

Coping processes and personality factors as predictors of *resilience* in adolescent students: Validation of a structural model

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Abstract

To know on which factors educators should focus to favor resilience development in adolescence, this study tests two predictive models of the hypothetical relations between two kinds of predictors -coping styles and resiliency personality factors- and *resilience* as criterion. A total of 1078 Spanish students (12-18 years old) from four different Spanish schools participated in the study. To determine to what extent the variables in the model predict *resilience*, four path analyses with latent variables (PALV) were realized: two for testing each model, and the remaining two for cross-validation. Results showed that perceived improvement in resilience depends mainly on coping strategies and styles in the expected direction, and that resiliency (personality) factors mediate the effect of coping styles, but their own effect is very low. Moreover, the effect of “sense of relatedness” was contrary towards expectations coming from previous studies. A hypothetical explanation of this result is suggested.

Keywords: resilience, resiliency, coping, protective personality factors, person-situation interaction.

Resumen

Para averiguar sobre qué factores actuar para facilitar el desarrollo de la resiliencia en la adolescencia, este estudio contrasta la validez de dos modelos sobre las relaciones hipotéticas entre dos grupos de predictores, estilos de afrontamiento y factores de personalidad asociados a la resiliencia, y ésta como criterio. Participan en el estudio 1078 alumnos (12 a 18 años) de cuatro colegios. Se realizan cuatro análisis de rutas con variables latentes (PALV), dos para testar cada modelo y dos de validación cruzada. Los resultados muestran que la mejora de la resiliencia depende de los estilos de afrontamiento, y que los factores de personalidad asociados a la resiliencia actúan como mediadores del efecto de aquellos, pero también que su efecto directo es muy pequeño. Además, el efecto del “sentido de relación” es contrario al esperado a partir de los resultados de otros estudios. Se presenta una explicación hipotética de este resultado.

Palabras clave: resiliencia, afrontamiento, personalidad, interacción persona-situación.

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Introduction

Everyone, at some point in their lives, have to deal with adverse situations. However, it is a fact that not everyone faces them in the same way. There are people who break down in the face of difficulties, get depressed, feel anxiety, or stagnate in the problem, whereas others are not only able to cope with it, but even emerge strengthened from these situations. These people are said to be “resilient” (Uriarte, 2005). There are different points of view on the nature of *resilience*. However, this study is in line with that of Luthar (2006) and Smith et al. (2008), according to whom *resilience* is a concept that refers to positive adaptation or recovery despite experiences of significant adversity. It implies, then, two elements: adverse situations and positive adaptation (not getting overwhelmed, not getting depressed). Leipold and Greve (2009) pointed also that *resilience* is a phenomenon -the “outcome” of acting in an adaptive way in front of adverse situations-, and therefore, it becomes necessary to explain the processes underlying it. This necessity is especially important because *resilience* varies from a person to another, and people can be aware of their degree of *resilience* (Alonso-Tapia, Nieto, & Ruiz, 2013; Villasana, Alonso-Tapia, & Ruiz, 2016). This awareness, if assessed, can also predict different positive and negative behavioral events related to how people –children, adolescents or adults- will react when confronted with adversity in the future, and to whether they will develop some kind of pathology as a consequence of being exposed to adversities of different kind and degree (Masten & Narayan, 2012; Reivich & Shatte, 2002).

Thus, what does an adolescent do that allows him/her to say that he/she does not become discouraged when facing an adverse situation? What makes him/her different from the adolescent who says he/she gets discouraged? If personal factors underlying *resilience* could be identified and measured, such knowledge would help professionals to develop effective interventional strategies aimed at helping adolescents exposed to social adversity and trauma to react in a resilient way (Riggs & MacDougall, 2014).

Masten (2007) considered that resilience might depend on dynamic psychological processes such as the use of *coping strategies* (CS), and/or on *personality factors* configuring what she called *resiliency*. In relation to these two possibilities, on one side, some authors (Prince-Embury, 2007; Prince-Embury & Courville, 2008; Prince-Embury & Saklofske, 2013, 2014) have shown the important role that the personality factors configuring *resiliency* play as potential determinants of *resilience* in adolescence. On the other side, Villasana et al. (2016) have shown that *resilience* in adolescents depends in great degree on *coping styles* and *strategies*. However, it is possible that the coping styles and the personality factors underlying *resilience* are related. If this were the case, it would be important to know the relative weight of each of these variables on *resilience*, as depending on the answer to this question, the implications for assessment and intervention would be different. However, what is the theoretical basis from which this objective can be approached? What coping processes and personality factors might underlie resilience and, therefore, should be assessed to test our suppositions?

Coping processes

The degree of *resilience* that people show could be explained by the use of different CS (Leipold & Greve, 2009). According to most researches, coping is an essential

factor for understanding the effects of stress on children and adolescents. According to Lazarus and Folkman (1984), coping refers to “those constantly changing cognitive and behavioral efforts that are developed in order to manage the external and/or internal specific demands that are appraised as exceeding the individual's resources” (p. 141). When dealing with such demands, it is important that the answer –the strategies used- is functionally adaptive to the specific context or situation (Folkman & Moskowitz, 2004; Skinner, Edge, Altman, & Sherwood, 2003). According to this idea, the study of coping processes should not separate the person who copes from his or her situational context (Lazarus, 2006): both types of variables should be taken into account in order to appraise coping efficacy and, consequently, its effects on resilience. In any case, which coping strategies and styles should be considered as potential variables affecting *resilience*?

Coping strategies are virtually infinite (Skinner et al. 2003). However, neither all strategies are equally effective, nor their assessment has the same capacity for predicting well-being or negative affect. A recent meta-analysis of coping measures (Kato, 2013) showed that some of the strategies included in the reviewed scales have good predictive power for positive and negative outcomes. Regarding the positive outcomes, well-being correlates with active coping and planning (that is, trying to solve the problem; $r = .25$), positive reinterpretation and growth (positive thinking; $r = .32$), seeking social support (help-seeking; $r = .24$) and acceptance (avoiding to think about the problem when it is unsolvable; $r = .18$). On the other hand, negative affect is related to thinking repetitively about the problem (rumination; $r = .38$), behavioral disengagement (isolation; $r = .40$) and focusing on venting emotions (emotional expression; $r = .28$). Lastly, depression, anxiety and general distress correlate with self-blame ($r = .43$, $r = .32$ and $r = .43$, respectively). On the base of these data, a recent study by Villasana et al. (2016) developed a questionnaire, the “Person-Situation Coping Questionnaire for Adolescents (PSCQA)”, that includes the above mentioned coping strategies and that, at the same time, takes into account the role of situations in the activation of coping strategies.

In the PSCQA, though coping strategies can be organized in different ways (Carver & Connor-Smith, 2010; Schwarzer & Schwarzer, 1996), the authors decided to follow the well-known distinction, put forward by Lazarus and Folkman (1984), between problem-focused coping (PFC) and emotion-focused coping (EFC). PFC aims to handle or alter the problem that is the source of discomfort. This kind of coping includes some of the strategies above mentioned –positive thinking, look for problem solution, help-seeking-, whereas EFC includes the strategies self-blaming, self-isolation and emotional expression. Other two strategies, rumination and thinking avoidance, load in the two coping styles.

The aforementioned study demonstrates that PFC relates positively to *resilience*, whereas the opposite happens with emotion-focused coping (EFC), as well as with the role played by the situation in such relationship. Another study on the relationships between coping processes and resilience, based on the “person x situation” interaction but realized with adult subjects by Alonso-Tapia, Rodríguez-Rey, Garrido-Hernansaiz, Ruiz and Nieto (2016) showed similar relationships for PFC and EFC. Therefore, given the evidence supporting the validity of the coping model on which the PSCQA is based, such model will be used in the present study to test the relative weight of coping and the personality factors on *resilience*.

Personality factors

Concerning personal factors that can configure *resiliency*, Olsson, Bond, Burns, Vella-Brodrick and Sawyer (2003) reviewed and summarized the most frequently mentioned ones: tolerance for negative affect, self-efficacy, self-esteem, foundational sense of self, internal locus of control, sense of humor, hopefulness, strategies to deal with stress, enduring set of values among others. A search for an instrument that allowed assessing all of them did not produce any result. Fortunately, Prince-Embury (2007) and the set of works recently published related to her own studies (Prince-Embury & Saklofske, 2013, 2014) represent a good line of research on *resiliency* developed with children and adolescents. According to it, *resiliency* translates the combined effect of several personal traits that operate not only under adverse circumstances, but also in normal ones (Prince-Embury, 2013). Prince-Embury organized resiliency variables in a *resiliency* model (Prince-Embury & Saklofske, 2014) which have been tested with Spanish adolescents by Villasana, Alonso-Tapia and Ruiz (in press). This model, that will be used as a starting point to test the relative weight of coping and personality factors on *resilience*, includes three general factors: sense of mastery (SM), sense of relatedness (SR) and emotional reactivity (ER) (Prince-Embury, 2007). SM refers to personal internal resources to face problems, and manifests in three specific factors: optimism, self-efficacy and adaptability. SR refers to perceived support from the environment and adequate social skills, and manifests by the indicators trust, support, comfort and tolerance. Finally, ER implies a lack of adequate emotional self-regulation abilities, and manifests in the specific factors sensitivity, impairment, and slow recovery. Results of previous studies suggest that SM would correlate positively with resilience and that ER would correlate negatively. As for SR, results are not convergent (Villasana et al., in press; Prince-Embury, 2014), and so no clear expectancies of its effects on resilience will be established.

Coping, resiliency and resilience: hypothetical model

The more or less continuous use of coping strategies and styles may or may not crystallize in the development of the personality factors (resiliency) that contribute to resilience. If coping and personality factors were independent, then each one would contribute separately to resilience, as the model shown in Figure 1 suggests. On the other side, if the more or less continuous use of coping strategies and styles contributed to the development of resiliency factors, these would act as mediators of the effect of coping on resilience, as shown in Figure 2. In this case, according to the model, it is expected, first, that PFC and EFC relate negatively. Second, that PFC would probably affect resilience in a positive way, though this effect would be mediated through its positive relation with SM and a negative relation with ER. Third, that EFC would probably affect resilience in a negative way, though this effect would be also indirect, through its positive relation with ER. Finally, given that results of previous studies on the effect of SR on resilience are not convergent, no hypothesis will be anticipated on such relationship. Instead, the study will try to answer the question of what of the following alternatives is supported by data. On one side, it may be that SR effects on resilience are positive, especially considering that this variable correlates positively with SM (Prince-Embury, 2014). However, a work with adolescent population (Villasana et al, in press) found that SR was unrelated to resilience, a result that could be attributed to

the fact that people high in sense of relatedness may be high or not in SM. Due to this fact, SR would contribute positively to resilience in the first case and negatively in the second one. Besides, the relation could be null or even negative depending on participants' characteristics.

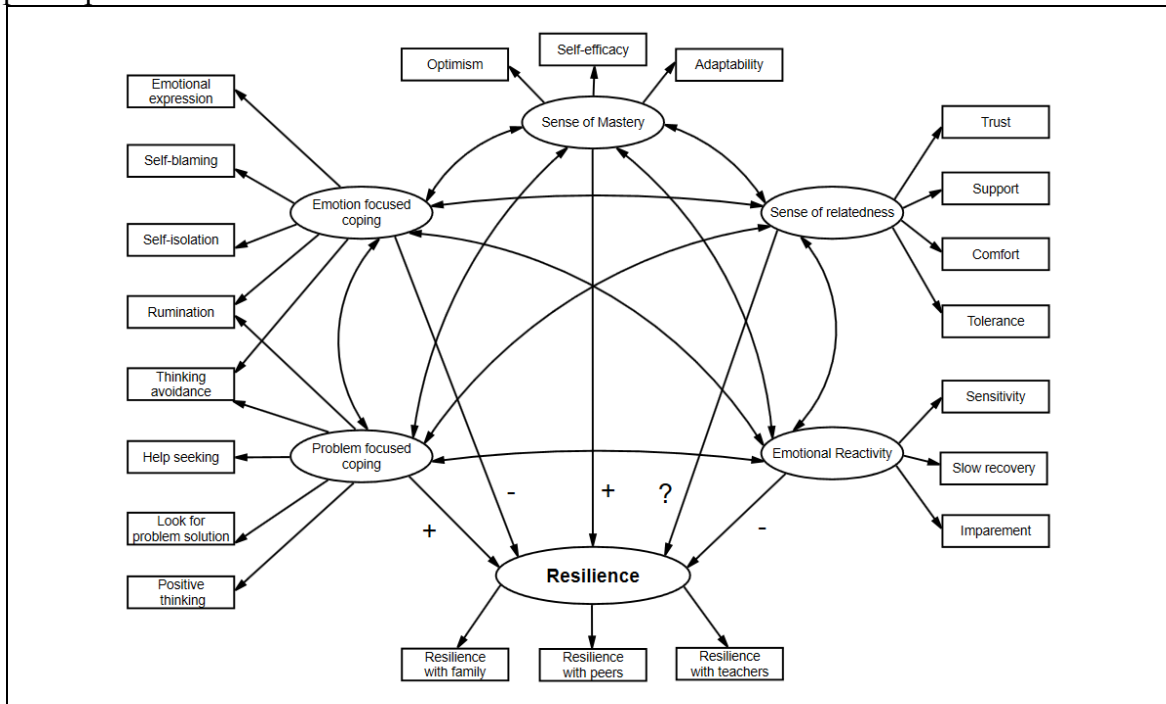


Figure 1. Dependence of *resilience* on coping styles and personality factors (Model 1)

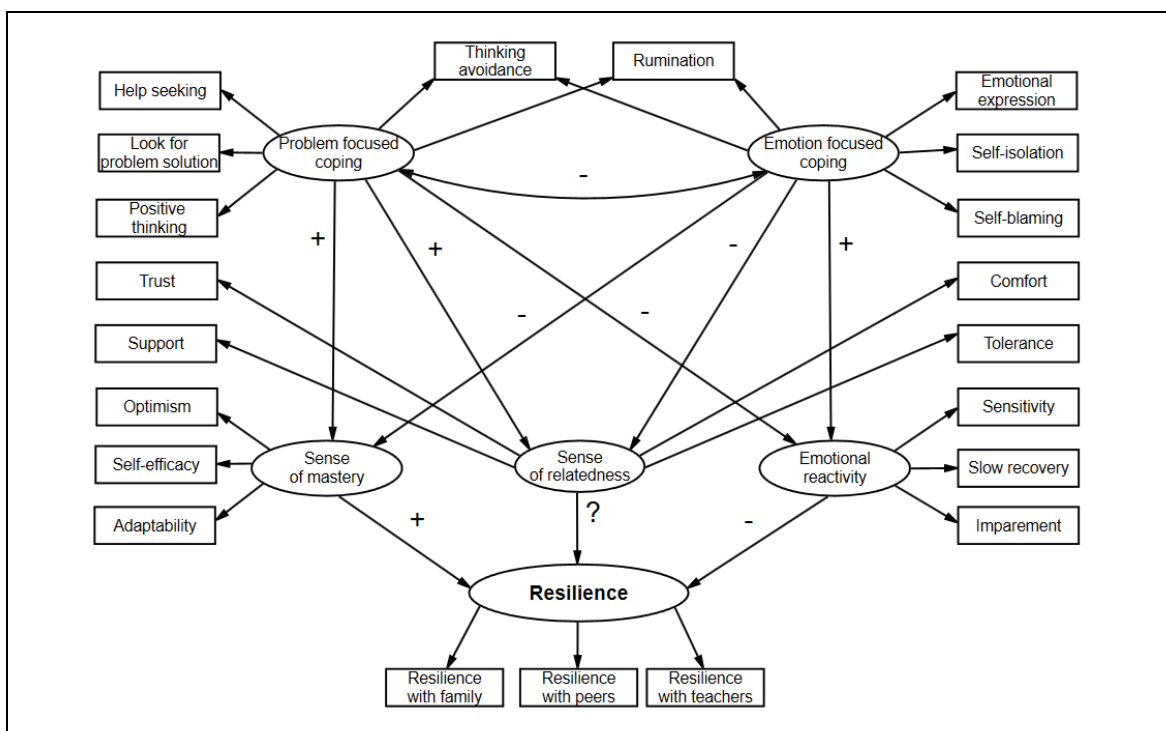


Figure 2. Dependence of *resilience* on coping styles through personality factors (Model 2).

Summarizing, the main objective of the study is to test which of the two models of the relationship between coping, resiliency (personality) factors and resilience is best supported by data, or whether these support both models.

Method

Participants

A total of 1,078 Spanish students, 585 boys and 493 girls, from three public schools and one charter school took part in the study. Two of the schools were settled in rural areas, whereas the other two pertained to urban areas. Ages were comprised between 12 and 18 years ($M = 14.10$; $SD = 1.69$). By educational stages, 412 belonged to the first cycle of secondary school (ages 13-14), 452 to the second cycle (ages 15- 16) and 214 were high school students (ages 17-18). The sample was divided into two subsamples, one for the initial analysis, and the other one for cross-validation.

Materials

Subjective Resilience Questionnaire (SRQ) (Alonso-Tapia et al., 2013)

This questionnaire has a general scale (*SR*) and three specific ones that assess the perceived degree of resilience when facing adverse events that students confront in their relationships with teachers (*RT*), with peers (*RP*) and with family-parents- (*RF*). It is composed of 30 items, ten for each group of people that may cause stress. Half of the items for each group are positive and half, negative. Item examples are: “My teachers sometimes tell me that what I do or say is not correct, without trying to understand what is that I find difficult, but that doesn’t decrease my effort to learn”, “Sometimes my friends criticize me for not doing something well instead of trying to help me, but that doesn’t decrease my effort to improve myself”, “If my parents ignore me when I need them to help me with a problem, I get discouraged and stop striving to solve it” (negative item). The reliability index ω (McDonald, 1999) of the general scale is: *SR*: $\omega = .97$, and those of the specific scales are: *RT*: $\omega = .98$; *RP*: $\omega = .93$; *RF*: $\omega = .93$.

Person-Situation Coping Questionnaire for Adolescents (PSCQA) (Villasana et al., 2016)

This questionnaire allows assessing to what extent the *CS* used by adolescents generalize to different situations or vary depending on the kind of adverse situation. It is composed of 40 items, which make reference to eight different kinds of *CS*: *Rumination* ($\omega_{\text{rum}} = .90$); *thinking avoidance* ($\omega_{\text{thav}} = .88$); *self-isolation* ($\omega_{\text{siso}} = .91$); *help seeking* ($\omega_{\text{hseek}} = .91$); *look for problem solution* ($\omega_{\text{ps}} = .90$); *emotional expression* ($\omega_{\text{emexp}} = .90$); *self-blaming* ($\omega_{\text{sblem}} = .89$); *positive thinking* ($\omega_{\text{posth}} = .90$); and to one of five possible adverse situations (“problems with peers due to my own fault”, “problems with parents”, “problems with teachers”, “problems with peers because of their fault”, and “problems of study and achievement”). The coping strategies are grouped in two *CS*: *problem focused coping (PFC)*, ($\omega_{\text{PFC}} = .83$), and *emotion focused coping (PFC)*, ($\omega_{\text{EFC}} = .97$).

Resiliency Scales for Children & Adolescents (RSCA) (Prince-Embury, 2007)

These scales were translated following the usual process for granting translation adequacy –first English to Spanish and then Spanish to English- to be used with the Spanish population. The questionnaire has 64 items grouped in ten specific scales integrated into three general ones: (1) *Sense of mastery scale (SM)* that includes the optimism, self-efficacy and adaptability sub-scales; (2) *Sense of relatedness scale (SR)*, that includes the trust, support, comfort and tolerance scales; and (3) *Emotional reactivity scale (ER)* that includes the sensitivity, recovery and impairment scales. Items are answered in a 5 point Likert scale, from 0 (never) to four (almost always). The reliability of the scales in the American sample was greater than .80 or .90, depending on indexes and ages, and in this study, they ranged between .76 and .80 in the case of the nine first order factors, and between .86 and .91 in the case of the three general scales.

Procedure

Ethics approval for this study was granted by the Research Ethics Committee at the Universidad Autónoma of Madrid, Spain. Students filled out the questionnaires distributed into the groups and courses to which they belonged, in 50-minute sessions. One of the researchers, present during the completion of the questionnaires, provided the different groups with precise instructions. The questionnaires included a code to identify that they belonged to a same student, but anonymity was preserved. Once the data were collected, the following analyses were carried out to determine the factorial and predictive validity of the Person-Situation Coping Questionnaire for Adolescents (PSCQA).

Data analyses

As stated above, in order to determine to what extent the *coping styles* and *resiliency scales* predict *resilience*, the scores derived from all items included in each original scale included in the questionnaires, without eliminating anyone of them, were used as observed variables. Then, first, correlations between the factor scores in the main independent and dependent variables were calculated to see whether each variable related to resilience before deducting the effect of its relation to other variables.

Second, two models were suggested for validation: Model 1, which analyses the direct dependence of *resilience* on *CS* and *personality factors* (Figure 1), and Model 2, which analyses whether *CS* effect on *resilience* is mediated through *personality factors* (Figure 2).

Third, in order to test each model, two path analysis with latent variables (PALV) were conducted, one for each model (PALV-1, PALV-3), using the first subsample. Data were analyzed using AMOS-23 statistical software. Estimates were obtained using the maximum likelihood method, after examining whether data were adequate for the analysis (Mardia's coefficient: $21.82 < 70$) (Rodríguez & Ruiz, 2008). In order to assess model-fit, absolute fit indexes (χ^2 , χ^2/df , GFI, SRMR), relative fit index (IFI) and non-centrality fit indexes (CFI, RMSEA) were used, as well as criteria for acceptance or rejection based on the degree of adjustment described by Hair, Black, Babin and Anderson (2010). The AIC index for comparing models was also used.

Fourth, in order to cross-validate the results of the previous analyses, two multi-

group analysis (PALV-2, PALV-4) were carried out, one for each model, using the two subsamples and employing the same criteria that were used in the initial analysis for estimating parameters and for assessing model fit.

Results

Correlation analysis

Table 1 shows correlations between the main predictors and *resilience*, as well as between predictors themselves. Correlations between predictors were in the expected direction, except for the correlation between the two *CS*, positive and highly significant. As for correlations with *resilience*, all of them were highly significant and in the expected direction, though not very high. However, the correlation between two variables may be due to their mutual dependence on a third one. So, in order to understand the nature of the relations, the following analyses were realized.

Table 1

Correlations between *coping styles*, *resiliency factors* and *resilience*

	PFC ¹	EFC	SM	SR	ER
RES	.35***	-.25***	.53***	.27***	-.40***
PFC		.28***	.78***	.67***	-.13
EFC			-.32***	-.21**	.40***
SM				.75***	-.36***
SR					-.27***

¹ RES: Resilience; PFC: Problem focused coping; EFC: Emotional focused coping; SM: Sens of mastery; SR: Sense of relatedness; ER: Emotional reactivity

Dependence of resilience on coping styles “and” personality factors (Model 1)

Figure 3 shows the standardized estimates of the confirmatory model, as well as the squared multiple correlations, and Table 2 shows the fit statistics of the proposed model (PALV-1). Concerning the degree of fit, chi-square statistic was significant, probably due to the sample size, but the ratio χ^2/df , and the GFI, RMSEA and SRMR indexes were well inside the limits that allowed the model to be accepted. However, IFI = .88 and CFI = .88 fell slightly short of the standard limits of significance. Therefore, a *cross-validation analysis* (PALV-2) was carried out in order to test the validity of the model. The fit statistics presented in Table 2 are best than those of PALV-1 as, with the exception of chi-square statistic, all the remaining indexes were well inside the limits allowing the model to be accepted. Besides, the model comparison statistics (Table 3) showed that fit is not reduced even when restrictions are imposed for equality between groups in measurement weights, structural weights, structural covariances, structural residuals, and measurement residuals.

Considering the questions that the PALV was to answer, results in Figure 3 show that: (1) The model is useful for explaining almost half of variance in *resilience* (47%); (2) The effect from *coping styles* and *resilience* is highly significant, positive in the case of *PFC*, and negative in the case of *EFC*, as expected. (3) The effect from *resiliency*

factors on *resilience*, once discarded their relation with *CS*, did not reach a significant level. Besides, though it not was a question that the PALV was trying to answer, *PFC* and *EFC* relation is non-significant.

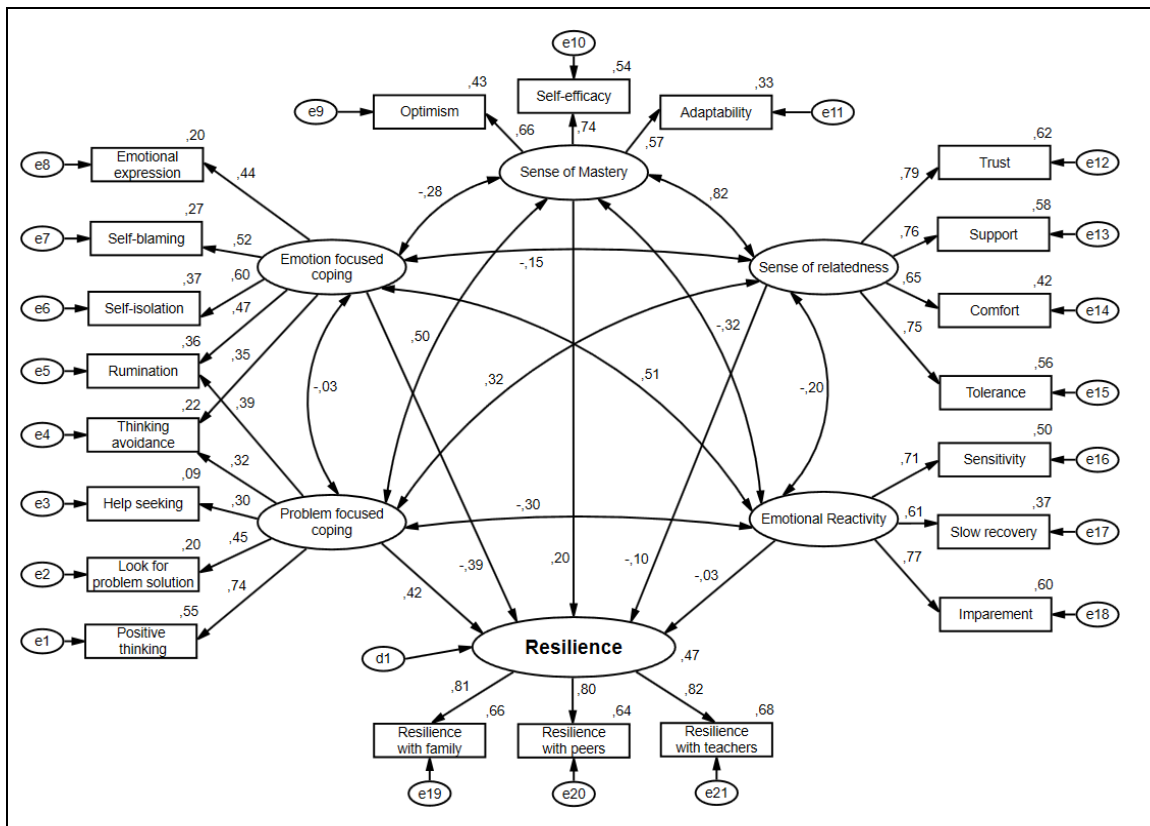


Figure 3. Dependence of *resilience* on *coping styles* and *personality factors*. Results corresponding to Model 1.

Table 2

Goodness of fit statistics for path analyses with latent variables and for cross validation analysis corresponding to Model 1 (PALV 1 & 2) and to Model 2 (PALV 3 & 4)

	χ^2	<i>df</i>	<i>p</i>	χ^2/df	GFI	IFI	CFI	RMSEA	SRMR	AIC
PALV-1, M1 <i>N</i> = 542	596.45	172	<.001	3.46	.90	.88	.88	.068	.066	714.45
PALV-2, CVA (<i>N</i> = 542/541)	1131.48	403	<.001	2.80	.91	.90	.90	.044	.069	1249.48
PALV-3, M2 <i>N</i> = 542	736.82	178	<.001	4.13	.88	.84	.84	.076	.077	842.82
PALV-4, CVA (<i>N</i> = 542/541)	1333.40	388	<.001	3.43	.89	.87	.87	.049	.081	1507.15

Note. PALV = Path Analysis with Latent Variables. PALV-1 = Baseline Model-1; PALV-2 = Cross-validation analysis Model-1; PALV-3 = Baseline Model-2; PALV-4 = Cross-validation analysis Model-2.

Table 3

PALV2. Cross validation of the model using multi-group analyses with two samples. Chi-square differences for model comparison against the unconstrained multi-sample model

Model	df	χ^2	p
Measurement weights	17	19,968	.27
Structural weights	22	24,254	.33
Structural covariances	37	43,017	.23
Structural residuals	38	45,827	.18
Measurement residuals	59	76,055	.07

Dependence of resilience on coping styles “through” personality factors

Figure 4 shows the standardized estimates of the confirmatory model, as well as the squared multiple correlations. All prediction weights, even those very low, were significant at 1%.

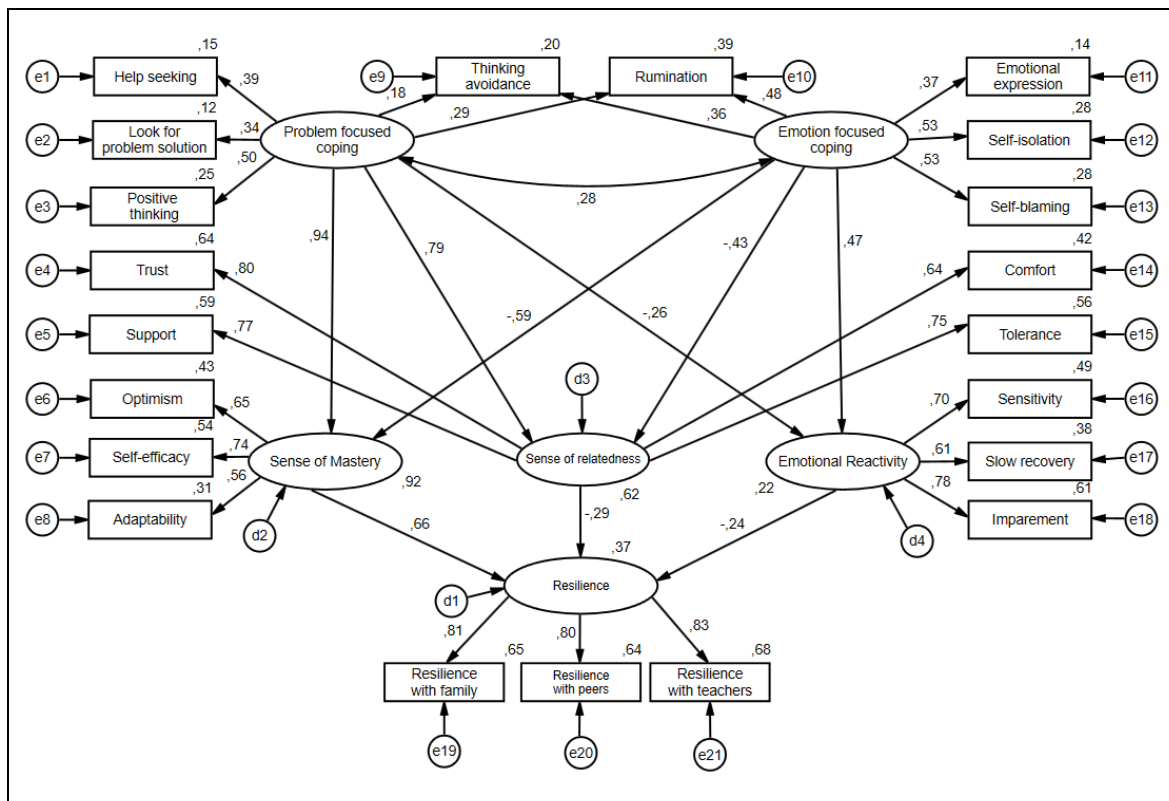


Figure 4. Dependence of Resilience on Coping styles through personality factors. Results of solution corresponding to Model 2 (PALV-3).

Table 2 shows the fit statistics of the proposed model (PALV-3). Chi-square statistic was significant, probably due to the sample size. From the remaining indexes, GFI = .88, IFI = .84 and CFI = .84, fell slightly short of the standard limits of significance. Therefore, a *cross-validation analysis* (PALV-4) was carried out in order to test the validity of the model. In this case, fit was slightly better, as shows in Table 2. Besides, the model comparison statistics (Table 4) showed that fit is not reduced even when restrictions are imposed for equality between groups in measurement weights, structural weights, structural covariances and structural residuals. These results suggests that the model is well estimated and should not be rejected.

Table 4

PALV4. Cross validation of the model using multi-group analyses with two samples. Chi-square differences for model comparison against the unconstrained multi-sample model

Model	<i>df</i>	χ^2	<i>P</i>
Measurement weights	17	13.600	.69
Structural weights	26	24.760	.53
Structural covariances	29	33.529	.26
Structural residuals	32	38.251	.20
Measurement residuals	53	72.256	.04

The analysis of direct and indirect effects (Table 5) shows that, as expected, *CS* effect on *resilience* is indirect (direct effects were deleted from the model after an initial analysis because they were null). Moreover, once deducted the indirect effect of *CS* that *SM*, *SR* and *ER* are conveying from the direct effect of these personality factors on *resilience*, the direct effect of these variables is very small.

Table 5

PALV-4. Direct and indirect effects of the predictors on resilience

Predictors	Effects	Criteria			Resilience
		Sense of Mastery	Sense of Relatedness	Emotional Reactivity	
Problem focused coping	<i>Direct effect</i>	.94	.79	-.26	*
	<i>Indirect effect</i>				.46
Emotion focused coping	<i>Direct effect</i>	-.59	-.43	.47	*
	<i>Indirect effect</i>				-.38
Sense of Mastery	<i>Direct effect</i>				.66
Sense of Relatedness	<i>Direct effect</i>				-.29
Emotional Reactivity	<i>Direct effect</i>				-.24

Comparison of Models 1 and 2

Models 1 and 2 are well estimated. However, the comparison of fit indexes shows that fit of Model 2 is slightly worse than that of Model 1. This conclusion is also supported by the comparison between AIC indexes for PALV-1 and PALV-3, and for PALV-2 and PALV-4 (Table 1). In all cases, the AIC index is better for Model 1 than for Model 2. This result means that CS clearly affect *resilience*, whereas *resiliency* factors' effect is hardly significant. The significant correlations initially found (Table 1) might be due to the potential mediating role that *SM*, *SR* and *ER* play between CS and *resilience*, a result that deserves more evidence, especially from a developmental point of view.

Discussion

The goal of this study was to validate a predictive model of the hypothetical relations between coping, resiliency and resilience, by analyzing the relative fit and the predictive validity of two predictive models. In relation to this goal, the results give support to the following conclusions.

First, in adolescence, resilience, as the capacity of bouncing back after adverse experiences, seems to depend mainly on coping styles and strategies, as results corresponding to both tested models suggest. In line with the results found by Villasana et al. (2016), the greater the degree in which adolescents' coping is problem-solving focused and the lower in which is emotion focused, the greater their *resilience* is and vice versa. However, the positive and significant correlation found between both coping styles suggests that adolescents could not be very consistent in adopting strategies corresponding to one style or the other. Given this result, the less adaptive style might interfere with the more adaptive style, a fact that can influence resilience.

Second, though correlations between resiliency (personality) factors and resilience are significant, in line with Prince-Embury ideas discussed in the introduction, results of testing Model 1 showed that once deducted the variance in common with CS, the effect of personality factors is not significant. This result does not invalidate correlations, but shows that the effect of personality factors on resilience is probably due to the fact that both share a great deal of common variance with CS.

Third, results corresponding to the analysis of Model 2 suggest that the effect of CS on *resilience* is mediated through the personality factors included in the model. Besides, these results provide additional evidence supporting conclusion two, as once deducted CS indirect effects on resilience from resiliency factors' total effect, the direct effect of these factors is almost irrelevant.

The results supporting the above conclusions could be explained as follows. First, adolescents combine in a rather high degree the use of strategies defining the two CS. When this happens, the less adaptive style may interfere with the more adaptive style, as illustrated by the following case. Let us suppose that an adolescent usually adopts a problem-focused CS. In one case, for example, if he/she experiences stress when envisioning an exam, it could happen that he/she starts ruminating the possibility of failing –one of the coping strategies related to the problem focused coping style, but also to the emotion-centered coping style-, and that this rumination produces anxiety until it becomes an unbearable experience. Then, in order to reduce it, he/she might take

a premature decision based on a lack of emotional regulation, for example, not to take the exam. In another case, however, if the stress is due to having quarreled with a friend, he/she may look for a solution to the problem –another strategy related to the problem-focused coping style- and decide to call his friend to make it up with him/her. Once the decision had been taken, the upset -emotion- can disappear. Depending on the greater or lower regularity with which adolescents use the different CS, resilience development can vary.

In any case, CS and not resiliency (personality) factors are the variables that mainly contribute to subjective resilience, an effect that may be mediated by personality factors. The analysis of Model 2 shows that PFC's positive effect on resilience is conveyed mainly through its positive relation with SM and, in lesser degree, through its negative relation with ER.

A result that deserves special attention is the fact that PFC's direct effect on SR is positive, while the direct effect of SR on *resilience* is negative. From a mathematical point of view, this result implies that the greater the PFC, the greater the SR and the lower the resilience. This implication is neither coherent with the fact that the indirect effect from PFC on resilience is positive nor with the implication of the psychological meaning of PFC for resilience.

A hypothetical explanation of the result just mentioned –a hypothesis that should be tested- could be the following. SR could be high for two reasons. On one side, SR implies good relationships with other people based on trust, comfort, tolerance and support. Adolescents with high PFC tend to be optimistic, to have high self-efficacy and to be highly adaptable, characteristics that do not obstruct but rather favor the development of SR and *resilience*. These adolescents may ask for help, but only after trying to solve problems in adverse situations by themselves. Therefore, they strengthen the PFC strategies that contribute positively to *resilience*. On the other side, the development of SR may be due to a supporting environment that protects adolescents from adversity, a support that, at the same time, makes them highly dependent on other people. This dependence would obstruct the use of adequate CS favoring *resilience* when protection or help from others is lacking or impossible, and adolescents have to confront adverse situations only with their own resources. The two reasons that can favor SR would explain the meaning of the path $PFC \rightarrow SR \rightarrow Resilience$: once deducted the positive effect of PFC on SR, the effect of scoring high in this variable can only be due to the second reason: a supporting environment that, instead of favouring PFC, favors being dependent on others for confronting adversities and so, obstruct the development of *resilience*. If this hypothetical explanation received support beyond this paper, it would clarify the role that supportive environments may play on developing *resilience*, an important need according to Masten's and Narayan's review (2012).

Our results have important educational implications in order to promote the development of *resilience*. Taking into account the path $PFC \rightarrow SM \rightarrow Resilience$, adolescents should be taught to use PFC strategies –to look for a solution for the stressing problem, to think in a positive way about problem implications, to ask for help if necessary, or to avoid thinking on the problem if it has not any solution-. Besides, considering the path $PFC \rightarrow ER \rightarrow Resilience$, adolescents should also be taught how to self-regulate their emotional reactivity in a positive way. This regulation would imply to use strategies such as to suppress negative thoughts, to focus on present-moment experiences bringing fully attention to them in a non-judgmental way, to focus on future instead of regretting past events, to avoid comparing oneself with other people, to focus

on what mistakes can teach, etc. Finally, taking into account the explanation given to the path $PFC \rightarrow SR \rightarrow Resilience$, adolescents should be taught to confront adversities by themselves so that they can develop their personal coping resources, and only if personal confrontation fails, to ask for help. A supporting environment should make adolescent autonomous, not dependent. This last implication is a very important one. A supporting environment may favor well-being, but not necessarily resilience development. People show their *resilience* mainly when they have to cope alone with adversity. So, unless educational interventions focus their efforts on helping students to know how to cope by themselves with adversity, adolescents do not be able to become resilient when they have to confront adversity without other's help.

The present study has also some limitations that raise new research questions. First, the relationships that have been analyzed between CS, resiliency and resilience are based in correlations, and so they not demonstrate the existence of causal relations: only support the idea that data are coherent with causal suppositions. A different kind of study is necessary to test causality. Second, the fact that the explanation given to the PFC-SR-resilience is hypothetical makes necessary to test it.

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