key questions and a concurrent verbal interview while students answered the MMC instrument, based on verbal probing techniques (Willis, 2005).

    To understand the relevance of academic stressors in children's lives, the first key question asked children to generate their own stressful situations by identifying events faced in their everyday lives that "make them distress or sad." Then, the four stems describing four common academic stressors (see "Measures" section) that were extracted from the MMC instrument were presented to children, and they were asked to rate each on severity, emotional reactivity (anxiety and depressive reactions), and controllability using a 3-point Likert-type scale. Students completed the MMC instrument and concurrently answered an interview (Karabenick et al., 2007;

Willis, 2005) addressing the meaning interpretation of the scale items (e.g., "what do you think this question is asking," "was it easy or hard to answer," "I noticed that you hesitated. Tell me what you were thinking") and the reasons for deciding and selecting the response option ("why do you choose this answer option").

MMC Validation Study

Participants. Six schools (four public and two private) from four different cities in the north of Portugal were invited to integrate the study on the basis that students from different socioeconomic backgrounds attended them. This resulted in a nonprobabilistic, convenience sample.

A number of 583 students filled in the Portuguese version of the MMC instrument. Following data screening, 58 participants were discarded for revealing multivariate outliers (Mahalanobis distance values with $p < .001$). Students were, then, randomly selected from the available data to match the 2016 census data published by the Direção Geral de Estatísticas da Educação e Ciência (DGEEC)/Portuguese Bureau of Educational Statistics, 2017) regarding students' gender (48% female and 52% male) and cycle of education attendance (41% at the fifth and sixth elementary grades, and 59% at middle school). Despite the effort made to match these characteristics, it cannot be assumed that the final sample, composed of 459 students, was representative of Portuguese students in this age range. The mean age of the participants was 12.22 years ($SD = 1.73$ years). Most of the participants were male ($n = 238$, 51.90%), attended the middle grades ($n = 269$, 58.60%), and reported a medium/high socioeconomic status (SES; $n = 232$, 50.54%).

Participants discarded from the overall sample were not different from the ones retained regarding the sociodemographic variables, coping scores, academic achievement, and perceived competence. The final sample was randomly divided into a calibration sample ($N_1 = 229$), to test the factorial validity of the instrument, and a validation sample ($N_2 = 230$) for measurement invariance testing to cross validate the instrument's factorial structure.

Measures. The validation study assessed students' academic coping, perceived competence, and achievement.

Academic coping. Students answered the MMC, a 4-point Likert-type scale, composed by 11 subscales tapping the 11 ways of academic coping. Each subscale consists of five items that follow one of the four stems describing stressful academic events: Stem 1—"When I have difficulty learning something . . . "; Stem 2—"When I have trouble with a subject in school . . . "; Stem 3—"When I run into a problem on an important test . . . "; and Stem 4—"When something bad happens to me in school (like not doing well on a test or not being able to answer an important question)."

Coping scores were computed according to Skinner et al. (2013), considering the sum for each individual way of coping divided by the total coping (sum of each student's coping scores across all 11 ways of coping), and then multiplied by 100, so that scores range from 1 to 100.

Students' self-perception in the academic domain. Students' self-perceptions in the academic domain were assessed using the Self-Perception Profile for Children (Harter, 2012) that seeks to evaluate the students' perceived cognitive competence, as applied to schoolwork, on a scale of 1 to 4.

Academic achievement. Students' school grades in math and language (the only school subjects with final exams in the Portuguese education system within the participants' age range) were averaged as an index of their academic performance, and range from 1 to 5. Math and language grades correlated significantly ($r = .69$, $p < .001$).

SES. SES was assessed using profession and educational attainment of parents on a scale ranging from 1 (*low*) to 4 (*high*).

Data analysis. Data screening (Malone & Lubansky, 2012; Schreiber, Stage, King, Nora, & Barlow, 2006), sample stratification procedures, and sample division procedure were performed using the software IBM SPSS Statistics 24 (IBM, 2016). Using the calibration sample, data were examined in two ways following the statistical procedure described by Skinner et al. (2013). First, different single-factor CFAs were performed on the subscales to determine whether the items for each of the 11 ways of coping were unidimensional. Second, the factorial validity of the two multidimensional structures of adaptive and maladaptive coping were evaluated. The data obtained from the calibration sample were then cross validated with the validation sample through measurement invariance testing, performed using multigroup CFA. Finally, the relations between the coping scores and the students' perceived competence and academic achievement were assessed through Pearson bivariate correlations.

All the CFAs were performed using the software Mplus 7 (Muthén & Muthén, 1998-2012). Model fit was evaluated using the normed chi-square (χ^2/df), the comparative fit index (CFI), the Tucker–Lewis index (TLI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR). To have an adequate model fit, the χ^2/df value should be 3.0 or less (Kline, 2005), CFI and TLI values should be higher than .90 (Hu & Bentler, 1999), the RMSEA value should be .10 or less (MacCallum, Browne, & Sugawara, 1996), and the SRMR should be .08 or less. The chi-square statistics were reported, even though these values were not used as a fit index, given the limitations reported in the literature (Hooper, Coughlan, & Mullen, 2008).

Model modification was performed considering modification indexes (MIs; threshold of 11) coupled with high expected parameter change (EPC). Following Hooper et al. (2008), the modified model was compared with the original model using the Akaike information criterion (AIC).

Measurement invariance of the multidimensional structures of adaptive and maladaptive coping was tested by setting cross-group constraints and by comparing the more restricted models with the less restricted ones (Chen, 2007). Following Vandenberg and Lance (2000), different levels of measurement invariance were tested, respectively, configural, metric, scalar, and strict (factor variance and error term variance) invariance. Invariance was considered when the chi-square difference between models was nonsignificant (Cheung & Rensvold, 2002), and when the change in CFI was equal or less than .01, complemented by a change equal or less than .015 in RMSEA.

Results

Cultural Equivalence Study

Students spontaneously referred 69 daily stressors. Using an inductive approach to thematic content analysis (Braun & Clarke, 2006) the stressors were organized into four categories: school (25 extracts), family (20 extracts), peer relations (20 extracts), and extracurricular activities (four extracts). The school stressors, namely, those referring to evaluation were the most frequent, confirming the relevance of academic stressors in students' life. Two reviewers independently rated 25% randomly selected students' interviews (17 in total). Using Cohen's *kappa* coefficient, a robust measure of *interrater agreement* for qualitative (categorical) items, results showed high interrater reliability, κ = .861, 95% confidence interval (CI) = [0.66, 1.00], $p <$ .001), supporting the validity of the *categories* of *analysis* and coding *system developed*.

The four stress-inducing stems used in the original MMC instrument were also validated by the Portuguese students, who rated them as moderately to highly stressful but quite controllable, eliciting mostly anxiety and less depressive reactions (see Table 2).

Table 2. Stress-Inducting Stems Characterization According to Severity, Anxiety, and Depressive Reactions and Controllability.

	Stem 1		Stem 2		Stem 3		Stem 4	
	Mdn	IQR	*Mdn*	IQR	*Mdn*	IQR	*Mdn*	IQR
Severity	2	2, 2	2	2, 3	3	2, 3	2	2, 3
Anxiety reaction	1	1, 2	2	2, 3	2	2, 3	2	2, 3
Depressive reaction	1	1, 2	2	2, 2	2	2, 2	2	2, 2
Controllability	3	2, 3	2	2, 3	2	2, 3	2	2, 3

Note. Mdn = median; IQR = interquartile range.

Table 3. Fit Indexes, Standard Factor Loading (SFL) Minimum and Maximum, and Composite Reliability (CR) for Single-Factor Models for Each Way of Coping for the Calibration Sample.

Way of coping	χ^2/df	CFI	TLI	RMSEA	SRMR	AIC	SFL min-max	CR
Adaptive ways								
Strategizing	1.87	.989	.978	.062	.024	2,449.18	.64-.83	.84
Help Seeking (Model 1)	4.87	.939	.878	.172	.041	2,489.75	.71-.84	.88
Help Seeking (Model 2)	3.06	.985	.963	.095	.024	2,465.09	.65-.87	.87
Comfort Seeking	1.25	.998	.996	.033	.015	2,605.07	.66-.85	.89
Self-Encouragement	0.82	1	1	0	.023	2,833.69	.28-.76	.65
Commitment	0.56	1	1	0	.013	2,564.50	.49-.80	.84
Maladaptive ways								
Confusion	1.92	.991	.983	.065	.020	2,335.50	.66-.80	.88
Escape	1.55	.989	.979	.049	.026	2,293.21	.40-.75	.77
Concealment (Model 1)	8.22	.931	.861	.178	.039	1,986.87	.42-.53	.86
Concealment (Model 2)	2.92	.985	.963	.091	.025	1,959.44	.66-.86	.88
Self-Pity	2.40	.987	.973	.078	.021	2,066.93	.40-.85	.86
Rumination	3.23	.983	.966	.099	.021	2,317.58	.69-.85	.89
Projection	0.71	1	1	0	.018	1,641.99	.28-.77	.74

Note. CFI = comparative fit index; TLI = Tucker–Lewis index; RMSEA = root mean square error of approximation; SRMR = standardized root mean square residual; AIC = Akaike information criterion.

The cognitive interview feedback revealed that, generally, children grasped the meaning of the items and showed no difficulty in completing the questionnaire. Two items were reworded to prevent misinterpretation. Taken together, findings of this study demonstrate the cultural validity of the MMC stems and items.

MMC Validation Study

Single-factor models for each way of coping for the calibration sample. Different single-factor CFAs were performed with the calibration sample. Overall, single-factor models revealed an adequate fit to the data, with the exception of Help Seeking and Concealment, that revealed χ^2/df values greater than 3 and RMSEA values greater than .10 (Table 3). However, according to Kenny, Kaniskan, and McCoach (2015), in models with small degrees of freedom, as is the case, the RMSEA can falsely indicate poor model fit (even with moderate sample sizes). For each model, the MIs suggested the correlation of the error terms of two items. The subsequent specifications of the models are displayed in Table 3 (Model 2), revealing adequate fit indexes.

Composite reliability was estimated to each way of coping according to the Fornell and Larcker (1981) equation and presented in Table 3. All ways of coping revealed a composite reliability score equal to or higher than .74, except for Help Seeking, which revealed a score of .65.

Factorial validity of the adaptive and maladaptive coping for the calibration sample. The multidimensional structure of adaptive coping (see Figure 1) provided good fit to the data, $\chi^2(264) = 431.99$, $p < .001$, $\chi^2/df = 1.64$, CFI = .94, TLI = .93, RMSEA = .05, 90% CI = [0.04, 0.06], SRMR = .07. All standardized factor loadings were statistically significant at $p < .001$, and one (Item 15) was lower than .40. Factor variance was also statistically significant at $p < .001$, the highest pertaining to Comfort Seeking (44%) and the lowest to Self-Encouragement (14%). Correlations among factors were statistically significant. The highest correlation was found between Strategizing and Commitment, $r = .78$, $p < .001$, and the smallest between Help Seeking and Self-Encouragement, $r = .17$, $p = .05$.

The multidimensional structure of maladaptive coping (see Figure 2) also provided good fit to the data, $\chi^2(389) = 597.86$, $p < .001$, $\chi^2/df = 1.54$, CFI = .94, TLI = .93, RMSEA = .05, 90% CI = [0.04, 0.06], SRMR = .07. All standardized factor loadings were statistically significant at $p < .001$, and one (Item 44) was lower than .40. Factor variance was statistically significant at $p < .01$, the highest referring to Rumination (39%) and the lowest to Projection (4%). Correlations between factors were statistically significant, the highest between Confusion and Rumination, $r = .66$, $p < .001$, and the smallest between Escape and Self-Pity, $r = .23$, $p = .003$.

Correlations of adaptive coping with maladaptive ways of coping, and of maladaptive coping with adaptive ways of coping were negative, with r values ranging from $-.30$ to $-.74$, $p < .001$.

Multigroup CFA (calibration vs. validation samples) regarding adaptive coping and maladaptive coping. Multigroup CFA was performed with the measurement models of the multidimensional structures of adaptive and maladaptive coping to test equivalence of factorial validity across samples (calibration vs. validation). Results of the different levels of measurement invariance tested for models are displayed in Table 4. Configural, metric, scalar, and strict (in both factor and error terms) invariance were supported for both samples regarding adaptive and maladaptive coping. Concerning the maladaptive coping, all the criteria for invariance were met for the second level of the strict invariance (error term), except the one regarding the chi-square difference. Nevertheless, because several limitations are pointed out in the literature to the chi-square statistics as a measure of goodness-of-fit (e.g., Hooper et al., 2008), and the results of the multigroup comparison reveal invariance through the criteria of CFI and RMSEA differences, we believe that this level of invariance can be stated.

As all levels of measurement invariance were found for both models, the multidimensional structures of adaptive, $\chi^2(264) = 569.43$, $p < .001$, $\chi^2/df = 2.16$, CFI = .95, TLI = .94, RMSEA = .05, 90% CI = [0.05, 0.06], SRMR = .06, and maladaptive coping, $\chi^2(389) = 792.96$, $p < .001$, $\chi^2/df = 2.04$, CFI = .94, TLI = .93, RMSEA = .05, 90% CI = [0.04, 0.06], SRMR = .06, were tested with data from the overall sample ($N = 459$), revealing good fit to the data.

Descriptive statistics and correlations between the coping scores and the students' perceived competence and academic achievement. Descriptive statistics and correlations between coping scores and perceived competence and academic achievement are displayed in Table 5. The students' perceived competence and academic achievement are positively correlated with Strategizing, Help Seeking, and Commitment (average $rs_{PC} = .39$, average $rs_{AA} = .32$). Perceived competence is negatively correlated with Confusion, Concealment, Self-Pity, Rumination, and Projection (average $rs_{PC} = -.30$), and academic achievement is negatively correlated with Confusion,
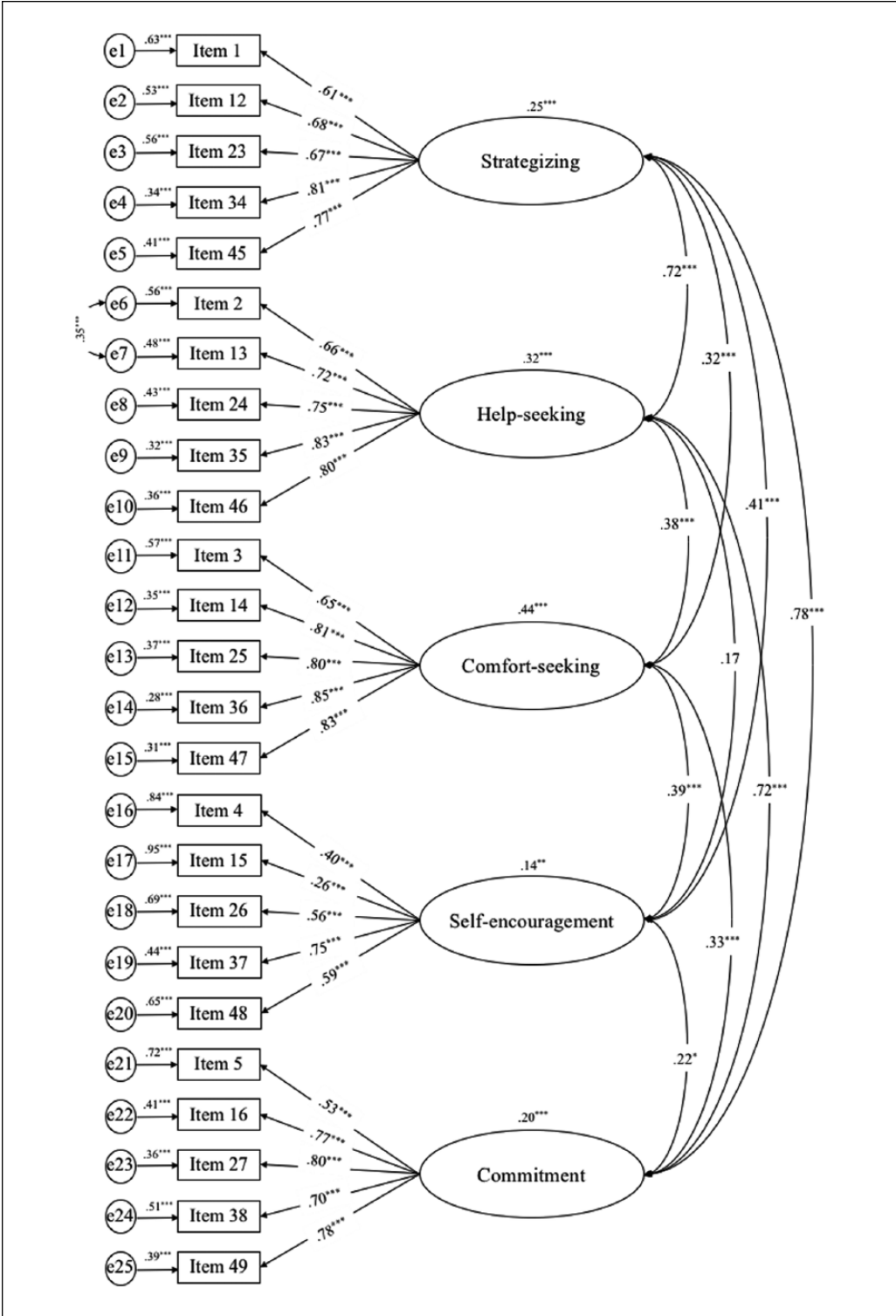
Figure 1. Confirmatory factor analysis of adaptive coping for the calibration sample.
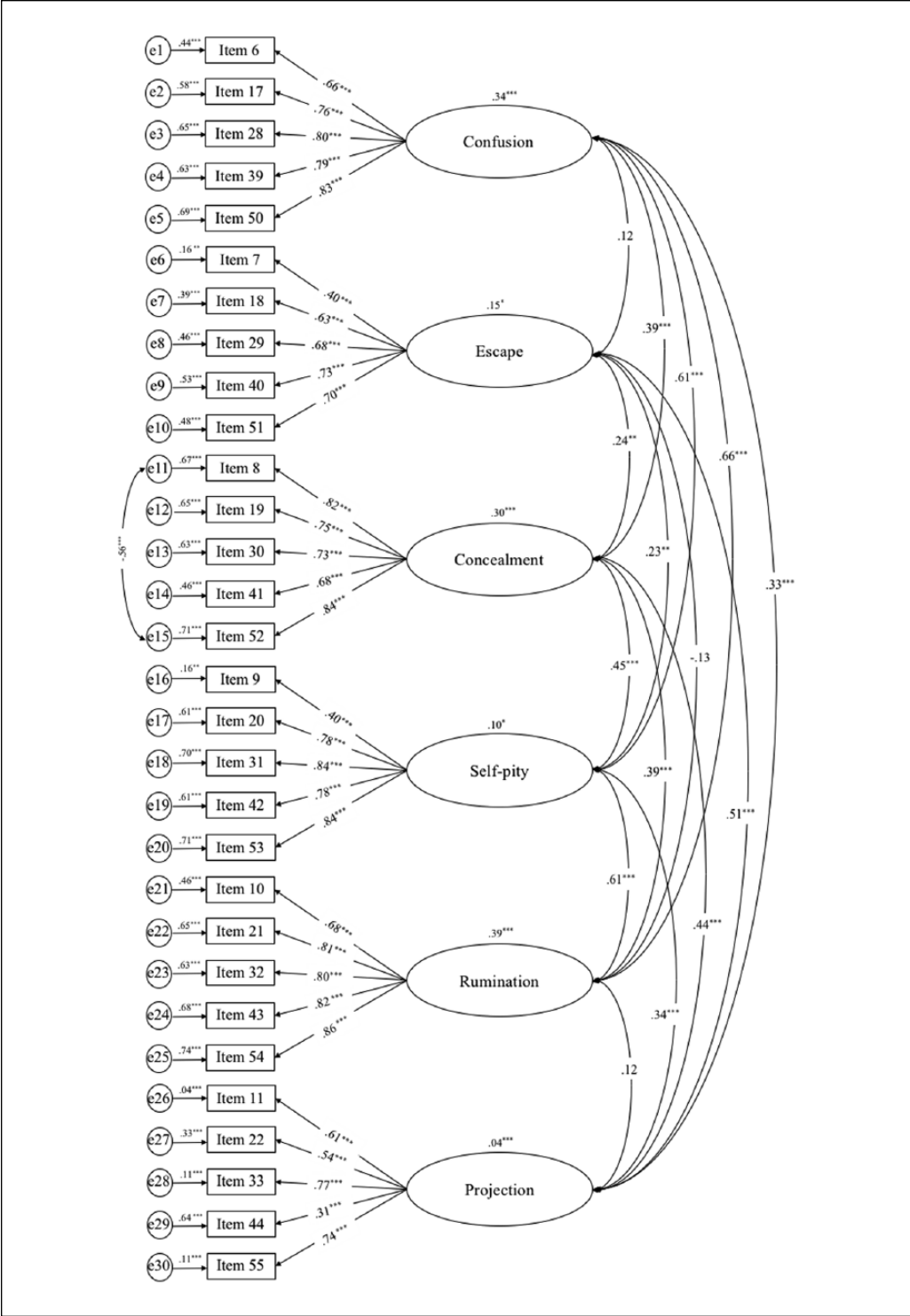*p < .05. **p < .01. ***p < .001.

Figure 2. Confirmatory factor analysis of maladaptive coping for the calibration sample.
**$p < .01$. ***$p < .001$.

Table 4. Global Fit Indexes for the Multigroup Confirmatory Factor Analyses (Calibration vs. Validation Samples) Regarding Adaptive Coping and Maladaptive Coping.

Measurement invariance	χ^2 (df)	CFI	RMSEA	Model comparison	$\Delta\chi^2$	Δdf	p	ΔCFI	ΔRMSEA
Adaptive coping									
Model 1: Configural	880.84 (528)	.938	.054						
Model 2: Metric	902.59 (548)	.938	.053	2 vs. 1	21.75	20	.354	0	−.001
Model 3: Scalar	926.35 (573)	.938	.052	3 vs. 2	23.77	25	.533	0	−.001
Model 4.1: Strict (factor variance)	929.39 (578)	.938	.051	4.1 vs. 3	3.04	5	.694	0	−.001
Model 4.2: Strict (error term variance)	955.97 (603)	.938	.051	4.2 vs. 4.1	26.58	25	.377	0	0
Maladaptive coping									
Model 1: Configural	1,263.84 (778)	.930	.052						
Model 2: Metric	1,280.68 (802)	.931	.051	2 vs. 1	16.84	24	.855	.001	−.001
Model 3: Scalar	1,303.10 (832)	.932	.050	3 vs. 2	22.42	30	.838	.001	−.001
Model 4.1: Strict (factor variance)	1,311.41 (838)	.932	.050	4.1 vs. 3	8.31	6	.216	0	0
Model 4.2: Strict (error term variance)	1,360.24 (868)	.929	.050	4.2 vs. 4.1	48.83	30	.016	−.003	0

Note. CFI = comparative fit index; RMSEA = root mean square error of approximation.

Table 5. Descriptive Statistics (*M* and Standard Deviation) and Correlations Between Coping Scores and Students' Perceived Competence and Academic Achievement.

		r	
	M (SD)	Perceived competence	Academic achievement
Perceived competence	2.74 (0.61)	—	
Academic achievement	3.78 (0.81)	.52***	—
Adaptive ways			
Strategizing	12.26 (2.47)	.44***	.44***
Help Seeking	12.18 (2.86)	.39***	.32***
Comfort Seeking	10.49 (2.82)	.12	.10
Self-Encouragement	10.68 (2.18)	.12	−.07
Commitment	12.00 (2.58)	.33***	.20***
Total adaptive	57.60 (7.34)	.49***	.38***
Maladaptive ways			
Confusion	7.50 (2.57)	−.42***	−.26***
Escape	7.24 (2.51)	−.10	−.11*
Concealment	6.58 (2.24)	−.22***	−.23***
Self-Pity	6.74 (2.10)	−.48***	−.37***
Rumination	8.27 (2.58)	−.12*	.01
Projection	6.08 (1.64)	−.26***	−.30***
Total maladaptive	42.39 (7.34)	−.49***	−.38***

* $p < .05$. *** $p < .001$.

Escape, Concealment, Self-Pity, and Projection (average $rs_{AA} = -.25$). Total adaptive coping is positively correlated with perceived academic competence and achievement, and total maladaptive coping presents the opposite pattern of association.

Discussion

This study adapted a Portuguese language version of the MMC (useful for Portuguese-speaking countries, e.g., Portugal, Brazil, Angola, and Mozambique). First, a qualitative study established the cultural validity of the MMC stems and items. Similar to the U.S. students, Portuguese

students identified school stressors as relevant (particularly those referring to evaluation), rating them as frequent and moderately to highly stressful. These findings seem to reflect the cultural value that Portuguese society assigns to academic performance and marks. In fact, in the Portuguese educational system (Organisation for Economic Co-operation and Development [OECD], 2014), student assessment includes progress tests at intermediate stages, at the end of cycles, and final national examinations. Moreover, students' marks are used to decide about students' retention or promotion.

Next, a quantitative study examined the factorial validity of the MMC dimensions. Results showed five adaptive (Strategizing, Help Seeking, Comfort Seeking, Self-Encouragement, and Commitment) and six maladaptive (Confusion, Escape, Concealment, Self-Pity, Rumination, and Projection) ways of coping with academic stressors, supporting the underlying structure of the original MMC (Skinner et al., 2013).

In general, items defining each way of coping were unidimensional and reliable. Even for the two subscales (Help Seeking and Concealment) with less satisfactory fit, fit indexes were adequate after error correlation, and reliability was high for the Concealment subscale and above cutoff (Bagozzi & Yi, 1988) for Help Seeking.

The multidimensional structure of the two coping models revealed good fit to the data, validating the distinct adaptive and maladaptive ways of coping. Inspection of the factor loadings and factor variance further confirmed the relevance of the items for defining the various ways of coping and the contribution of each way of coping for a full understanding of students' academic coping. Further studies should investigate in other Portuguese-speaking samples the consistency of the relatively lower loadings of Items 15 and 44 found in this study, to support a possible specific, cultural, interpretation of these two items.

Supporting the MMC model, the correlational analysis showed positive intercorrelations within adaptive and within maladaptive coping as would be expected and negative correlations between adaptive and maladaptive coping.

As a whole, based on validation and calibration samples, findings on the structural and psychometric properties of the Portuguese version of the multidimensional measure of academic coping suggest that it is a sound, valid, and reliable instrument to capture the various ways of coping in the academic domain used by elementary and middle school students.

A complementary goal of this study was to test the theoretically expected relations of ways of coping with students' academic achievement and perceived competence. Academic achievement showed significant positive relations with total adaptive coping, and significant negative correlations with total maladaptive coping, suggesting that students' adaptive ways of coping seem to provide a favorable context for improved learning. One mechanism that has been proposed to mediate the positive effects of adaptive coping is reengagement, which may support students' continued investment or return to academic activities in the face of obstacles (Skinner et al., 2016). By contrast, avoiding challenging academic material may prevent students from successful learning.

Moreover, there was a significant positive correlation of perceived competence in the academic domain with total adaptive coping. Based on this finding, it is argued that perceived competence may be a critical resource to students' coping in school settings, acting as a facilitator or as a hindrance to adaptive coping in the face of challenging tasks.

In addition, findings showed that specific ways of coping differed in the strength of their connections to external variables (perceived competence and academic achievement). For example, Strategizing, Help Seeking, and Commitment were more strongly related to the two external indicators of academic adaptation than Comfort Seeking and Self-Encouragement, perhaps because the former represent more instrumental, action-oriented strategies. Similarly, within maladaptive ways of coping, Self-Pity, Confusion, and Projection seem to be particularly debilitating strategies, whereas Rumination, the more frequently used maladaptive strategy, showed a rather neutral

role. These associations offer further support to the multidimensionality of academic coping by suggesting distinctive functional roles for each way of coping. Moreover, they provide important insights into the links of ways of coping to adaptive and maladaptive processes.

The results showing significant associations of ways of coping with students' perceived competence and academic achievement also contribute to establishing the external validity and discriminant validity of the scale.

In addition, some limitations should be considered and addressed in future research. Although this study used a cross-sectional sample of elementary and middle school students, subsequent research might examine the strategies more employed at different ages and the longitudinal development of coping. Furthermore, additional insights about the functional connections of the various ways of coping with antecedents and consequences would provide complementary support to the structural distinction found in the current study. The links of ways of coping to students' variables and academic outcomes may provide important information about possible intervention strategies that can be taught to students. Further research is also needed to cross validate the measure, using a representative sample of Portuguese students, and to assess its equivalence in different Portuguese-speaking countries.

The limited availability of valid and reliable *instruments* specifically designed for assessing students' coping with daily academic obstacles and setbacks, the relevance of academic coping for school success, and the very positive results supported by robust testing and crossed validation found in this study offer an important contribution facilitating investigation and practice in educational contexts.

Declaration of Conflicting Interests

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References

Bagozzi, R., & Yi, Y. (1988). On the evaluation of structure equation models. *Journal of the Academy of Marketing Science*, *16*, 74-94. doi:10.1007/BF02723327

Boekaerts, M. (1993). Being concerned with well-being and with learning. *Educational Psychologist*, *28*, 149-167. doi:10.1207/s15326985ep2802_4

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*, 77-101. doi:10.1191/1478088706qp063oa

Burnett, P. C., & Fanshawe, J. P. (1997). School-related stressors in adolescents. *Journal of Youth and Adolescence*, *26*, 415-428. doi:10.1023/A:1024529321194

Causey, D. L., & Dubow, E. F. (2010). Development of a self-report coping measure for elementary school children. *Journal of Clinical Child Psychology*, *21*, 47-59. doi:10.1207/s15374424jccp2101_8

Chen, F. F. (2007). Sensitivity of goodness of fit indexes to lack of measurement invariance. *Structural Equation Modeling: A Multidisciplinary Journal*, *14*, 464-504. doi:10.1080/10705510701301834

Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. Structural Equation Modeling: *A Multidisciplinary Journal*, *9*, 233-255. doi:10.1207/S15328007SEM0902_5

Direção Geral de Estatísticas da Educação e Ciência. (2017). *Estatísticas da Educação* [Portuguese National Services of Educational and Science Statistics] *2015-2016*. Retrieved from http://www.dgeec.mec.pt/np4/home

Dweck, C. S. (2006). *Mindset: The new psychology of success*. New York, NY: Random House.

Elliot, A. J., & Dweck, C. S. (Eds.). (2005). *Handbook of competence and motivation*. New York, NY: Guilford Press.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equations models with unobservable variables and measurement error. *Journal of Marketing*, *18*, 39-50. doi:10.2307/3151312

Harkness, J. A., Villar, A., & Edwards, B. (2010). Translation, adaptation, and design. In J. A. Harkness, et al. (Eds.), *Survey methods in multinational, multicultural and multiregional contexts* (pp. 117-140). Hoboken, NJ: John Wiley.

Harter, S. (2012). *Self-Perception Profile for Children: Manual and questionnaire*. Denver, CO: Department of Psychology, University of Denver.

Hooper, D., Coughlan, J., & Mullen, M. (2008). Structural equation modelling: Guidelines for determining model fit. *Electronic Journal of Business Research Methods*, *6*, 53-60.

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, *6*, 1-55. doi:10.1080/10705519909540118.

IBM. (2016). *IBM SPSS statistics for Windows (Version 24.0)*. Armonk, NY: Author.

International Test Commission. (2017). *The ITC guidelines for translating and adapting tests* (2nd ed.). Available from www.InTestCom.org

Johnson, T. (1998). Approaches to equivalence in cross-cultural and cross-national survey research. In J. A. Harkness (Ed.), *Zuma-Nachrichten Spezial Volume 3. Cross-Cultural Survey Equivalence* (pp. 1-40). Mannheim, Germany: Zuma.

Karabenick, S. A., Woolley, M. E., Friedel, J. M., Ammon, B. V., Blazevski, J., Bonney, C. R., . . . Kelly, K. L. (2007). Cognitive processing of self-report items in educational research: Do they think what we mean? *Educational Psychologist*, *42*, 139-151. doi:10.1080/00461520701416231

Kenny, D. A., Kaniskan, B., & McCoach, D. B. (2015). The performance of RMSEA in models with small degrees of freedom. *Sociological Methods & Research*, *44*, 486-507. doi:10.1177/0049124114543236

Kline, R. B. (2005). *Principles and practice of structural equation modeling* (2nd ed.). New York, NY: Guilford Press.

Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York, NY: Springer.

Lemos, M. S. (2002). Social and emotional processes in the classroom setting: A goal approach. *Anxiety, Stress, and Coping*, *15*, 383-400. doi:10.1080/1061580021000056537

Leung, G. S. M., & He, X. (2010). Resourcefulness: A protective factor buffer against the academic stress of school-aged children. *Educational Psychology*, *30*, 395-410. doi:10.1080/01443411003682574

MacCallum, R. C., Browne, M. W., & Sugawara, H. M. (1996). Power analysis and determination of sample size for covariance structure modeling. *Psychological Methods*, *1*, 130-149. doi:10.1037/1082-989X.1.2.130

Malone, P. S., & Lubansky, J. B. (2012). Preparing data for structural equation modeling: Doing your homework. In R. H. Hoyle (Ed.), *Handbook of structural equation modeling* (pp. 263-276). New York, NY: Guilford Press.

Martin, A. J. (2013). Academic buoyancy and academic resilience: Exploring "everyday" and "classic" resilience in the face of academic adversity. *School Psychology International*, *34*, 488-500. doi:10.1177/0143034312472759

Muthén, L. K., & Muthén, B. O. (1998-2012). *Mplus user's guide* (7th ed.). Los Angeles, CA: Author.

Organisation for Economic Co-operation and Development. (2014). *Education policy outlook Portugal*. Retrieved from http://www.oecd.org/education/highlightsportugal.htm

Schreiber, J. B., Stage, F. K., King, J., Nora, A., & Barlow, E. A. (2006). Reporting structural equation modeling and confirmatory factor analysis results: A review. *The Journal of Educational Research*, *99*, 323-337. doi:10.3200/JOER.99.6.323-338

Skinner, E. A., Edge, K., Altman, J., & Sherwood, H. (2003). Searching for the structure of coping: A review and critique of category systems for classifying ways of coping. *Psychological Bulletin*, *129*, 216-269. doi:10.1037/0033-2909.129.2.216

Skinner, E. A., & Pitzer, J. (2012). Developmental dynamics of engagement, coping, and everyday resilience. In S. L. Christenson, A. L. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 21-44). New York, NY: Springer Science. doi:10.1007/978-1-4614-2018-7_2

Skinner, E. A., Pitzer, J. R., & Steele, J. (2013). Coping as part of motivational resilience in school: A multidimensional measure of families, allocations, and profiles of academic coping. *Journal of Educational and Psychological Measurement*, *73*, 803-835. doi:10.1177/0013164413485241

Skinner, E. A., Pitzer, J. R., & Steele, J. (2016). Can student engagement serve as a motivational resource for academic coping, persistence, and learning during late elementary and early middle school? *Developmental Psychology*, *52*, 2099-2117. doi:10.1037/dev0000232

Skinner, E. A., & Wellborn, J. G. (1997). Children's coping in the academic domain. In S. A. Wolchik & I. N. Sandler (Eds.), *Handbook of children's coping with common stressors: Linking theory and intervention* (pp. 387-422). New York, NY: Plenum Press.

Smith, P. B. (2004). Acquiescent response bias as an aspect of cultural communication style. *Journal of Cross-Cultural Psychology*, *35*, 50-61. doi:10.1177/0022022103260380

Spirito, A., Stark, L. J., Grace, N., & Stamoulis, D. (1991). Common problems and coping strategies reported in childhood and early adolescence. *Journal of Youth and Adolescence*, *20*, 531-544. doi:10.1007/BF01540636

Suldo, S. M., Dedrick, R. F., Shaunessy-Dedrick, E., Fefer, S. A., & Ferron, J. (2015). Development and initial validation of the coping with academic demands scale: How students in accelerated high school curricula cope with school-related stressors. *Journal of Psychoeducational Assessment*, *33*, 357-374. doi:10.1177/0734282914552165

Swanson, J., Valiente, C., Lemery-Chalfant, K., & O'Brien, T. C. (2011). Predicting early adolescents' academic achievement, social competence, and physical health from parenting, ego resilience, and engagement coping. *Journal of Early Adolescence*, *31*, 548-576. doi:10.1177/0272431610366249

Vandenberg, R. J., & Lance, C. E. (2000). A review and synthesis of the measurement invariance literature: Suggestions, practices, recommendations, for organizational research. *Organizational Research Methods*, *3*, 4-70. doi.org/10.1177/109442810031002

Willis, G. B. (2005). *Cognitive interviewing: A tool for improving questionnaire design*. Thousand Oaks, CA: SAGE.

Wolchik, S. A., & Sandler, I. N. (Eds.). (1997). *Handbook of children's coping: Linking theory and intervention*. New York, NY: Plenum.