

ARTÍCULO DE INVESTIGACIÓN

CONSTRUCTION, VALIDITY AND RELIABILITY OF A  
GLOBAL SCALE OF PERCEIVED STRESSFUL EVENTS FOR  
ADOLESCENTS

CONSTRUCCIÓN, VALIDACIÓN Y CONFIABILIDAD DE UNA ESCALA GLOBAL DE  
ESTRESORES PERCIBIDOS PARA ADOLESCENTES

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Abstract

Adolescence is a vulnerable developmental stage, in which the adolescents' life experiences can be an important source of stress influencing their well-being and mental health, however, it depends on their subjective appraisal. The Perceived Stressors Global Scale for Adolescents was developed a valid and reliable measure to identify major and minor potentially stressful events, in multiple domains, as well as, the level of stress perceived, in adolescents. An instrumental study was conducted participating 991 adolescents aged 13 to 18 years old, attending public schools from five states of Mexico. A factor analysis by principal component (PC) with promax rotation method was performed, which revealed 53 Likert items distributed in six factors: Critical events; Daily hassles; Social exhibition; Family concerns; Academic stressors; and Social pressure. Confirmatory factor analysis (CFA) was conducted using maximum likelihood (ML) method corroborating the initial solution of six factors. The model's goodness-of-fit measures are acceptable, as well as, the internal consistency coefficients. Although data indicate that the scale could be useful for identifying domains and types of stressors, as well as, the intensity of adolescent's perceived stress, it is recommended to test this factorial model in other samples.

**Keywords:** Adolescents; perceived stress; validity; reliability; confirmatory

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## Resumen

La adolescencia es una etapa del desarrollo vulnerable en la que las experiencias de vida de los adolescentes pueden ser una importante fuente de estrés que influye en su bienestar emocional y salud mental. La Escala Global de Estrés Percibidos para Adolescentes, fue desarrollado con el objetivo de contar con una medida válida y confiable que identifique sucesos mayores y menores potencialmente estresantes en diversos dominios, así como el nivel de estrés percibido, en adolescentes. Se llevó a cabo un estudio instrumental y los participantes fueron 991 adolescentes de 13 a 18 años de escuelas públicas de cinco estados de México. Se realizó un análisis factorial por componentes principales (CP) con rotación promax que arrojó 53 ítems distribuidos en seis factores: Eventos críticos; Contrariedades diarias; Exposición social; Preocupaciones familiares; Estrés académicos; y Presión social. Un análisis factorial confirmatorio (AFC) con el método de máxima verosimilitud (ML) corroboró una solución de seis factores. Los indicadores de bondad del ajuste del modelo son aceptables, así como los coeficientes de consistencia interna. La escala puede ser útil para identificar dominios y tipos de estresores, e intensidad del estrés percibida por los adolescentes, aunque se recomienda probar este modelo en otras muestras.

**Palabras clave:** Adolescentes; estrés percibido; validez; confiabilidad; confirmatorio

## Resumo

A adolescência é um estágio de desenvolvimento vulnerável, no qual as experiências de vida dos adolescentes podem ser uma importante fonte de estresse que influencia seu bem-estar emocional e saúde mental. A Escala Global de Estressores Percebidos para Adolescentes foi desenvolvida com o objetivo de ter uma medida válida e confiável que identifique eventos potencialmente maiores e menores em vários domínios, bem como o nível de estresse percebido em adolescentes. Foi realizado um estudo instrumental e os participantes foram 991 adolescentes de 13 a 18 anos de escolas públicas de cinco estados do México. Foi realizada uma análise fatorial de componente principal (PC) com rotação do promax, que resultou em 53 itens distribuídos em seis fatores: Eventos críticos; Contratempos diários; Exposição social; Preocupações familiares; Estressores acadêmicos; e pressão social. Uma análise fatorial confirmatória (AFC) com o método da máxima verossimilhança (ML) corroborou uma solução de seis fatores. Os indicadores de qualidade de ajuste do modelo são aceitáveis, assim como os coeficientes de consistência interna. A escala pode ser útil para identificar domínios e tipos de estressores e a intensidade do estresse percebida pelos adolescentes, embora seja recomendável testar esse modelo em outras amostras.

**Palavras-chave:** Adolescentes; estresse percebido; validade; confiabilidade; confirmativo

## Introduction

From an ecologic-transactional perspective, adolescents' development and adaptation depend on interaction of diverse factors across multiple systems, including adolescents themselves, family, school, neighborhood and other systems involving macrostructural factors (Cicchetti 2013). Adolescence represents a stage of growth, opportunities and resources, however, to some adolescents can be a process accompanied by stress impacting their well-being, physical and emotional (Romero, Silva, Villasmil, Bermúdez, & Madueño, 2017).

According to general theories on stress, the latter may be conceptualized as an external stimulus that alters an individual's homeostasis, but also as a response of the individual to such stimulus, generally of a non-adaptive character, which leads to the identification of an "objective" stress and a "subjective" stress, which involves the perception (Yan, Li, & Sui, 2014). Stress is an important issue form the developmental psychopathology during since is related to psychological and physiological problems during adolescence (Xu et al., 2019).

Coddington (1972) was one of the first to make a list to assess the most common stressors in children and

adolescents, aimed at identifying objective stress. On the basis of the transactional model of stress (Lazarus, 1993) adolescent stress models (e.g. Grant et al., 2014; Seiffge-Krenke, Aunola, & Nurmi, 2009) take into consideration both objective and subjective stress. The environmental events could be stressors and objective threat to adolescent development (Grant et al., 2014), however, features such as temperament and personality (Hewitt, Caelian, Chen, & Flett, 2014; Yan et al., 2014); for example, when the adolescent perception of control situation and self-control are low the stress responses arise (Galla & Wood, 2015).

At contextual level, parental conflicts and family economic hardship (Santiago, Torres, Brewer, Fuller, & Lennon, 2016), problems with parents (Persike & Seiffge-Krenke, 2016), damaging child-rearing practices (García-Linares, De la Torre, de la Villa, Cerezo, & Casanova, 2014), or family functioning issues (Sheidow, Henry, Tolan, & Strachan, 2014) are the most frequent stressors for adolescents, associated with psychopathology (Santiago et al., 2017).

On the other hand, the situation characteristics, the type and frequency of the event, or the level of perception of stress over the situation, are issues that influence the adolescent psychological adjustment. Major or critical life events (e.g. a parent's death or having an accident), and minor or daily life events (e.g. failing an exam, losing a class competition) may also potentially cause high stress levels, however, they are less frequently studied (Compas, Davis, Forsythe, & Wagner, 1987; Hewitt et al., 2014; Morales, 2017). There is evidence that daily stressors may predict both internalized and externalized problems (Sheidow et al., 2014). Conflicts with parents and peer, and social relationships, are the most commonly reported in different cultures (Encina & Avila, 2015; Rowe, Zimmer-Gembeck, & Hood, 2016) and may be the best predictors of antisocial behavior (Cicchetti, 2013), whereas those related to friends may predict depression (Persike & Seiffge-Krenke, 2016). Family problems economic pressures are considered as daily stressors frequently associated with adaptation problems as depression, somatic complaints, and aggressive behavior (Santiago et al., 2016; Williams, Lund, Liang, Mousseau, & Spencer, 2018). In the school context, everyday activities like submitting homework or open presentations are considered

as academic stressors associated with low performance (García-Ros, Pérez-González, & Fuentes, 2015; Serrano & Vaillo, 2016; Sun, Dunne, Hou, & Xu, 2012), poor psychological adjustment (Escobar, Blanca, Fernández, & Trianes, 2011), depression and anxiety symptoms (Anniko, Boersma, & Tillfors, 2019; Jaureguizar, Bernaras, Soroa, Sarasa, & Garaigordobil, 2016), as well as, increase of cortisol (Xu et al., 2019). Social relations, in general, are another source of stress (Serrano & Vaillo, 2016) and have been considered the two primary sources of perceived stress by adolescents related to different kinds of internalized and externalized symptoms (Williams et al., 2018; Xie, Li, Yi, & Deng, 2014).

In view of negative impact of stress on adolescents' mental health and the cultural influences, many instruments have been developed in different countries. Some of them are check list and were developed from an objective perspective of stress, for example, the Coddington's Life Event Scales (CLES: Coddington, 1972) which has been adapted in some countries as Spain (Villalonga, Valderas, Palacio, Herdman, Rajmil, & Alonso, 2008). The Adolescent Perceived Events Scale (APES: Compas, et al., 1987) is other check list, which include positive or negative adolescent's perception regarding events. The Problem Questionnaire (PQ) is a Likert scale with six factors, developed in German adolescents, frequently used in European population (Seiffge-Krenke, et al., 2009). Perceived Stress Scale, (PSS-10), developed in 1983 by Cohen, Kamarck and Mermelstein, is a brief instrument composed of two dimensions, and is still used in diverse contexts and was adapted in Mexican adolescents (González & Landero, 2007). Taking into account cultural differences, Adolescent Stress Questionnaire (ASQ) was developed to assess stress sources in ten domains in Norway population and also used with Scandinavian youth (Byrne, Davenport, & Mazanov, 2007; Moksnes, Byrne, Mazanov, & Espness, 2010). Lately was developed the ASQ-Short version (Anniko, Boersma, van Wijk, Byrne & Tillfors, 2018) with nine factors, three of them of academic issues. Other scales evaluate a particular domain such as the Student Stress Inventory-Stress Manifestations (SSI-SM), adapted in Spanish youth by Escobar et al. (2011) to assess sources of stress in the school setting, as well as, the Academic Stress in Secondary Education Questionnaire (García-Ros et al., 2015)

which assess specific academic stressors as do homework, relationships with peers and teachers. Likewise, the Educational Stress Scale for Adolescents (ESSA) recently developed in Chinese adolescents. It is a 30 Likert items in five factors focusing with five factors focusing in academic stressors (Sun et al., 2012). The Daily Stress in the School is another measure developed with Chilean children and adolescents (Encina & Avila, 2015) and also explore everyday stress related with school setting including academic stress, stress of relational violence and environmental stress (Östberg, Låftman, Modin, & Lindfors, 2018).

Regarding Mexican population, there are few instruments specifically designed to adolescents. The Life Events Questionnaire for Adolescents (Lucio & Durán, 2003), is a measure mainly on positive and negative stressful life events in seven areas (e. g. family, school, social, behavior problems, achievements and failures) that can be perceived as good, bad or indifferent. Other measures used in Mexican adolescents, were adapted from those aimed to adults, for example PSS (Cohen et al., 1983) with general population and university students (González & Landero, 2007).

Summarizing, some measures only cover a range of age and stage of adolescence (e.g. early adolescence), most of them are focused on a particular type of event (e. g. everyday stress) and domains (e. g. school, fa-

mily); moreover, most of them including major events, an only a few assess the level of adolescent stress. According to evidence it is necessary evaluate both, minor and major events, in different areas (Rowe et al., 2016) frequently perceived as stressful by adolescents in an updated comprehensive measure and suitable the cultural context. Based on previous recommendations (e. g. Compas et al., 1987; Grant et al., 2014; Sheidow et al., 2014) the purpose of the present study was to develop a valid and reliable measure, to identifying major and minor potentially stressful events in multiple domains and assess the level perceived stress in adolescents aged 13 to 18 years old. Identifying types and sources of stress, including the level of stress it is an important issue due its clinical implications for the mental health, as well as, for designing school-based intervention from a preventive perspective.

## Method

### Participants

The total sample was intentionally composed by 991 adolescents, 51.6% male and 48.4% female, aged 13 to 18 years old ( $M_{age} = 14.76$ ;  $DE = 1.43$ ). The study involved voluntary participation of students attending public high schools from five regions or states of Mexico: Mexico City, State of Mexico, Jalisco, Yucatán, and Oaxaca (Table 1).

Table 1. Distribution by sex, age, and schooling of the overall sample

	States					Total sample N=991
	Mexico City n=296	State of Mexico n=167	Jalisco n=216	Yucatán n=180	Oaxaca n=132	
	f (%)	f (%)	f (%)	f (%)	f (%)	f (%)
<b>Sex</b>						
Boys	148 (50)	118 (70.1)	101 (46.8)	88 (48.9)	56 (42.4)	511 (51.6)
Girls	148 (50)	49 (29.9)	115 (53.2)	92 (51.1)	76 (57.6)	480 (48.4)
<b>Age</b>						
13	55 (18.7)	26 (15.6)	36 (16.7)	8 (4.4)	64 (48.5)	189 (19.1)
14	107 (36.6)	30 (18.0)	46 (21.3)	2 (1.1)	35(26.5)	240 (24.2)
15	96 (32.8)	14 (8.4)	100 (46.3)	52 (28.9)	26 (19.7)	298 (30.1)

	States					Total sample N=991
	Mexico City n=296	State of Mexico n=167	Jalisco n=216	Yucatán n=180	Oaxaca n=132	
16	17 (5.5)	29 (17.4)	29 (13.4)	79 (43.9)	7 (5.3)	151 (15.2)
17	11 (3.3)	55 (32.9)	4 (1.9)	29 (16.1)	-	89 (9.0)
18	10 (3.1)	13 (7.8)	1 (0.5)	10 (5.6)	-	24 (2.4)
<b>Schooling</b>						
Junior High School	232 (78.2)	68 (40.7)	151 (69.9)	62 (36.4)	132 (100)	655 (66.1)
High School	64 (21.8)	99 (59.3)	65 (30.1)	118 (65.6)	-	336 (33.9)

### Instrument

The Perceived Stressors Global Scale for Adolescent (PSGS-A) was constructed in order to provide a valid and reliable measure aimed to identify potentially stressful major and minor events in multiple domains occurring during the last year, and to assess how stressful the event was for adolescents. The initial or pilot was integrated by 96 Likert 6-point items (0= No (did not happen); 1=Not at all stressful ; 2=A little stressful; 3=Much stressful; 4= Very much Stressful; 5=Extremely Stressful) and one open question aimed to explore any other stressful event reported by the adolescent.

### Procedure

An instrumental study was carried out (Ato, López, & Benavente, 2013) involved three broad steps: I. Instrument design: 1. 669 answers to open questions concerning to stressful life events occurred during the last year were obtained and content analysis was carry out; 2. On the basis of this analysis, we elaborated a pilot version of 96 Likert items; 3. A panel of ten psychologists adolescence experts was asked to assess the adequacy of the items. 4. Pilot testing of this version with an open question was performed to refine the wording and format of the scale in school adolescents. Responses of the pilot test were analyzed in order to retain the items with better properties. 4. After that, 13 items were added,

resulting the analysis of the answered to open question, so 109 Likert items version, plus an open question were applied in the general study. II. Initial examination of structure: The psychometric properties of 109 items were explored and adequacy of data was examined, then, factor structure analyses were carried out, and III. Test of the structure initial solution: A confirmatory analysis was conducted.

Authorization was requested from school directives for the evaluation, which was conducted by group in classrooms and lasted for 35 minutes. Considering ethical issues and standards stablish of Belmont Report (1979), all participants were informed about the purpose of the evaluation and informed assent and consent were requested from adolescents and their parents, respectively, whom accepted collaborate voluntarily without any kind of payment.

### Data analyses

Descriptive, correlational, reliability, and factor analyses were conducted using (IBM, 2009). A concordance analysis (Cohen's kappa) among psychologist experts was conducted to examined content validity. The psychometric properties of items were analyzed by assessing skewness and kurtosis, item-correlation and item-scale correlations (r-Pearson), as well as, its discrimination capability by comparing extreme groups using t-Student for independent samples. Criteria to retain items were: a) skewness and kurtosis values between  $\pm$

1.50; b)  $r < .300$  or  $> .800$ ; c)  $t$  values with  $p \leq .05$ . In order to analyze the PSGS-A' factor structure, the sample was randomly split into two parts has been recommended (Izquierdo, Olea, & Abad, 2014). The factor analysis using principal component analysis (PCA) method extraction with promax rotation was conducted with the first part or sample one ( $N_1=497$ ;  $Age=14.95$ ;  $SD=1.34$ ), since the assumption was the variables are correlated (Brown, 2009). Previous to PCA, an analysis of sample adequacy was tested, using Kaiser-Meyer-Olkin (KMO) and Bartlett's sphericity test indexes. Data from a second part or sample two ( $N_2=494$ ;  $Age=14.56$ ;  $SD=1.22$ ) was used to perform a confirmatory factor analysis (CFA) to establish the initial construct validity of PSGS-A, using maximum likelihood estimation (ML) method using AMOS 21.0 (Arbuckle, 2012). The goodness-of-fit of the model was established through the following indexes of fit:  $\chi^2$  values (CMNI);  $\chi^2$  ratio/degrees of freedom (CMNI/DF) as parsimony measures of less than 2.00; the Goodness of Fit Index (GFI), with values  $\geq 0.90$  indicating good fit; the root mean square of error approximation (RMSEA) value  $\leq .05$  can be considered a good fit, values between .05 and .08 is an adequate fit, however values  $< .06$  is also considered a good fit index (Hair, Black, Babin, & Anderson, 2014). Incremental indexes like AGFI or adjusted goodness of fit index; the Tucker-Lewis Index (TLI), and the comparative fit index (CFI), with values close to 1, indicating a good fit

(Thompson, 2004). The reliability was assessed testing the internal consistency; values  $< .60$  were considered acceptable in exploratory analysis (Hair et al., 2014).

## Results

### Content validity and analysis of items

Content validity was examined by expert judgment method, obtaining that 70% of judges agreed that 79.76% of the items were relevant and belonged to the initial corresponding dimension and determined based on the literature about adolescent stress. Kappa concordance coefficients were obtained ( $p < 0.05$ ); degree of agreement between judges showed that 86 of 109 items ranging from moderate ( $k=0.4-0.6$ ) to very high ( $k=0.8-1.00$ ) values, according the proposed theoretical dimension (Escobar & Cuervo, 2008). Taking account, the analyses of psychometric properties of items, 15 items were removed (Table 2). Regarding skewness and kurtosis ten items with positive or negative values  $> 1.50$  were eliminated. Three items with  $r < .300$  or  $> .800$  were eliminated too. In addition, two items with non-statistically significant  $t$ -values ( $p > .05$ ) should be removed (66. "being sexually harassed"; 72. "having a disabled sibling" and 84. "thinking about being kidnapped"), but since in non-normal samples could be significant, they were retained

Table 2. Properties of items removed according criteria previous the factor analysis

Items	Elimination criteria					
	<i>M</i>	<i>SD</i>	Skewness	Kurtosis	<i>r</i>	<i>t Student</i>
6. Have to drive	1.17	1.48	1.135	.277	.200*	1.909
13. See that they mistreat a friend	2.15	1.71	.207	-1.599	-.249*	4.345*
29. Having abused drugs	1.94	1.54	1.543	1.088	.577**	-15.217**
30. That they screw me up mistreating school	1.10	1.41	1.529	1.002	.381**	-5.862*
42. Having abused alcohol	1.08	1.54	1.578	.940	.187*	-5.214*
48. Caring for my grandparents	1.07	1.32	1.242	1.502	.155	.994
60. Suffer a violation	1.35	1.93	1.033	-.632	.239	-.961
61. Unwanted pregnancy	1.29	1.87	1.084	-.459	.200*	1.405**

Items	Elimination criteria					
	<i>M</i>	<i>SD</i>	Skewness	Kurtosis	<i>r</i>	<i>t Student</i>
72. Having a disabled sibling	1.08	1.56	1.557	.305	.144	-4.675*
77. That my friends pressure me to use alcohol or drugs	1.03	1.58	1.593	1.043	-.058	3.299*
85. Unwanted abortion	.99	1.71	1.518	.717	.324**	3.567**
86. Suffer some sexual dysfunction	2.07	1.64	1.536	.363	.388**	-12.019**
88. Death of a family member and/or friend	1.48	1.91	-.021	-1.562	.318**	-5.989*
107. Go to camp only with classmates or friends	1.07	1.34	1.559	.818	.299*	-6.004*
108. Go exchange to study outside the country	1.02	1.49	1.522	.552	.219	4.108*

\*  $p \leq 0.05$ ; \*\*  $p \leq 0.01$

### Factor structure analysis

Prior to factor analysis, a normality test was conducted with Kolmogorov-Smirnov statistics, with values at  $d = 1.258$  and  $d = 1.457$  ( $p > .05$ ), which indicated a normal distribution. The Kaiser-Meyer-Olkin index ( $KMO = .943$ ) and the Bartlett's sphericity test ( $X^2 = 29815.346$ ;  $gl = 5460$ ;  $p < .001$ ), confirmed the adequacy of data to conduct factor analysis. A principal component analysis (PCA) method, with promax rotation was carried out. The item selection criteria were: 1. Commonalities  $\geq .400$ ; 2. Factors loads  $\geq .400$ ; 3. Items not loading more than one factor; and 4. At list 3-4 items were loading in each factor and had theoretic

meaningful. The resulting matrix (Table 3) shows the factor weights of the 53 items and their properties, distributed in six factors that explained a total variance of 46.69%: F1. Critical events ( $Ce = 13$  items) assess major unexpected life events; F2. Daily hassles ( $Dh = 9$  items) identifies everyday stressors; F3. Social exposure ( $Se = 9$ ), evaluate situations implying social exposure that usually produce stress; F4. Family concerns ( $Fc = 9$  items) makes reference to stressors related to family issues; F5. Academic stressors ( $As = 7$  items) identifies school related stressors; F6. Social pressure ( $Sp = 6$  items) reflects situations representing social pressure and social interaction limitations that could be a source of stress.

Table 3. Configuration matrix with factor weights and psychometrics properties of the items

Items	F1	F2	F3	F4	F5	F6	M	SD	Skewness	Kurtosis
84. Being kidnapped	.808						1.59	2.06	.756	-1.497
96. Being arrested or arrested	.779						1.32	1.73	1.014	-.410
97. My friends pressure me to conduct criminal behavior	.739						1.89	1.60	1.256	.235

Ítems	F1	F2	F3	F4	F5	F6	M	SD	Skewness	Kurtosis
94. Expelled or suspended from school	.724						1.68	1.86	.709	-.971
66. Being sexually harassed	.721						1.69	1.81	.933	-.676
62. Death of any of the parents	.694						1.72	2.11	.650	-1.354
103. Not getting a job	.654						1.27	1.64	1.066	-.185
104. Having one of my parents (mother or father) sick	.641						1.85	1.90	.507	-1.287
82. Being a victim of an assault	.626						1.80	1.83	.513	-1.198
93. Live in an unsafe or violent place	.570						1.62	1.61	.678	-.813
95. Have to work	.542						1.20	1.46	1.015	-.028
89. Have a family member sick	.471						2.11	1.76	.208	-1.254
87. Death of my pet	.459						2.03	1.80	.402	-1.184
92. Not having enough time for my activities		.617					2.18	1.60	.213	-1.006
83. Lose something valuable		.595					2.51	1.79	-.019	-1.327
74. Fight with my friends		.589					1.85	1.52	.506	-.613
65. Be in traffic while transporting		.540					1.92	1.56	.432	-.774
91. Not getting enough sleep		.531					1.90	1.64	.506	-.857
54. Loss money		.523					2.33	1.63	.165	-1.043
67. Not having internet		.516					2.09	1.77	.373	-1.150
75. Fight with my brother(s)		.513					1.81	1.50	.465	-.693

Table 3. Configuration matrix with factor weights and psychometrics properties of the items (Continue...)

Ítems	F1	F2	F3	F4	F5	F6	M	SD	Skewness	Kurtosis
99. Not getting transportation		.499					1.51	1.57	.749	-.497
73. Get out alone to buy something to store			.616				1.48	1.46	.787	-.384
105. Travel by plane, truck or car			.584				1.48	1.43	.815	-.136
106. Go to summer-course			.560				1.39	1.52	.959	-.100
76. Transport me alone to school			.539				2.28	1.41	1.085	.411
46. Go to parties or large gatherings			.521				1.48	1.38	.793	-.135
57. Do work team at school			.521				1.99	2.11	.630	-.553
49. Go to doctor			.486				1.52	1.37	.797	.048

Ítems	F1	F2	F3	F4	F5	F6	M	SD	Skewness	Kurtosis
109. Staying to sleep in the house of a friend or partner			.483				1.16	1.31	1.121	.596
80. Attend to take extra classes			.452				1.49	1.54	.806	-.415
51. That my brothers fight each other				.539			2.21	1.45	1.095	.290
19. That my father / mother drink too much alcohol				.523			1.32	1.67	.997	-.331
44. That my father / mother change jobs				.501			2.08	1.30	1.145	.565
43. Changing my home outside the city or country				.498			1.11	1.61	1.296	.364
39. Change or move from home				.498			1.19	1.48	1.072	.107
40. That my parents do not have money to pay the rent/mortgage				.449			1.36	1.72	.922	-.574
17. Leaving the house by one of my parents				.447			1.27	1.63	1.033	-.223
47. Have stepmother/stepfather				.436			1.11	1.65	1.316	.354
71. My father/mother losed their job				.402			1.56	1.72	.736	-.766
4. To take an exam					.594		2.58	1.42	-.140	-.609
16. Have a lot of homework					.586		2.59	1.49	-.152	-.775
22. Participate in class					.525		2.23	1.44	.224	-.663
5. Get bad grades or notes					.514		2.63	1.61	-.185	-1.001
24. Do not turn in homework					.479		2.23	1.42	.129	-.694
12. Speak in public front many people					.478		2.09	1.59	.312	-.908
1. That teacher asks me in class					.401		2.95	1.19	.009	-.297
25. Not having friends						.604	1.45	1.48	.842	-.352
26. Not having a boyfriend						.567	1.38	1.42	1.010	.196
27. Not having a cell phone						.525	1.71	1.62	.610	-.780
37. That a boy I like rejects me						.479	1.41	1.57	.771	-.525
20. Not having money to buy what I want						.471	2.02	1.58	.370	-.833
36. Moken me on online						.421	1.06	1.44	1.340	.820
Variance explained = 46.69%	28.61	6.19	4.36	3.27	2.40	1.86				
Total Cronbach's alpha = .962	.765	.756	.807	.788	.799	.763				

Note: N=491. Extraction method: principal components. Rotation method: promax Kaiser's normalization. F1.

Critical events, F2. Daily hassles, F3. Social exposure, F4. Family concerns, F5. Academic stressors, F6. Social pressure

In addition, to proportion of variance explained, a scree-test were also used as criterion to choose the num-

ber of factors (Figure 1). The inflexion point in the scree plot indicates that six or seven factors could be maintained. Given that some theoretical assumptions, we decided retained six factors (Brown, 2009).

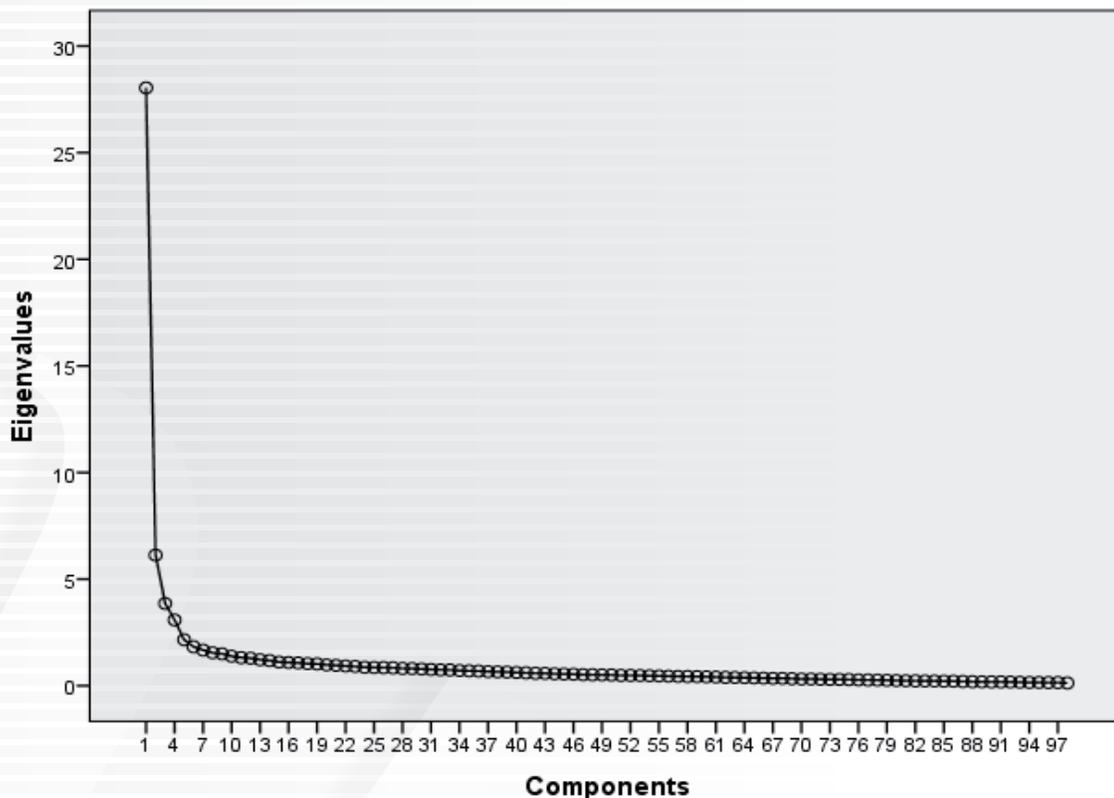


Figure 1. Scree plot of components of PSGS-A

### Internal consistency

The analysis of internal consistency of PSGS-A of each factor and entire scale (Table 3), showed high and moderate Chronbach's alpha values (Hair et al., 2014). These factors were included in the CFA, after evaluating its means and correlations.

Descriptive data and intercorrelations among factors

Table 4 shows that Critical events, Academic stressors and Daily hassles registered the highest scores. On the other hand, all correlations among the six factors of

PSGS-A were positive and statistically significant; most of them moderate, which suggest a relative independence among scale factors. The highest correlation was between Critical events and Daily hassles and the lowest between Critical events and Social Exposure. No statistically significant differences by sex were observed in the comparative analyses with t-Student, except in Daily hassles with girls scoring higher than boys ( $M_{girls} = 2.76$ ;  $M_{boys} = 1.98$ ;  $p = .003$ ).

Table 4. Means, standard deviations, and intercorrelations among factors of PSGS-A

Factors	<i>M</i>	<i>SD</i>	F1	F2	F3	F4	F5	F6
F1. Critical events	2.94	1.33	1	.653**	.320**	.736**	.380**	.453**
F2. Daily hassles	2.66	1.12		1	.427**	.583**	.542**	.484**
F3. Social exposure	1.83	.948			1	.417**	.452**	.424**
F4. Family concerns	2.60	1.11				1	.419**	.566**
F5. Academic stressors	2.71	.950					1	.393**
F6. Social pressure	2.36	1.03						1

N=497. \*  $p \leq 0.05$ ; \*\*  $p \leq 0.01$ .

### Confirmatory factor analysis

The confirmatory factor analysis (CFA), with sample 2 ( $S2=494$ ) is shown in Figure 2. All the parameters were significant ( $p < .05$ ), indicating an adequate fit of model with 48 items across the original six factors (Arburckle, 2012). According to the cutoff criteria for several fit indexes (Hair et al., 2014) absolute goodness of fit indexes can be considered acceptable: Square Chi ( $\chi^2=2911.260$ ;  $gl=2064$ ;  $p < .001$ ); Goodness of Fit Index (GFI=.900); Root mean square error of approximation (RMSEA=.059) with interval of confidence  $< .06$  to  $.08$ . Comparative fit with Incremental Fit Index (IFI=.914) was good, however, Tucker-Lewis Index (TLI=.895) and Compared Goodness of Fit Index (CFI=.898) can be considered marginal, as well as, Adjusted Goodness of Fit Index (AGFI=.879). and Parsimony Index (CMIN/DF=2.76) were, also under the umbral. All indexes can be considered marginals, except the GFE and the CFI were  $> .90$  as it recommended (Thompson, 2004).

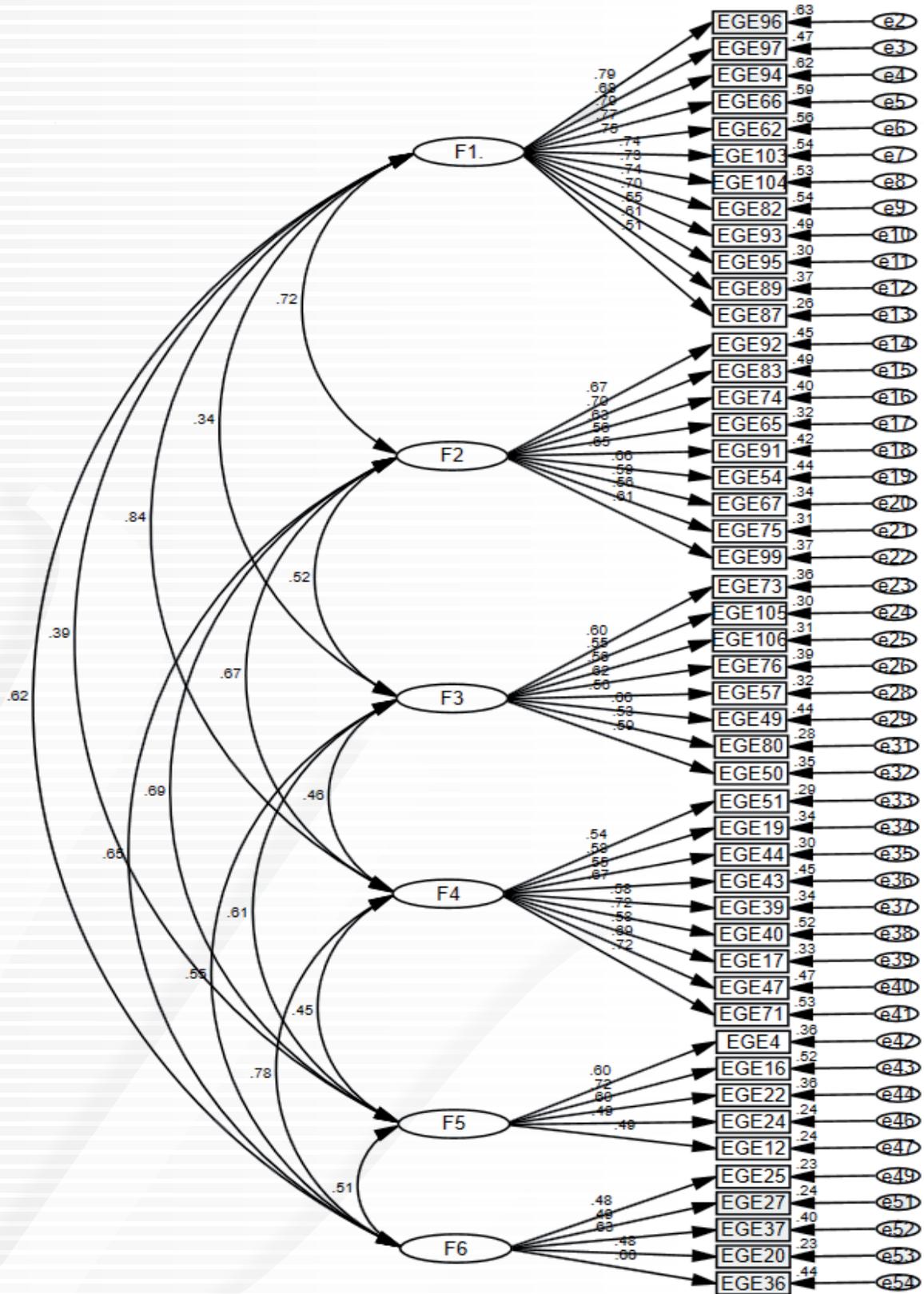


Figure 2. Model of six factors evaluated with a confirmatory factor analysis

## Discussion

From an eco-systemic and preventive perspective, multidimensional evaluation of life events and stress is the basis for designing intervention with adolescents, which involves the use of valid and reliable measures (Cicchetti, 2013). The purpose of this study was to develop a valid and reliable measure, to identifying potentially stressful major and minor events in multiple domains and the level of stress perceived by adolescents aged 13 to 18 years old. Previous skewness and kurtosis analyses indicated that items 72. “*having a disabled sibling*” and 84. “*thinking about being kidnapped*” were out of the recommended range ( $\pm 1.500$ ), so they should be deleted from the factor analysis however, in view of its potential significance for special groups, they were kept. In order to secure consistency with literature and assessment by judges, items were grouped as expected, since these are dimensions where adolescents often feel overwhelmed, pressed or stressed (Escobar & Cuervo, 2008).

Major or critical events were grouped in a first factor accounting for most of variance, which reveals that they continue to be a significant source of stress in most adolescents, even if they are not frequent (Compas et al., 1987; Grant et al., 2014; Jaureguizar et al., 2016). Items related with everyday stressor were integrated in the second factor named Daily Hassles (Hewitt et al., 2014; Morales, 2017) which are frequently associated with emotional and behavior problems (Hewitt et al., 2014; Sheidow et al., 2014). Despite the importance of everyday stressors in teenagers’ lives, stress measures for teenagers are not always included, or they are evaluated separately in a single instrument. The factorization of a third dominion called Social Exposure, in this study, seems to be changes in the social environment that make teenagers fearfully perceive “common” situations that did not produce stress in the past, such as “*going to store to buy things*” or “*getting to school*” (Persike & Seiffge-Krenke, 2016; Sheidow et al., 2014). A fourth factor, Family concern, identifies stressors related to family dynamics (e.g. fights between parents, with siblings) and families worries in general. This result is consistent with the family domain of EEP (González & Landero, 2007) and identifies everyday parent-children relationship (García-Linares et al., 2014; Persike

& Seiffge-Krenke, 2016), as well as, family functioning issues overall (Yan et al., 2014). Family financial situation such as “*no having enough money*» or “*one of my parents loses his/her job*” frequently are considered as not affecting adolescents, on contrary, in this study report that economic pressures are source of stress. These findings show that family economic hardships, also are important to adolescents, and could be a potential negative influence on psychological adjustment, as depression or antisocial behavior (Santiago et al., 2016, 2017). The Academic Stressors factor assess school events in a way that is similar to SSI-S (Escobar et al., 2011; García-Ros et al, 2015), and also to ESSA (Sun et al., 2012), frequently reported by adolescents and related to academic performance and school desertion (García-Ros et al., 2015). The six factor Social pressure is related with stress from interpersonal relations (Persike & Seiffge-Krenke, 2016; Serrano & Vaillo, 2016), which evaluates issues similar to the Others’ Expectations domain in ESSA (Sun et al, 2012) and imply concerns in social interaction. Noticed that the scree-plot suggests a seven factors configuration, but the decision to retained six factors was on base of several statistical criteria and theoretical considerations (Brown, 2009; Izquierdo et al., 2014).

Regarding the CFE outcomes, a number of limitations could be noted of the PSGS-A. Some indexes of fit of goodness of model (e.g. TLI, CFI, and AGFI) can be considered marginal or slightly below stablish criteria ( $\geq 0.90$ ). RMSEA index of fit results a little bit above the optimal cutting point, even though within the acceptable range (.05 - .08) according to Hair et al. (2014). On the other hand, the  $X^2$  value was significative, may be, due it is a parameter particularly sensible to sample size.

In addition, the large sample size in this study could be increasing the indexes of internal consistency of PSGS-A, whereas the proportion of explained variance decreasing. These considerations indicate that it should be considered the first validated version of this measure and more tests concerning construct validity. Therefore, its structure may be evaluated though other programs, such as Factor, that could be provide other solution for the factor structure of PSGS-A.

Nevertheless, the factor analysis (PC) indicators and the overall fit of model resulting of CFE, a suggest

that the PSGS-A is a multidimensional instrument with an adequate theoretical and empirical factor structure and acceptable reliability indicators. The PSGS-A could imply significant advantages as compared to general measurements that are more suitable for adults (Cohen et al., 1983), some of which have been validated with adolescents (e. g. González & Landero, 2007). PSGS-A assess life, major and daily events on multiple domains identifying the level of perceived stress by Mexican youth. The PSGS-A identify domains as basic adolescent interaction scenarios: school, family, and social, as have been reported previously (Anniko et al., 2018, 2019; Escobar et al., 2011; Rowe et al, 2016; Sun, et al 2012). Moreover, critical events, social exposure and daily hassles, are domains, particularly the first one, that seems to reflect the perspective of Mexican adolescents in different contexts better than other instruments designed in other countries. In view of the importance of critical events like those occurring every day as part of adolescents' development and adaptation, the PSGS-A could be useful in comprehensively evaluating different sources and types of stressors and measuring how stressful they are for adolescents (Grant et al., 2014; Östberg et al., 2018).

These results suggest that the Perceived Stressors Global Scale for Adolescent (PSGS-A) is an updated and culturally relevant measure with acceptable psychometric properties to use with Mexican population. Nevertheless, given that some limitations, it is recommended testing the validity and reliability of PSGS-A with other samples, as well as, analyzing its concurrent validity and its test-retest reliability, in view of the changing nature of event perception during adolescence and according to sub-stages. It is also important to assess its capability to discriminate normative samples from clinical and subclinical ones.

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