

The Connor-Davidson Resilience Scale (CD-RISC) amongst Young Spanish Adults

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ARTICLE INFO

Article history:

Received 5 January 2019

Accepted 5 March 2019

Available online 8 April 2019

Keywords:

Resilience
Connor-Davidson Resilience
Scale (CD-RISC)
Young Spanish adults

ABSTRACT

The interest in resilience has grown over the last few decades due to its relationships with health, well-being, and quality of life. Several instruments have been developed to measure resilience, with one of the most common being the Connor-Davidson Resilience Scale (CD-RISC). This scale has been validated in many cultures with divergent results. This paper investigates the factor structure of the CD-RISC. Participants were 3,214 students (62.1% female, mean age = 21.01, $SD = 2.86$) who were randomly divided into two equal subsamples ($n = 1,607$). One subsample was used to explore which models best fit the data and these models were fitted using the other subsample. Confirmatory factor analysis did not support the original 5-factor CD-RISC. The analyses supported unidimensional scale structures for both the 22-item and 10-item versions of the scale. The shorter instrument reduces the time needed to answer the questionnaire, allows it to be combined with other instruments, and does not require large sample sizes.

La escala de resiliencia de Connor-Davidson en adultos españoles jóvenes

RESUMEN

El interés por el estudio de la resiliencia ha aumentado en las últimas décadas debido a su relación con la salud, el bienestar y la calidad de vida. Se han desarrollado diversos instrumentos para medir la resiliencia, siendo uno de los más comunes la Escala de Resiliencia de Connor-Davidson (CD-RISC). Esta escala ha sido validada en muchas culturas con resultados diversos. En este trabajo se analiza la estructura factorial del CD-RISC en una muestra de 3,214 estudiantes (62.1% mujeres, edad media = 21.01, $DT = 2.86$) que fueron divididos aleatoriamente en dos submuestras iguales ($n = 1,607$). Se exploró en una de las submuestras qué modelos se ajustaban mejor a los datos y estos modelos fueron ajustados en la otra submuestra. El análisis factorial confirmatorio no avaló la estructura de 5 factores del CD-RISC, sino que confirmó una estructura unidimensional de 22 y de 10 ítems. La escala de 10 ítems reduce el tiempo de aplicación del cuestionario, permite combinarlo con otros instrumentos y no requiere muestras muy grandes.

Palabras clave:

Resiliencia
Escala de Resiliencia de
Connor-Davidson (CD-RISC)
Adultos jóvenes españoles

Resilience is not an easy concept to define and as a consequence there are several definitions of resilience. These definitions broadly take three different approaches: some researchers propose that resilience is located in the person (trait), others propose resilience as an outcome or behaviour, and others understand it as a process (Hu, Zhang, & Wang, 2015; Prince-Embury, 2013). Despite these divergent approaches, a review by Wald, Taylor, Admundson, Jang, and Stapleton (2006) identified a number of common features in these definitions: human strength, some type of disruption and growth, adaptative coping, and positive outcomes after exposure to adversity. For example, Luthar, Cicchetti, and Becker (2000) define resilience as a dynamic process encompassing positive adaptation within the context of significant adversity. Masten (2001) propose resilience as a phenomenon characterized by positive outcomes in spite of serious

threats to adaptation or development. Connor and Davidson (2003) describe resilience as personal qualities that enable the person to thrive in the face of adversity. These serious threats or adversity could be understood as great stressors (e.g., bombs, victims of persecution) but also as cumulative stressful experiences in ordinary life (e.g., deaths in family) or a combination of both (Cyrlunik, 2002; Infurna & Luthar, 2017; Rolf & Glantz, 2002).

Despite the fact that resilience has been criticised for its heterogeneity and complexity (Kaplan, 1999), it is considered to be a valuable concept (Prince-Embury & Saklofske, 2013) and has been used by interventions in several fields, such as protecting against adolescent substance use and drug use in adults (Hicks et al., 2014; Wingo, Ressler, & Bradley, 2014), burnout (Hao, Hong, Xu, Zhou, & Xie, 2015; Ying, Wang, Lin, & Chen, 2016), and facilitating performance

Cite this article as: Gras, M. E., Font-Mayolas, S., Baltasar, A., Patiño, J., Sullman, M. J. M., & Planes, M. (2019). The Connor-Davidson Resilience Scale (CD-RISC) amongst young Spanish adults. *Clínica y Salud*, 30, 73-79. <https://www.doi.org/10.5093/clysa2019a11>

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in sport (Martin-Krumm, Sarrazin, Peterson, & Famose, 2003). Furthermore, high resilience has been positively associated with positive indicators of mental health (Aiena, Baczwaski, Schulenberg, & Buchanan, 2015; Benetti & Kambouropoulos, 2006; Hu et al., 2015; Martínez-Martí & Ruch, 2016; Smith, Tooley, Christopher, & Kay, 2010; Waugh, Fredrickson, & Taylor, 2008), to emotional intelligence (Liu, Wang, & Lü, 2013), as well as being negatively associated with neuroticism (Sarubin et al., 2015; Lü, Wang, Liu, & Zhang, 2014) and negative affect (Bajaj & Pande, 2015; Liu, Wang, Zhou, & Li, 2014).

Unfortunately, the different tools used to measure resilience have made it difficult to compare findings and to develop preventive interventions (Prince-Embury & Saklofske, 2013; Vanderbilt-Adriance & Shaw, 2008). Windle, Bennett, and Noyes (2011) performed a systematic review of nineteen resilience scales and concluded that the scales with best psychometric properties were the Connor-Davidson Resilience Scale (Connor & Davidson, 2003), the resilience scale for adults (Friborg, Hjemdal, Rosenvinge, & Martinussen, 2003) and the brief resilience scale (Smith et al., 2008).

The Connor-Davidson Resilience Scale - CD-RISC (Connor & Davidson, 2003) is one of the most common instruments to assess resilience amongst adults. Each item is rated on a five-point scale (0 = *not at all true* to 4 = *true nearly all the time*). The total score ranges from 0 to 100, with higher scores corresponding to higher levels of resilience. The original research reported that the scale included five factors: factor 1 describes the notion of personal competence, high standards, and tenacity; factor 2 relates to trust in one's instincts, tolerance to negative affect and the strengthening effects of stress; factor 3 was related to the positive acceptance of change and secure relationships; factor 4 refers to control; and factor 5 concerns spiritual influences. The scale had good psychometric properties (Cronbach's alpha = .89; test-retest reliability: intraclass correlation coefficient = .87), but the reliability of the factors was not reported.

The CD-RISC has been validated in a variety of countries and cultures, such as Australia (Burns & Anstey, 2010), China (Fu, Leoutsakos, & Underwood, 2014; Wang, Shi, Zhang, & Zhang, 2010; Yu et al., 2011; Yu & Zhang, 2007), India (Singh & Yu, 2010), Korea (Baek, Lee, Joo, Lee, & Choi, 2010; Jung et al., 2012), South Africa (Jorgesen & Seedat, 2008), Spain (Manzano-García & Ayala-Calvo, 2013; Notario-Pacheco et al., 2014, 2011; Serrano-Parra et al., 2012, 2013), Turkey (Karairmak, 2010) and the United States (Burrow-Sánchez, Corrales, Ortiz, & Meyers, 2014; Campbell-Sills & Stein, 2007; Coates, Phares, & Dedrick, 2013; Fernandez, Fehon, Treloar, Ng, & Sledge, 2015; Green et al., 2014; Lamond et al., 2009), among others. Nevertheless, many of these validations failed to find the original 5 factor structure and instead propose four-factor, three-factor, and unidimensional models (including the original 25 items or shorter versions).

For example, using exploratory factor analysis (EFA), Lamond et al. (2009) reported a four-factor CD-RISC structure in a sample of 1,395 women aged over 60 (mean age = 72.2, $SD = 7.2$) in San Diego. The alpha for the whole scale was .923, but the alphas for the individual factors were not reported. Also using confirmatory factor analysis (CFA), Singh and Yu (2010) reported a four-factor structure when using the CD-RISC in a sample of 256 Indian undergraduate students (65% male, mean age = 22.75, $SD = 1.36$). The individual alphas for the factors ranged from .69 to .80, and was .89 for the entire scale. Furthermore, using EFA, Crespo, Fernández-Lansac, and Soberón (2014) reported a four factor structure of CD-RISC in a sample of Spanish caregivers of the elderly ($n = 111$, 73.9% female, mean age = 62.0, $SD = 11.8$), but four items (item 3: "Sometimes fate or God can help", item 9: "Things happen for a reason", item 18: "I can make unpopular or difficult decisions", and item 20: "I have to act on a hunch") were dropped due to non-salient loadings.

A number of other authors have also found that EFA does not support the original 5 factor structure of CD-RISC, finding instead a three factor solution. For example, Yu and Zhang (2007) used CFA to fit a three factor model that emerged with EFA in a Chinese sample

($n = 560$, 50% male, 84% between 20 and 60, 10% under 20 and 6% over 60). These authors called the factors: Tenacity (13 items, alpha = .88), Strength (8 items, alpha = .80), and Optimism (4 items, alpha = .60). The reliability coefficient of the scale was .91. Karairmak (2010) also adjusted a three-factor model, which emerged with EFA, using CFA in a sample of 246 Turkish earthquake survivors (61% female, mean age = 35.8, $SD = 8.6$), but one item was dropped due to low factor loadings (item 2: "I have close and secure relationships"). The overall reliability coefficient of the scale was .92 but the internal consistence of the third factor was only .49. Similarly, using CFA, Serrano-Parra et al. (2012) fitted a 17-item 3-factor model which emerged from EFA in a sample of Spanish elderly people ($n = 168$, 65.5% female, mean age = 67.2, $SD = 7.6$). Items 1, 3, 8, 9, 15, 18, 20, and 25 were dropped due to their low factor loadings. The Cronbach's alpha was acceptable for the first two factors (.79), but was low for the third (.56). More recently, Manzano-García and Ayala-Calvo (2013) also used CFA to verify a three-factor 23-item model, which emerged with EFA, in two subsamples ($n_1 = 389$, $n_2 = 394$) of Spanish entrepreneurs (67.8% male, aged 20-50). The factors were labelled by the authors as Hardiness (9 items, composite reliability = .88), Resourcefulness (7 items, composite reliability = .87) and Optimism (7 items, composite reliability = .81). Items 3 and 9 failed to load higher than .30 on any factor and were therefore dropped. These two items correspond to the original factor 5 (Spiritual Influences).

Unidimensional models of the CD-RISC have also been proposed by several authors. For example, Campbell-Sills and Stein (2007) studied a sample of 1,743 undergraduate American students (74.4% female, mean age = 18.8, $SD = 2.2$) divided into three subsamples (each over 500) to determine the factor structure of the CD-RISC. After some modifications, they reported a 10-item 1-factor model with good psychometric properties (composite reliability = .85). The CD-RISC-10 is comprised of item 1 ("I am able to adapt to change"); item 4 ("I can deal with whatever comes my way"); item 6 ("I see the humorous side of things"); item 7 ("Coping with stress can strengthen me"); item 8 ("I tend to bounce back after a hardship or illness"); item 11 ("I can achieve my goals"), item 14 ("Under pressure, I focus and think clear"); item 16 ("I am not easily discouraged by failure"); item 17 ("I think of myself as a strong person"); and item 19 ("I can handle unpleasant feelings"). This short form has been validated in different cultures and populations. For instance, using EFA, Wang et al. (2010) assessed the psychometric properties of the CD-RISC-10 in a sample of 341 teachers, who were victims of an earthquake (54.2% female, mean age = 39.0, $SD = 9.6$) and found that the scale had a good internal consistency (alpha = .91). Burns and Anstey (2010) also supported the unidimensional CD-RISC model. These authors studied a sample of 1,775 young Australian adults (45.9% males, range age 20-24) and, using CFA, fitted a unidimensional model (dropping items 2, 3, and 9) for a 22-item scale. They also supported the unidimensional factor structure for the 10-item scale, as proposed by Campbell-Sill and Stein (2007). Gucciardi, Jackson, Coulter, and Mallett (2011) also supported the unidimensional nature of the 10-item scale, but failed to support the 22-item model proposed by Burns and Anstey (2010). These authors studied two subsamples of 321 adults (19% females, mean age = 26.1, $SD = 6.8$) and 199 adolescents (23% females, mean age 16.9, $SD = 1.9$), all of whom were engaged in competitive cricket in Australia. Notario-Pacheco et al. (2014, 2011) and Serrano-Parra et al. (2013) also supported the reliability of the Spanish CD-RISC-10, with samples of university students ($n = 681$, 73.9% female, mean age 20.1, $SD = 4.1$), patients with fibromyalgia ($n = 208$, 95.7% female, mean age = 52.4, $SD = 8.4$), and elderly people ($n = 500$, 57.2% female, mean age = 67.5, $SD = 8.6$).

In addition, Vaishnavi, Connor, and Davidson (2007) proposed a 2-item version of the CD-RISC (CD-RISC2) in order to assess the clinical modification of resilience. They used items 1 ("I am able to adapt to change") and item 8 ("I tend to bounce back after a hardship or illness"). Therefore, the present research investigated

the factor structure of the 25-item and 10-item versions of the CD-RISC in a large sample of Spanish young adults. Furthermore, we compare the CD-RISC scores by gender.

Method

Participants

The initial sample consisted of 3,267 students from four faculties at a university in the north-east of Spain. Thirty students present in the classes refused to answer the questionnaire, resulting in a participation rate of 99%. As our aim was to study young adults, only students aged under 36 years old were included in the research, resulting in a final sample of 3,214 students (mean age = 21.01, $SD = 2.86$, 62.1% female). The distribution of students by faculty was: Nursing (11.8 %), Education and Psychology (44.3%), Medicine (13.3%), and Engineering (30.6 %), which was broadly representative of the university's student population.

Materials

The Spanish version of the Connor-Davidson Resilience Scale (CD-RISC) (Manzano-García & Ayala-Calvo, 2013) was used to measure resilience. The original English scale consists of 25 items which form five factors (Connor & Davidson, 2003). Respondents are asked to answer on a five-point Likert scale (0 = *totally disagree* to 4 = *totally agree*).

Design and Procedure

A cross-sectional survey was used to collect data. After permission had been obtained from the person in charge of each faculty, the questionnaires were administered to all students present during normal class time in a compulsory subject. Students granted their consent to participate in the research in accordance with the Declaration of Helsinki. Participation was voluntary and students were assured of their anonymity and the confidentiality of their responses. The students answered the Spanish form of the CD-RISC along with the demographic variables. This research complies with the research ethics policy of the institution where the students were enrolled.

To fit the CFA models, participants were randomly divided into two equal sized subsamples: A ($n = 1,607$) and B ($n = 1,607$). Subsample A was used to explore which models better fitted the data and then these models were fitted in subsample B.

Data Analysis

Confirmatory factor analysis (CFA) was used to assess the adequacy of the CD-RISC. The maximum likelihood method was used to estimate the model parameters; t -tests were used to compare means between groups and the effect sizes were measured using Cohen's d . AMOS 22 was utilised to conduct the CFA and SPSS 19.0 for all other statistical analyses.

Results

Structural Validity of CD-RISC

CFA was carried out with a half of the sample (subsample A: $n = 1,607$) initially to try to fit the original five-factor model (Connor & Davidson, 2003), but the goodness of fit indices were poor (model 1, Table 1). When significant covariance paths between errors terms were included for modification indexes (MI) over 20, the goodness of fit remained poor (model 2, Table 1).

Secondly, the 23-item (excluding items 3 "Sometimes fate or God can help" and 9 ("Things happen for a reason") three-factor solution, proposed by Manzano-García and Ayala-Calvo (2013), was fitted with even worse results (model 3, Table 1). The goodness of fit indices did not improve substantially when covariance paths between the error terms were included for MI over 20 (model 4, Table 1).

Following other authors (e.g., Burns & Anstey, 2010) a 22-item unidimensional model (without items 3 and 9) was also tried, but goodness of fit indices were not very good (model 5, Table 1). However, goodness of fit improved when we reran the analysis including the covariance paths between errors terms with MI over 20 (items 4/5, 6/7, 10/11, 14/15, 16/17, 18/19, 20/21, and 24/25) (model 6, Table 1).

As item 20 ("I have to act on a hunch") failed to load over .30 we reran the analysis without this item, but the goodness of fit did not improve substantially (model 7, Table 1). Nevertheless, when significant covariance paths between errors terms were included for MI over 20 (items 1/2, 4/5, 6/7, 10/11, 14/15, 16/17, 18/19, and 24/25) acceptable goodness of fit indices resulted (model 8, Table 1). This

Table 1. Models Tested

Model	Subsample	Model fitted	S-B χ^2	df	CFI	RMSEA	95% CI RMSEA	SRMR
1	A	5 Factor 25 items (Connor & Davidson, 2003)	2,207.15	265	.818	.068	.065 : .070	.052
2	A	5 Factor 25 items with MI (Connor & Davidson, 2003)	1,510.86	258	.883	.055	.052 : .058	.052
3	A	3 Factor 23 items (dropping items 3 and 9) (Manzano-García & Ayala-Calvo, 2013)	2,152.99	227	.813	.073	.070 : .076	.054
4	A	3 Factor 23 items with MI (Manzano-García & Ayala-Calvo, 2013)	1,735.69	220	.853	.065	.063 : .068	.049
5	A	1 Factor 23 items	2,276.56	230	.801	.074	.072 : .077	.056
6	A	1 Factor 23 items with MI	1,409.31	222	.885	.058	.055 : .061	.046
7	A	1 Factor 22 items (dropping item 20)	2,174.33	209	.807	.077	.074 : .079	.056
8	A	1 Factor 22 items with MI	1,250.53	201	.897	.057	.054 : .060	.045
9	A	1 Factor 10 items (Campbell-Sills and Stein, 2007)	270.23	35	.926	.065	.058 : .072	.040
10	A	1 Factor 10 items with MI	184.15	33	.953	.053	.046 : .061	.034
11	B	1 Factor 22 items with MI	1,306.68	201	.880	.059	.056 : .062	.049
12	B	1 Factor 10 items with MI	196.26	33	.947	.056	.048 : .063	.036

Note. MI = modification indices.

model was also attempted using subsample B ($n = 1,607$), which resulted in similar goodness of fit indices (model 11, Table 1).

The short 10-item unidimensional version proposed by Campbell-Sills and Stein (2007) was then tested using sample A. This short version includes items 1, 4, 6, 7, 8, 11, 14, 16, 17, and 19. This found acceptable goodness of fit indices (model 9, Table 1), which improved when significant paths between errors terms were included for MI over 20 (items 6/7, and 16/17) (model 10, Table 1). This model was also tried using subsample B, which produced similar goodness of fit indices (model 12, Table 1).

Table 2 shows the factor loadings, along with the composite reliability coefficients (CR) for the two models fitted. All factor loadings were over .30 and the CR coefficients were acceptable.

Table 2. Factor Loadings and Composite Reliability Coefficients of the Fitted Models

Item No.	Item	22-Item model	10-Item model
	Composite reliability	.88	.78
1	Able to adapt to change	.48	.52
2	Close and secure relationships	.31	
4	Can deal with whatever comes	.41	.43
5	Past success gives confidence for new challenges	.43	
6	Try to see the humorous side of things	.42	.46
7	Coping with stress can strengthen me	.34	.39
8	Tend to bounce back after illness or hardship	.57	.61
10	Best effort no matter what	.40	
11	Can achieve goals despite obstacles	.64	.54
12	When things looks hopeless, I don't give up	.53	
13	Know where to turn for help	.47	
14	Can stay focused under pressure	.39	.43
15	Prefer to take the lead in problem solving	.59	
16	Not easily discouraged by failure	.56	.57
17	Think of self as a strong person	.66	.65
18	Make unpopular or difficult decisions	.54	
19	Can handle unpleasant feelings	.48	.54
21	Have a strong sense of purpose	.52	
22	In control of your life	.56	
23	I like challenges	.59	
24	You work to attain your goals	.55	
25	Pride in your achievements	.44	

CD-RISC by Gender

Table 3 shows means, standard deviations in the whole sample and by gender, as well as the results of the t-test and the Cohen's d effect size. The resilience scores of the young adult males were higher in 15 of the 22 items, many of them related to challenge and overcoming adversity (item 4: "I can deal with whatever comes my way"; item 5: "Past success gives confidence for new challenges"; item 12: "When things look hopeless, I don't give up"; item 23: "I like challenges"; item 16: "I'm not easily discouraged by failure"; item 19: "I can handle unpleasant feelings"; item 14: "Under pressure, I focus and think clearly", among others). However, females scored higher than men in items related to personal effort (item 10: "I give my best effort no matter what"), relationships (item 2: "I have close and secure relationships"; item 13: "I know where to turn to for help"), and for item 25 "I take pride in my achievements". Nevertheless, effect sizes ranged from very small (.06) to moderate (.37). There were only three items with means that did not differ significantly between males and females (Item 11: "I can achieve my goals"; Item 21: "I have a strong sense of purpose" and Item 24:

"I work to attain my goals"). Men's total score were significantly higher than women's, on both the 22-item scale and the 10-item version. Nevertheless, the effect sizes were very small (under .20) or in the small to medium range (.20 to .50).

Discussion

The aim of this paper was to investigate the factor structure of the CD-RISC in a large sample of Spanish undergraduate students. Confirmatory factor analysis failed to support the adequacy of the original five factor CD-RISC (Connor & Davidson, 2003) among Spanish undergraduate students. These findings are generally in agreement with previous research (Campbell-Sills & Stein, 2007; Crespo et al., 2014; Karairmak, 2010; Lamond et al., 2009; Manzano-García & Ayala-Calvo, 2013; Serrano-Parra et al., 2012; Singh & Yu, 2010; Yu & Zhang, 2007). Furthermore, CFA did not support the three factor model proposed by Manzano-García and Ayala-Calvo (2013) among Spanish entrepreneurs. The present research found one dimension solutions for both the revised 22-item scale and the 10-item scale proposed by Campbell-Sills and Stein (2007).

The 22-item scale fitted after items 3 ("Sometimes fate or God can help"), 9 ("Things happen for a reason") and 20 ("I have to act on a hunch") were dropped from the original scale. In support of this action, Connor and Davidson (2003) reported a low item-total scale correlation with these three items. In addition, many authors have found that items 3 and 9 failed to load over .30, either on unidimensional models (Burns & Anstey, 2010) or three/four factor models (Crespo et al., 2014; Manzano-García & Ayala Calvo, 2013). In the original scale, these two items correspond to factor 5 and were related to spiritual influences (Connor & Davidson, 2003). Regarding item 20, authors such as Crespo et al. (2014) also found factor loadings lower than .35 when studying in a sample of non-professional Spanish elderly caregivers of dependent relatives. This item was included in factor 2 (trust in one's instincts, tolerance to negative affect, and strengthening effects of stress) by Connor and Davidson (2003).

The present results also support the 10-item unidimensional CD-RISC proposed by Campbell-Sills and Stein (2007). This short version has also been validated across specific populations such as adult and adolescent Australian cricketers (Gucciardi et al., 2011), elderly Spanish participants (aged 60-75) (Serrano-Parra et al., 2013), Spanish patients with fibromyalgia (Notario-Pacheco, 2014), and the youngest adult cohort (aged 20-24) from the PATH study in Canberra (Burns & Anstey, 2010).

Another aim of this research was to compare the CD-RISC scores by gender. Men's total score was significantly higher than women's in both the 22-item and the 10-item scale, which is in agreement with previous research. For example, using the original 25-item scale among Chinese secondary school students ($N = 2,914$, range age 13-17), Yu et al. (2011) found males scored significantly higher than females. This pattern has also been found using the 10-item CD-RISC. Using the 10-item version Campbell-Sills, Forde, and Stein (2009) found significantly higher scores in men than in women ($N = 764$, range age 18-75). According to these authors the gender difference might be due to a bias in responding, as men are more concerned (than women) to provide an image of strength in coping with stress. Another possible explanation is that previous research has found resilience has a negative relationship with different personality constructs, such as neuroticism, which are higher among females (Campbell-Sills, Cohan, & Stein, 2006; Schmitt, Realo, Voracek, & Allik, 2008; Sing & Yu, 2010). Nevertheless, as other authors have not found significant differences by gender ($N = 246$ Turkey's earthquake survivors, range age 18-58), and the effect size found here were in the small to medium range, according to Cohen's criteria (Cohen, 1988), further research is needed to clarify these results.

Table 3. CD-RISC Items by Gender

Item No.	Item	Male Mean (SD)	Female Mean (SD)	Total Mean (SD)	t (p)	d
1	Able to adapt to change ¹	3.16 (0.80)	3.07 (0.81)	3.10 (0.81)	3.18 (.001)	0.12
2	Close and secure relationships	2.95 (0.88)	3.10 (0.84)	3.05 (0.86)	-5.05 (< .001)	-0.18
4	Can deal with whatever comes ¹	2.60 (1.11)	2.38 (1.05)	2.47 (1.08)	5.75 (< .001)	0.21
5	Past success gives confidence for new challenge	3.06 (0.96)	2.99 (0.96)	3.02 (0.96)	2.05 (.041)	0.07
6	Try to see the humorous side of things ¹	3.07 (0.90)	2.85 (0.92)	2.93 (0.92)	6.82 (< .001)	0.23
7	Coping with stress can strengthen me ¹	2.28 (1.06)	2.20 (1.07)	2.24 (1.07)	2.08 (.037)	0.06
8	Tend to bounce back after illness or hardship ¹	3.07 (0.89)	3.00 (0.85)	3.03 (0.86)	2.24 (.026)	0.08
10	Best effort no matter what	2.91 (0.88)	3.12 (0.78)	3.04 (0.83)	-6.91 (< .001)	-0.26
11	Can achieve goals despite obstacles ¹	3.27 (0.77)	3.22 (0.75)	3.24 (0.76)	1.77 (.076)	0.06
12	When things looks hopeless, I don't give up	2.95 (0.95)	2.81 (0.94)	2.87 (0.94)	4.03 (< .001)	0.15
13	Know where to turn for help	2.81 (0.91)	2.95 (0.93)	2.90 (0.93)	-4.41 (< .001)	-0.16
14	Can stay focused under pressure ¹	2.64 (1.04)	2.25 (1.12)	2.40 (1.11)	9.81 (< .001)	0.36
15	Prefer to take the lead in problem solving	2.90 (0.90)	2.73 (0.91)	2.80 (0.91)	5.20 (< .001)	0.19
16	Not easily discouraged by failure ¹	2.55 (1.04)	2.18 (1.02)	2.32 (1.04)	9.77 (< .001)	0.37
17	Think of self as a strong person ¹	2.84 (0.97)	2.60 (0.97)	2.70 (0.98)	6.87 (< .001)	0.25
18	Make unpopular or difficult decisions	2.87 (0.94)	2.64 (0.88)	2.73 (0.91)	6.90 (< .001)	0.25
19	Can handle unpleasant feelings ¹	2.73 (0.94)	2.38 (0.93)	2.51 (0.95)	10.21 (< .001)	0.37
21	Have a strong sense of purpose	2.63 (0.86)	2.58 (0.86)	2.60 (0.86)	1.50 (.134)	-0.06
22	In control of your life	2.85 (0.92)	2.71 (0.89)	2.76 (0.90)	4.48 (< .001)	0.16
23	I like challenges	3.16 (0.87)	2.83 (0.93)	2.96 (0.92)	10.09 (< .001)	0.36
24	You work to attain your goals	3.27 (0.81)	3.28 (0.79)	3.28 (0.79)	-0.46 (.648)	-0.02
25	Pride in your achievements	3.37 (0.87)	3.44 (0.78)	3.41 (0.82)	-2.11 (.035)	0.08
	22-item total score	63.93 (10.87)	61.32 (10.90)	62.31 (10.96)	6.60 (< .001)	0.24
	10-item total score	28.22 (5.56)	26.14 (5.55)	26.93 (5.64)	10.31 (< .001)	0.37

Note. ¹10-item short version.

The study reported here clearly has a number of methodological limitations, such as the possibility of sampling bias. Since all participants were undergraduate students in a city in the north-east of Spain, it is possible that they differ significantly in some way from the general population of young Spanish people. Furthermore, the use of self-reported questionnaires might result in social desirability bias. However, as anonymity and confidentiality were guaranteed, we expect social desirability bias to be relatively low.

Conclusions

Confirmatory factor analysis failed to support the original 5-factor solution (Connor & Davidson, 2003) using the 25-item CD-RISC, supporting instead a unidimensional factor structure for both the 10-item and 22-item CD-RISCs.

Although both instruments are adequate, the shorter 10-item CD-RISC is a particularly useful tool as it reduces the time needed to answer the questionnaire, allows it to be combined with other instruments, and does not require very large sample sizes.

Conflict of Interest

The authors of this article declare no conflict of interest.

References

- Aiena, B. J., Baczwaski, B. J., Schulenberg, S. E., & Buchanan, E. M. (2015). Measuring resilience with the RS-14: A tale of two samples. *Journal of Personality Assessment, 97*, 291-300. <https://doi.org/10.1080/00223891.2014.951445>
- Baek, H. S., Lee, K. U., Joo, E. J., Lee, M. Y., & Choi, K. S. (2010). Reliability and validity of the Korean version of the Connor-Davidson Resilience Scale. *Psychiatric Investigation, 7*, 109-115. <https://doi.org/10.4306/pi.2010.7.2.109>
- Bajaj, B., & Pande, N. (2015). Mediating role of resilience in the impact of mindfulness on life satisfaction and affect as indices of subjective well-being. *Personality and Individual Differences, 81*, 1-7. <https://doi.org/10.1016/j.paid.2015.09.005>
- Benetti, C., & Kambouropoulos, N. (2006). Affect-regulated indirect effects of trait anxiety and trait resilience on self-esteem. *Personality and Individual Differences, 41*, 341-352. <https://doi.org/10.1016/j.paid.2006.01.015>
- Burns, R. A., & Anstey, K. J. (2010). The Connor-Davidson Resilience Scale (CD-RISC): Testing the invariance of a unidimensional resilience measure that is independent of positive and negative affect. *Personality and Individual Differences, 48*, 527-531. <https://doi.org/10.1016/j.paid.2009.11.026>
- Burrow-Sánchez, J. J., Corrales, C., Ortiz, J. C., & Meyers, K. (2014). Resilience in a sample of Mexican American adolescents with substance use disorders. *Psychological Assessment, 26*, 1038-1043. <https://doi.org/10.1037/pas0000011>
- Campbell-Sills, L., Cohan, S. L., & Stein, M. B. (2006). Relationship of resilience to personality, coping and psychiatric symptoms in young adults. *Behaviour Research and Therapy, 44*, 586-599. <https://doi.org/10.1016/j.brat.2005.05.001>
- Campbell-Sills, L., Forde, D. R., & Stein (2009). Demographic and childhood environmental predictors of resilience in a community sample. *Journal of Psychiatric Research, 43*, 1007-1012. <https://doi.org/10.1016/j.jpsychires.2009.01.013>
- Campbell-Sills, L., & Stein, M. B. (2007). Psychometric analysis of refinement of the Connor-Davidson Resilience Scale (CD-RISC): Validation of a 10-item measure of resilience. *Journal of Traumatic Stress, 20*, 1019-1028. <https://doi.org/10.1002/jts.20271>
- Coates, E. E., Phares, V., & Dedrick, R. F. (2013). Psychometric properties of the Connor-Davidson Resilience Scale 10 among low-income African American men. *Psychological Assessment, 25*, 1349-1354. <https://doi.org/10.1037/a0033434>
- Connor, K. M., & Davidson, J. R. T. (2003). Development of a new resilience scale: The Connor-Davidson Resilience Scale (CD-RISC). *Depression and Anxiety, 18*, 76-82. <https://doi.org/10.1002/da.10113>
- Cohen, J. (1988). *Statistical power analysis for the behavioural sciences*. (2nd ed.). Hillsdale, NJ: Erlbaum.
- Crespo, M., Fernández-Lansac, V., & Soberón, C. (2014). Adaptación española de la Escala de Resiliencia de Connor Davidson (CD-RISC) en situaciones de estrés crónico [Spanish adaptation of the Connor Davidson Resilience Scale (CD-RISC) in situations of chronic stress]. *Behavioral Psychology, 22*, 219-238.
- Cyrułnik, B. (2002). Los patitos feos. La resiliencia: una infancia infeliz no determina la vida [The ugly ducklings. Resilience: an unhappy childhood does not determine life]. Barcelona, España: Gedisa.
- Fernandez, A. C., Fehon, D. C., Treloar, H., Ng, R., & Sledge, W. H. (2015). Resilience in organ transplantation: An application of the Connor-Davidson Resilience Scale (CD-RISC) with liver transplant candidates. *Journal of Personality Assessment, 97*, 487-493. <https://doi.org/10.1080/00223891.2015.1029620>

- Friborg, O., Hjemdal, O., Rosenvinge, J. H., & Martinussen, M. (2003). A new rating scale for adult resilience: What are the central protective resources behind healthy adjustment? *International Journal of Methods in Psychiatric Research*, 12, 65-76. <https://doi.org/10.1002/mpr.143>
- Fu, C., Leoutsakos, J. M., & Underwood, C. (2014). An examination of resilience cross-culturally in child and adolescents survivors of the 2008 China earthquake using the Connor-Davidson Resilience Scale (CD-RISC). *Journal of Affective Disorders*, 155, 149-153. <https://doi.org/10.1016/j.jad.2013.10.041>
- Green, K. T., Hayward, L. C., Williams, A. M., Dennis, P. A., Bryan, B. C., Taber, K. H., ... Calhoun, P. S. (2014). Examining the factor structure of the Connor-Davidson Resilience Scale (CD-RISC) in a post-9/11 U.S. military veteran sample. *Assessment*, 21, 443-451. <https://doi.org/10.1177/1073191114524014>
- Gucciardi, D. F., Jackson, B., Coulter, T. J., & Mallett, C. J. (2011). The Connor-Davidson Resilience Scale (CD-RISC): Dimensionality and age-related measurement invariance with Australian cricketers. *Psychology of Sport and Exercise*, 12, 423-433. <https://doi.org/10.1016/j.psychsport.2011.02.005>
- Hao, S., Hong, W., Xu, H., Zhou, L., & Xie, Z. (2015). Relationship between resilience, stress and burnout among civil servants in Beijing, China: Mediating and moderating effect analysis. *Personality and Individual Differences*, 83, 65-71. <https://doi.org/10.1016/j.paid.2015.03.048>
- Hicks, B. M., Johnson, W., Durbin, C. E., Blonigen, D. M., Iacono, W. G., & McGue, M. (2014). Delineating selection and mediation effects among childhood personality and environmental risk factors in the development of adolescent substance abuse. *Journal of Abnormal Child Psychology*, 42, 845-859. <https://doi.org/10.1007/s10802-013-9831-z>
- Hu, T., Zhang, D., & Wang, J. (2015). A meta-analysis of the trait resilience and mental health. *Personality and Individual Differences*, 76, 18-27. <https://doi.org/10.1016/j.paid.2014.11.039>
- Infurna, F. J., & Luthar, S. S. (2017). Parents' adjustment following the death of their child: Resilience is multidimensional and differs across outcomes examined. *Journal of Research in Personality*, 68, 38-53. <https://doi.org/10.1016/j.jrp.2017.04.004>
- Jorgensen, I. E., & Seedat, S. (2008). Factor structure of the Connor-Davidson Resilience Scale in South African adolescents. *International Journal of Adolescent Medicine and Health*, 20, 23-32. <https://doi.org/10.1515/ijamh.2008.20.1.23>
- Jung, Y., Min, J., Shin, A. Y., Han, S. Y., Lee, K., Kim, T., ... Chae, J. H. (2012). The Korean version of the Connor-Davidson Resilience Scale: An extend validation. *Stress and Health*, 28, 319-326. <https://doi.org/10.1002/smi.1436>
- Kaplan, H. B. (1999). Toward an understanding of resilience: A critical review of definitions and models. In M. D. Glantz & J. L. Johnson (Eds.), *Resilience and development: Positive life adaptations* (pp. 17-83). New York, NY: Springer. https://doi.org/10.1007/0-306-47167-1_3
- Karairmak, O. (2010). Establishing the psychometric qualities of the Connor-Davidson Resilience Scale (CD-RISC) using exploratory and confirmatory factor analysis in a trauma survivor sample. *Psychiatry Research*, 179, 350-356. <https://doi.org/10.1016/j.psychres.2009.09.012>
- Lamond, A. J., Depp, C. A., Allison, M., Langer, R., Reichstadt, J., Moore, S., ... Jeste, D. V. (2009). Measurement and predictors of resilience among community-dwelling older women. *Journal of Psychiatric Research*, 43, 148-154. <https://doi.org/10.1016/j.jpsychires.2008.03.007>
- Liu, Y., Wang, Z., & Lü, W. (2013). Resilience and affect balance as mediators between trait emotional intelligence and life satisfaction. *Personality and Individual Differences*, 54, 850-855. <https://doi.org/10.1016/j.paid.2012.12.010>
- Liu, Y., Wang, Z., Zhou, C., & Li, T. (2014). Affect and self-esteem as mediators between trait resilience and psychological adjustment. *Personality and Individual Differences*, 66, 92-97. <https://doi.org/10.1016/j.paid.2014.03.023>
- Lü, W., Wang, Z., Liu, Y., & Zhang, H. (2014). Resilience as a mediator between extraversion, neuroticism and happiness, PA and NA. *Personality and Individual Differences*, 63, 128-133. <https://doi.org/10.1016/j.paid.2014.01.015>
- Luthar, S. S., Cicchetti, D., & Becker, B. (2000). The construct of resilience: A critical evaluation and guidelines for future work. *Child Development*, 71, 543-562. <https://doi.org/10.1111/1467-8624.00164>
- Manzano-García, C., & Ayala-Calvo, J. C. (2013). Psychometric properties of Connor-Davidson Resilience Scale in a Spanish sample of entrepreneurs. *Psicothema*, 25, 245-251. <https://doi.org/10.7334/psicothema2012.183>
- Martin-Krumm, C. P., Sarrazin, P. G., Peterson, C., & Famose, J. P. (2003). Explanatory style and resilience after sport failure. *Personality and Individual Differences*, 35, 1685-1695. [https://doi.org/10.1016/S0191-8869\(02\)00390-2](https://doi.org/10.1016/S0191-8869(02)00390-2)
- Martínez-Martí, M. L., & Ruch, W. (2016). Character strengths predict resilience over and above positive affect, self-efficacy, optimism, social support, self-esteem, and life satisfaction. *The Journal of Positive Psychology*, 12, 110-119. <https://doi.org/10.1080/17439760.2016.1163403>
- Masten, A. S. (2001). Ordinary magic: Resilience processes in development. *American Psychologist*, 56, 227-238. <https://doi.org/10.1037/0003-066X.56.3.227>
- Notario-Pacheco, B., Martínez-Vizcaíno, V., Trillo-Calvo, E., Pérez-Yus, M. C., Serrano-Parra, M. D., & García-Campayo, J. (2014). Reliability and validity of the Spanish version of the 10-item CD-RISC in patients with fibromyalgia. *Health and Quality of Life Outcomes*, 12, 14. <https://doi.org/10.1186/1477-7525-12-14>
- Notario-Pacheco, B., Solera-Martínez, M., Serrano-Parra, M. D., Bartolomé-Gutiérrez, R., García-Campayo, J., & Martínez-Vizcaíno, V. (2011). Reliability and validity of the Spanish version of the 10-item Connor-Davidson Resilience Scale (10-item CD-RISC) in young adults. *Health and Quality of Life Outcomes*, 9, 63-68. <https://doi.org/10.1186/1477-7525-9-63>
- Prince-Embury, S. (2013). Translating resilience theory for assessment and application with children, adolescents, and adults: conceptual issues. In S. Prince-Embury & D.H. Saklofske (Ed.) *Resilience in children, adolescents, and adults* (pp. 9-15). New York, NY: Springer. https://doi.org/10.1007/978-1-4614-4939-3_2
- Prince-Embury, S., & Saklofske, D. H. (2013). Translating resilience theory for application: Introduction. In S. Prince-Embury & D. H. Saklofske (Ed.), *Resilience in children, adolescents, and adults* (pp. 3-7). New York, NY: Springer. https://doi.org/10.1007/978-1-4614-4939-3_1
- Rolf, J. E., & Glantz, M. D. (2002). Resilience. An interview with Norman Garmezy. In M. D. Glantz & J. L. Johnson (Ed.), *Resilience and development. Positive life adaptations* (pp. 5-14). New York, NY: Kluwer Academic Publishers. https://doi.org/10.1007/0-306-47167-1_2
- Sarubin, N., Wolf, M., Giegling, I., Hilbert, S., Naumann, F., Gutt, D., ... Padberg, F. (2015). Neuroticism and extraversion as mediators between positive/negative life events and resilience. *Personality and Individual Differences*, 82, 193-198. <https://doi.org/10.1016/j.paid.2015.03.028>
- Schmitt, D. P., Realo, A., Voracek, M., & Allik, J. (2008). Why can't a man be more like a woman? Sex differences in big five personality traits across 55 cultures. *Journal of Personality and Social Psychology*, 94, 168-182. <https://doi.org/10.1037/0022-3514.94.1.168>
- Serrano-Parra, M. D., Garrido-Abejar, M., Notario-Pacheco, B., Bartolomé-Gutiérrez, R., Solera-Martínez, M., & Martínez-Vizcaíno, V. (2012). Validez de la escala de Resiliencia de Connor-Davidson en una población de mayores entre 60 y 75 años [Validity of the Resilience Scale of Connor-Davidson in a population aged between 60 and 75]. *International Journal of Psychological Research*, 5, 49-57.
- Serrano-Parra, M. D., Garrido-Abejar, M., Notario-Pacheco, B., Bartolomé-Gutiérrez, R., Solera-Martínez, M., & Martínez-Vizcaíno, V. (2013). Validez de la Escala de Resiliencia de Connor-Davidson (10-items) en una población de mayores no institucionalizados [Validity of the Connor-Davidson Resilience Scale (10-items) in a non-institutionalized elderly population]. *Enfermería Clínica*, 23, 14-21. <https://doi.org/10.1016/j.enfcli.2012.11.006>
- Singh, K., & Yu, X. (2010). Psychometric evaluation of the Connor-Davidson Resilience Scale (CD-RISC) in a sample of Indian students. *Journal of Psychology*, 1, 23-30.
- Smith, B. W., Dalen, J., Wiggins, K., Tooley, E., Christopher, P., & Bernard, J. (2008). The brief resilience scale: Assessing the ability to bounce back. *International Journal of Behavioural Medicine*, 15, 194-200. <https://doi.org/10.1080/10705500802222972>
- Smith, B. W., Tooley, E. M., Christopher, P. J., & Kay, V. S. (2010). Resilience as the ability to bounce back from stress: A neglected personal resource? *The Journal of Positive Psychology*, 5, 166-176. <https://doi.org/10.1080/17439760.2010.482186>
- Vaishnavi, S., Connor, K., & Davidson, J. R. T. (2007). An abbreviated version of the Connor-Davidson Resilience Scale (CD-RISC), the CD-RISC*: Psychometric properties and applications in psychopharmacological trials. *Psychiatry Research*, 152, 293-297. <https://doi.org/10.1016/j.psychres.2007.01.006>
- Vanderbilt-Adriance, E., & Shaw, D. S. (2008). Conceptualizing and re-evaluating resilience across levels of risk, time, and domains of competence. *Clinical Child and Family Psychology Review*, 11, 30-58. <https://doi.org/10.1007/s10567-008-0031-2>
- Wald, J., Taylor, S., Asmundson, G. J. G., Jang, K. L., & Stapleton, J. (2006). *Literature review of concepts final report: Psychological resilience*. Toronto, ON: DRDC.
- Wang, L., Shi, Z., Zhang, Y., & Zhang, Z. (2010). Psychometric properties of the 10-item Connor-Davidson Scale in Chinese earthquake victims. *Psychiatry and Clinical Neurosciences*, 64, 499-504. <https://doi.org/10.1111/j.1440-1819.2010.02130.x>
- Wang, C. E., Fredrickson, B. L., & Taylor, S. F. (2008). Adapting to life's slings and arrows: Individual differences in resilience when recovering from an anticipated threat. *Journal of Research in Personality*, 42, 1031-1046. <https://doi.org/10.1016/j.jrp.2008.02.005>
- Windle, G., Bennett, K. M., & Noyes, J. (2011). A methodological review of resilience measurement scales. *Health and Quality of Life Outcomes*, 9(8). <https://doi.org/10.1186/1477-7525-9-8>
- Wingo, A. P., Ressler, K. J., & Bradley, B. (2014). Resilience characteristics mitigate tendency for harmful alcohol and illicit drug use with a history of childhood abuse: A cross-sectional study of 2024 inner-city men and women. *Journal of Psychiatric Research*, 51, 93-99. <https://doi.org/10.1016/j.jpsychires.2014.01.007>
- Ying, L., Wang, Y., Lin, C., & Chen, C. (2016). Trait resilience moderated the relationship between PTSD and adolescent academic burnout in a post-disaster context. *Personality and Individual Differences*, 90, 108-112. <https://doi.org/10.1016/j.paid.2015.10.048>
- Yu, X., Lau, J. T. F., Mak, W. W. S., Zhang, J., Lui, W. W. S., & Zhang, J. (2011). Factor structure and psychometric properties of the Connor Davidson

Resilience Scale among Chinese adolescents. *Comprehensive Psychiatry*, 52, 218-224. <https://doi.org/10.1016/j.comppsy.2010.05.010>
Yu, X., & Zhang, J. (2007). Factor analysis and psychometric evaluation of the Connor-Davidson Resilience Scale (CD-RISC) with Chinese people.

Social Behaviour and Personality, 35, 19-30. <https://doi.org/10.2224/sbp.2007.35.1.19>

