

Validity and reliability evidence of the Psychological Capital Questionnaire-12 in a sample of Mexican workers

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Título: Evidencias psicométricas sobre la validez y fiabilidad del cuestionario de capital psicológico (PCQ-12) en una muestra de trabajadores mexicanos.

Resumen: El capital psicológico es un constructo que se incluye en la teoría del comportamiento positivo de la organización, que se basa en los principios positivos de la psicología. Este concepto está compuesto por cuatro dimensiones, autoeficacia, esperanza, resiliencia y optimismo, que tienen una acción sinérgica. El objetivo de este estudio fue informar sobre las propiedades psicométricas de una de las medidas de capital psicológico, el Cuestionario de Capital Psicológico-12 (CCP-12), en una muestra de 396 trabajadores mexicanos. La estructura factorial de este instrumento se analizó a través de un análisis factorial confirmatorio. La fiabilidad se evaluó con los coeficientes de fiabilidad Alfa y Compuesto de Cronbach. Además, también se evaluaron la validez convergente y discriminante. Con base en estos tres modelos concurrentes, se observó que el modelo que tenía un mejor ajuste estaba compuesto por cuatro factores correlacionados. Se discuten las implicaciones de estos resultados y se proporcionan recomendaciones para futuras investigaciones. Este artículo, que presenta una estructura factorial diferente a la habitual del capital psicológico, sugiere que las diferencias culturales pueden jugar un papel crucial en la forma en que se comporta el constructo evaluado.

Palabras clave: capital psicológico; Cuestionario de Capital Psicológico-12; fiabilidad; validez.

Abstract: Psychological capital is a construct that is included in the positive organizational behavior framework, which is based on positive psychology principles. This concept is composed by four dimensions, self-efficacy, hope, resilience, and optimism, which have a synergistic action. The aim of this study was to report the psychometric properties of one of the measures of psychological capital, the Psychological Capital Questionnaire-12 (PCQ-12), in a sample of 396 Mexican workers. This instrument's factor structure was analyzed through a confirmatory factor analysis. Reliability was assessed with the Cronbach's Alpha and Composite Reliability coefficients. Furthermore, convergent and discriminant validity were also evaluated. Based on three concurrent models, it was observed that the model which possessed a better fit was composed by four-correlated factors. The implications of these results are discussed, and recommendations are provided for future researches. This paper, which presents a different factor structure than the usual of psychological capital, suggests that cultural differences may play a crucial role on the way the assessed construct behaves.

Keywords: Psychological capital; Psychological Capital questionnaire-12; Reliability; Validity.

Introduction

Over the course of several decades, psychology focused solely and exclusively on symptom and disease. Most of the publications focused on symptom and disease instead of on the positive psychological resources of individuals (Myers, 2000; Schaufeli & Salanova, 2007). However, this paradigm of psychology lost emphasis with the publication of Seligman and Csikszentmihalyi (2000), who defended that psychology should evolve in the direction of studying the strengths and psychological capacities of individuals and organizations, and how these can be improved. As such, positive psychology emerges as a paradigm that presupposes a watershed from three pillars: (a) the study of positive emotions; (b) the study of positive traits, strengths, and virtues of individuals; and (c) the study of positive institutions that manifest virtues and are sustained from positive emotions (Seligman, 2003). But what positive psychology has promoted is the study of the positive aspects of the human being in

a context that has given, for a long time, too much importance to negative aspects (Csikszentmihalyi, 2014).

Positive Organizational Behavior (POB) is linked to positive psychology principles and is proposed as a new heretical paradigm that studies the nature and application of positively oriented psychological strengths and abilities. POB has basic criteria essential to consider constructs as positively oriented, such as: (a) having a solid theory and research; (b) being state-like (and therefore, with the possibility of learning and development through prevention and intervention programs); and (c) having a positive impact on job performance (Luthans, Youssef-Morgan, & Avolio, 2015; Youssef-Morgan & Luthans, 2015). Positive psychological capital respects all the above-mentioned criteria and, as such, can be integrated in the POB (Luthans & Youssef, 2004, 2007). This concept comes to suppress the limitations of other types of capital (economic, social, and human), which have been shown to be ineffective in the face of the social, economic, and labor changes in recent years (Luthans, Luthans, & Luthans, 2004). These changes had negative consequences for workers, such as labor precariousness and decreased well-being (Luthans et al., 2015).

Thus, this construct emerged with the aim of improving the psychological resources of workers, which has led to a great development in related studies (Avey, 2014). Positive psychological capital is defined as:

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an individual's positive psychological state of development and is characterized by: (a) having confidence (self-efficacy) to take on and put in the necessary effort to succeed at challenging tasks; (b) making a positive attribution (optimism) about succeeding now and in the future; (c) persevering towards goals and, when necessary, redirecting paths to goals (hope) in order to succeed; and (d) when beset by problems and adversity, sustaining and bouncing back and even beyond (resiliency) to attain success (Luthans, Youssef, & Avolio, 2007, p.3).

Dimensions of Positive Psychological Capital

Hope is a construct developed by Snyder, Irving, and Anderson (1991) from two basic elements, the ability to plan the pathways for achieving the desired objectives and the motivation to reach them (Luthans et al., 2007). As for self-efficacy, this concept is based on the work of Bandura (1997) and is defined as the ability to congregate cognitive and motivational resources and develop strategies to achieve the proposed objectives (Luthans, Avolio, & Avey, 2014). The study of resilience emerged in the 1990s from research in children and adolescents in hardship situations; hence its meaning is associated to the word adaptation (Wagnild & Young, 1993). Resilience is the ability to deal with adversity and recover from it (Block & Kremen, 1996). From the POB perspective, resilience is a proactive dimension, which allows that adversity is perceived as a growth opportunity. Resilience has been shown as a predictor of positive outcomes at work and is open to development (Sánchez-Teruel & Robles-Bello, 2014; Waite & Richardson, 2004). The pioneering researchers in the study of optimism were Scheier and Carver (1985), defining it as a positive attribution that individuals make of the context and situations they undergo (Luthans, Luthans, & Avey, 2014; Luthans et al., 2015).

The conceptualization of positive psychological capital through the four psychological resources referred above has shown an internal synergy from the empirical perspective, which means that psychological capital behaves as a high-order construct (Luthans, Avolio, Avey, & Norman, 2007). In psychometric terms, this means that there is an underlying relationship among the four dimensions that acts as a common mechanism, which contributes to a motivational boost for the achievement of goals and objectives (Luthans et al., 2014; Luthans et al., 2015). Studies performed with this construct, for example, the meta-analyses of Avey, Reichard, Luthans, and Mhatre (2011) and Rus and Jesus (2010) showed that positive psychological capital promotes desirable work attitudes and behaviors (e.g., creativity, organizational citizenship behaviors and job satisfaction) while contributes to reduce undesired work attitudes and behaviors (e.g., cynicism, intention to leave, turnover, and stress). This construct allows a better organizational functioning due to the benefits it brings for workers and may be considered as a competitive advantage.

Instruments used for the Evaluation of Positive Psychological Capital

To evaluate and measure positive psychological capital Luthans et al. (2007) created the *Psychological Capital questionnaire* (PCQ) consisting of 24 items, *Psychological Capital Questionnaire-24* (PCQ-24), and a short version with 12 items, *Psychological Capital Questionnaire-12* (PCQ-12; Avey, Avolio, & Luthans, 2011), both originally developed in the United States of America. In addition to these scales and given the increasing interest of the study of psychological capital and its outcomes, recently new instruments begun to emerge which are more specific to the worker's characteristics. Among them, we can highlight the *Compound PsyCap Scale* (CPC-12; Lorenz, Beer, Pütz, & Heinitz, 2016), the *Optimism, Resilience, Hope and Self-efficacy questionnaire* (OREA; Meseguer-de Pedro, Solar-Sánchez, Fernández-Valera, & García-Izquierdo, 2017), and *Psychological Capital* (Gupta & Singh, 2014). These instruments have shown an empirical structure according with the theoretical model, as well as adequate levels of reliability and validity.

Below we will assess some of the studies that have been performed with the PCQ-12. This instrument has been validated in other countries, such as China (Luthans, Avey, Clapp-Smith, & Li, 2008), New Zealand (Wooley, Hunting, & Levy, 2011), Romania (Rus, Baban, Jesus, & Andrei, 2012), Portugal (Viseu et al., 2012), and Spain, where two validations are reported (Léon-Pérez, Antino, & Léon-Rubio, 2017; Lopez-Núñez, Jesus, Viseu, & Santana, in press). The work of Wersing (2014) should also be mentioned, this author conducted a cross-cultural analysis of the PCQ-12 in twelve countries: Brazil, China, Germany, India, Italy, Mexico, Poland, South Africa, Sweden, Turkey, United Kingdom, and the United States of America. So far, the work of Wersing (2014) is the only scientific report that refers the psychometric properties of the PCQ-12 in Mexico. However, this work exclusively used a sample of executive directors of companies. Some researchers advocate the importance of delving into the psychometric properties of the instrument, to broaden the discussion on this construct's behavior in different sectors and cultures (Antunes, Caetano, & Pina e Cunha, 2017; Dawkins, Martin, Scott, & Sander-son, 2013). Derived from the above, the objective of this work was to study the psychometric properties of the Psychological Capital Questionnaire-12 (PCQ-12) in a sample of Mexican workers and verify if the assumption of a high-order construct is observed. To this end, three concurrent models are proposed: a second-order model, a first-order model, and a four-correlated factors model. In the conceptualization of psychological capital, the model that possesses the best fit is the second-order model (e.g., Alesandri, Borgogni, Consiglio, & Mitidieri, 2015; Badran & Youssef-Morgan, 2015; Wooley et al., 2011). Nevertheless, due to the possible intercultural variations of this construct (Antunes et al., 2007), the two concurrent models mentio-

ned above were also proposed. Regarding these aspects, the following research hypothesis was defined:

Hypothesis 1 (H1): Positive psychological capital, measured by the PCQ-12, presents a better fit for a sample of Mexican workers when it is conceptualized as a second-order construct.

Method

Participants

A total of 396 individuals responded to the chosen instrument. The participants were obtained through convenience sampling and were employees of 15 organizations from different sectors (service, trade, and educational) of the Jalisco state, Mexico. The inclusion criteria were to participate on a voluntary basis and be working at an organization. Participants were informed that the data provided would be managed in accordance with anonymity and confidentiality criteria.

Most of the sample consisted of females (66%, $n = 256$) while 34% ($n = 132$) were males, with an average age of 33 years old ($M = 33.49$; $SD = 10.02$). The occupational profile was varied: operational staff (58.9%, $n = 231$), clerical (18.5%, $n = 69$), teachers (9.3%, $n = 36$), middle management (11.2%, $n = 43$), and managers (2.8%, $n = 11$). As for the educational background: 6.2% ($n = 23$) in the sample had elementary school, 19.9% ($n = 79$) junior high school, 25% ($n = 99$) high school, 6.6% ($n = 26$) technical studies, 32.8% ($n = 130$) university studies, 2.3% ($n = 9$) postgraduate courses, and 1.3% ($n = 5$) unfinished career. Regarding marital status, it was observed that 47.2% ($n = 187$) were single, 39.9% ($n = 164$) married, and 5% ($n = 20$) divorced or separated; 25 individuals did not provide any information (6.3%).

Instrument

We used the reduced version of the PCQ-24 called PCQ-12 (Avey et al., 2011). This version consists of 12 items arranged in a six-point Likert scale (1 - *Strongly Disagree*; 2 - *Disagree*; 3 - *Somewhat Disagree*; 4 - *Somewhat Agree*; 5 - *Agree*; 6 - *Strongly Agree*). This instrument has four dimensions: self-efficacy (3 items), hope (4 items), resilience (3 items), and optimism (2 items). Some examples of items are: *I feel confident presenting information to a group of colleagues* (self-efficacy); *Right now I see myself as being pretty successful at work* (hope); *I can be "on my own", so to speak, at work if I have to* (resilience); and *I'm optimistic about what will happen to me in the future as it pertains to work* (optimism).

Procedure

First, we asked the authors of the instrument for authorization to use the PCQ-12, such request was performed through the website of *Mind Garden* (www.mindgarden.com).

Once the authorization was granted, the next step was the translation of the instrument from English into Spanish in a four-stage process, in accordance with the premises of van Widenfelt, Treffers, Beurs, Siebelink, and Koudijs (2005). Initially, the PCQ-12 was translated from the original language (English) into Spanish, this procedure was performed through an independent bilingual and bicultural judge. Then, this same instrument was subject to retroversion (i.e., re-translation of the PCQ-12 from Spanish into English). The retroversion process was performed by a second judge, equally bilingual and bicultural. The third stage aimed to compare the two versions obtained, in the presence of the two independent judges, to resolve differences at the level of the vocabulary used. Finally, we conducted a pilot study, 50 individuals were asked to state whether the obtained version of the PCQ-12 needed any adjustments in the content of the items to make them more understandable. According to Weeks, Swerissen, and Belfrage (2007), a correct translation has benefits in terms of validity and reliability.

The PCQ-12 was administered in work contexts, in the presence of the authors, and on a single occasion. All participants did so anonymously, completely voluntarily, and signed an informed consent statement. The questionnaires were administered in a paper and pencil format and the completion took 15 minutes on average.

The administration occurred between February and May 2016. As for data collection, and even though there is no agreement about the size of the sample needed to perform a confirmatory factor analysis (CFA), the authors followed the recommendations of Pais-Ribeiro (2008), each item should be answered by at least 5 participants. In addition, Lloret-Segura, Ferreres-Traver, Hernández-Baeza, and Tomás-Marco (2014) recommended applying the CFA to samples larger than 200 participants. Both the premises of Pais-Ribeiro (2008) and those of Lloret-Segura et al. (2014) were fulfilled, and the final sample consisted of 396 individuals.

Statistical Analysis

Given that the PCQ-12 has a predefined factorial structure, the analysis of the properties of the instrument was conducted through a CFA performed with the software Analysis of Moment Structures (AMOS) version 20. Prior to this analysis, the authors assessed the multivariate normal distribution through the values of skewness and kurtosis. In addition, the value of the Mardia test was also considered for the multivariate normal distribution, this test must present values lower than 5 (Byrne, 2010). The result of the Mardia test was higher than the referred value. Despite this result, and in accordance with Iacobucci (2010), if the values of skewness and kurtosis are not too high, the distance from normality is not enough to question the results of a model.

There is no consensus in the literature regarding the values that indicate the existence of a multivariate normal distribution, however some authors (e.g., Curran, West, & Finch, 1996) consider that for the maximum likelihood esti-

mation method, the most used in structural equation modeling, skewness and kurtosis values of 2 and 7, respectively, indicate the presence of a multivariate normal distribution. The results obtained respected the above-mentioned values and they were not too high. Therefore, we used the maximum likelihood estimation method to evaluate the data, since it is more robust regarding possible breaches from multivariate normality (Iacobucci, 2010; Marôco, 2010) (Table 1).

Table 1. Uni and Multivariate Statistical Analysis ($N = 396$).

Item	<i>M</i>	<i>SD</i>	<i>SI</i>	<i>KI</i>
1	4.89	1.145	-1.34	1.70
2	4.71	1.171	-.96	.71
3	4.80	1.188	-1.04	.71
4	5.05	1.084	-1.47	2.45
5	4.98	1.098	-1.21	1.40
6	5.21	.957	-1.78	4.60
7	4.58	1.310	-.95	.49
8	5.01	1.195	-1.49	2.05
9	4.26	1.510	-.75	-.32
10	4.96	1.244	-1.43	1.73
11	5.26	.993	-1.82	4.08
12	5.31	.965	-1.88	4.24

Mardia Test normalized and registered: 53.494

Note. *M* = Mean; *SD* = Standard-deviation; *SI* = Skewness Index; *KI* = Kurtosis Index.

Three models were initially proposed to analyze the structure of the data: second-order model, first-order model, and four-correlated factors model. The second-order model (model 1) consisted of four factors: self-efficacy, hope, resilience, and optimism linked to a second-order factor called positive psychological capital. The variance of this model was established as one. In the case of first-order model or one-dimensional model (model 2), it was decided that the first item should present a factor loading of one. Finally, in the four-correlated factors model (model 3), it was decided that the first item on each of the dimensions should present a factor loading of one.

The Chi-squared goodness-of-fit test (χ^2) was used to evaluate the quality of the model. However, this test presents a limitation related to the sample size, in large samples it may indicate the existence of statistically significant differences despite they are not present. To overcome this limitation, the Comparative Fit Index (CFI), the Root Mean Square Error of Approximation (RMSEA), the Standardized Root Mean Square Residual (SRMR), and the Normed Chi-squared (χ^2/df) indexes were considered. CFI values between .90 and .95 are considered good, and values above .95 are very good (Byrne, 2010; Marôco, 2010). A RMSEA bet-

ween .05 and .10 is acceptable and below .05 is good (Byrne, 2010; Marôco, 2010). In addition, a confidence interval of 90% was also considered for this index (90% RMSEA). A value of SRMR below .08 indicates a good fit (Hu & Bentler, 1999). Finally, values of χ^2/df lower than five are acceptable.

The factor loadings obtained were compared with the values proposed by Comrey and Lee (1992), excellent ($>.71$), very good ($>.63$), good ($>.55$), acceptable ($>.45$), and poor ($>.32$). The modification indices of the models were observed to improve their quality. The difference between the models was evaluated through the ΔCFI , values greater than .01 indicate that the models are statistically different (Cheung & Rensvold, 2002).

Convergent and discriminant validity were also assessed. To observe the existence of convergent validity the values of Average Variance Extracted (AVE) were evaluated, which must be greater than .50 (Bagozzi & Yi, 1988; Sharma, 1996). Discriminant validity was analyzed through the comparison between the AVE values of each construct and the values of their squared correlations (Fornell & Larcker, 1981).

Finally, reliability was assessed by using the Cronbach's Alpha and Composite Reliability (CR) coefficients. The results obtained were classified according to the proposal of Sharma (1996), values above .90 are excellent, between .80 and .90 are very good, between .70 and .80 are adequate, and below .50 are poor.

Results

Model 1 (second-order model) showed a poor fit. The same situation was observed in model 2 (first-order model), only the SRMR index respected the cut-off defined. In opposition, model 3 (four-correlated factors) showed a good fit (Table 2).

Table 2. Fit Indexes for the Assessed Factor Structures ($N = 396$).

Model	χ^2	<i>df</i>	χ^2/df	RMSEA	90%RMSEA	SRMR	CFI
Model 1	827.808**	62	13.352	.177	.166-.188	.335	.634
Model 2	355.285**	54	6.579	.119	.107-.131	.063	.856
Model 3	147.212**	48	3.067	.072	.059-.086	.045	.953

Note. Model 1 = second-order model; 2 = first-order model; Model 3 = four-correlated factors model; ** $p < .01$; *df* = degrees of freedom.

All the factor loadings were statistically significant and possessed the expected sign (Table 3). Item nine had a poor factor loading in model 2 (first-order model), according to the classification of Comrey and Lee (1992).

Table 3. Factor Loadings of the Items of PCQ-12 in the Proposed Factors Structures ($N = 396$).

Items	Model 1		Model 2		Model 3	
	λ^a	δ^b	λ	δ	λ	δ
Self-efficacy	.49 (.85;.86) ^c	-	-	-	(.85;.85)	-
Item 1	.82	.67	.71	.51	.80	.64
Item 2	.84	.70	.71	.51	.84	.70
Item 3	.79	.62	.73	.53	.80	.63
Hope	.40 (.79;.79)	-	-	-	(.79;.79)	-
Item 4	.69	.48	.69	.47	.70	.49
Item 5	.71	.50	.69	.48	.72	.53
Item 6	.79	.62	.71	.51	.75	.57
Item 7	.59	.35	.60	.36	.62	.39
Resilience	.39 (.58;.59)	-	-	-	(.58;.57)	-
Item 8	.61	.37	.58	.34	.63	.40
Item 9	.49	.24	.25	.06	.35	.12
Item 10	.61	.37	.57	.33	.67	.45
Optimism	.42 (.81;.82)	-	-	-	(.81;.82)	-
Item 11	.82	.66	.72	.52	.84	.70
Item 12	.84	.70	.71	.51	.82	.67
PsyCap	-	-	(.88;.90)	-	-	-

Note. Model 1 = second-order model; 2 = first-order model; Model 3 = four-correlated factors model; ^aFactor Loadings; ^bItem uniqueness; ^cCronbach's Alpha and Composite Reliability coefficients.

After the initial evaluation of the factor structures proposed, we analyzed the modification indices for improvements in the fit of the models, especially regarding possible covariances between the errors of the items of PCQ-12. We identified two items, items nine and ten, and then their statistical significance was assessed. Therefore, the three models were re-specified considering this covariance (Table 4).

Table 4. Fit Indexes for the Re-specified Factor Structures ($N = 396$).

Model	χ^2	df ^a	χ^2/df	RMSEA	90%RMSEA	SRMR	CFI
Model 1	611.522**	61	10.025	.151	.141-.162	.299	.737
Model 2	319.740**	53	6.033	.100	.088-.112	.055	.902
Model 3	146.389**	47	3.115	.064	.050-.078	.038	.964

Note. Model 1 = second-order model; 2 = first-order model; Model 3 = four-correlated factors model; ** $p < .01$; df = degrees of freedom.

All the factor loadings were statistically significant and showed the expected sign (Table 5). As in the previous case, item nine in models 2 and 3, reported a low factor loading (Comrey & Lee, 1992).

Table 5. Factor Loadings of the Items of PCQ-12 in the Re-specified Factor Structures ($N = 396$).

Items	Model 1		Model 2		Model 3	
	λ^a	δ^b	λ	δ	λ	δ
Self-efficacy	.40 (.85;.86) ^c	-	-	-	(.85;.87)	-
Item 1	.82	.67	.73	.54	.82	.67
Item 2	.84	.70	.74	.54	.85	.73
Item 3	.79	.62	.75	.56	.81	.66
Hope	.36 (.79;.82)	-	-	-	(.79;.82)	-
Item 4	.73	.54	.69	.48	.73	.54
Item 5	.74	.55	.69	.48	.76	.57
Item 6	.82	.67	.71	.50	.78	.61
Item 7	.63	.40	.60	.36	.65	.43
Resilience	.30 (.58;.56)	-	-	-	(.58;.54)	-
Item 8	.59	.35	.58	.35	.64	.41
Item 9	.47	.22	.23	.05	.28	.08
Item 10	.58	.33	.55	.30	.65	.42
Optimism	.42 (.81;.87)	-	-	-	(.81;.86)	-
Item 11	.88	.78	.68	.47	.86	.74
Item 12	.88	.77	.67	.45	.88	.78
PsyCap	-	-	(.88;.89)	-	-	-

Note. Model 1 = second-order model; 2 = first-order model; Model 3 = four-correlated factors model; ^aFactor Loadings; ^bItem uniqueness; ^cCronbach's Alpha and Composite Reliability coefficients.

Model 1 (second-order model) obtained a poor fit, not respecting any of the cut-off values for the indexes considered. In turn, model 2 (first-order model) and 3 (four-correlated factors) presented a good fit, however they were statistically different ($\Delta CFI = -.62$). Model 3 had the best fit showing good values for all the selected indexes. These results are contrary to H1, in which it was mentioned that the second-order model would be the most suitable for conceptualizing positive psychological capital in a sample of Mexican workers. Thus, it can be affirmed that the advanced research hypothesis was not corroborated by the obtained data. In relation to the factor loading of the items, except item nine in models 2 ($\lambda = .23$) and 3 ($\lambda = .28$), all the remaining items ranged from acceptable ($\lambda = .47$) to excellent ($\lambda = .88$). This classification is based on the assumptions of Comrey and Lee (1992), allowing us to state that the indicators of this instrument, excluding item nine, possess individual reliability, given that their factor loadings was higher than .45.

Since model 3 presented a better fit, we calculated the discriminant and convergent validity considering its results. The AVE values met the cut-off point defined in the literature (.50) except for the resilience dimension. If the convergent validity of this dimension is calculated by deleting item nine, because this item obtained a poor factor loading, it can be observed that the values achieved improve (.42) (Table 6). However, this value is not sufficient to consider that this dimension has convergent validity. Discriminant validity values can also be found in Table 6. From the analysis of this table it can be concluded that the dimensions of the instrument under analysis have adequate discriminant validity. Fi-

nally, regarding reliability, all values were acceptable, ranging from acceptable (.79) to good (.89) (Sharma, 1996). An exception occurred in the resilience dimension in models 1 and 3.

Table 6. Convergent and Discriminant Validity Values ($N = 396$).

Dimensions	1.	2.	3.	4.
1. Self-efficacy	.68			
2. Hope	.44	.54		
3. Resilience	.27	.34	.42	
4. Optimism	.31	.42	.36	.76

Note. AVE values are indicated in bold. The other values are the squared correlations.

With the goal of addressing the limitations posed by item nine, both at the individual reliability of items and the reliability of the resilience dimension, we calculated model 3, which had a better fit, without including the item referred above. The results obtained considered the cut-off values defined ($\chi^2(39) = 107.592, p < .01; \chi^2/df = 2.579; RMSEA = .067; 90\%RMSEA = [.052-.082]; SRMR = .058; CFI = .966$), which were, in general, good. Table 7 reports the values of the factor loadings of the items of PCQ-12 and the reliability results for model 3 with the exclusion of item nine.

Table 7. Factor Loadings of the Items of PCQ-12 for Model 3 Excluding Item Nine ($N = 396$).

Items	Model 3	
	λ^a	δ^b
Self-efficacy	(.85;.87) ^c	-
Item 1	.82	.67
Item 2	.85	.73
Item 3	.81	.66
Hope	(.79;.82)	-
Item 4	.74	.54
Item 5	.76	.57
Item 6	.78	.61
Item 7	.65	.43
Resilience	(.53;.59)	-
Item 8	.64	.41
Item 10	.65	.42
Optimism	(.81;.86)	-
Item 11	.86	.74
Item 12	.88	.78

Note. Model 3 = four-correlated factors model; ^aFactor loadings; ^bItem uniqueness; ^cCronbach's Alpha and Composite Reliability coefficients.

As it can be observed, deleting item nine in model 3 led to a better individual reliability of the items of PCQ-12, varying their factor loadings between .64 and .88, in accordance to the classification of Comrey and Lee (1992), between very good and excellent. At the internal consistency level, deleting item nine did not produce significant changes, since the dimension resilience continued to present a value lower than .70.

Discussion

The objective of this study was to evaluate the psychometric properties, validity and reliability, of the PCQ-12 in a sample of Mexican workers and to observe if positive psychological capital behaves as a second-order construct. In this work, through a CFA, three concurrent models were analyzed, and it was found that the four-correlated factors model was the one that showed a better fit, which indicates that each of the four dimensions of positive psychological capital have their own identity and interact with each other. These results did not coincide with what was stated in H1, which suggested that positive psychological capital, as measured by the PCQ-12, in a sample of Mexican workers, would present a factor structure composed by a second-order construct.

Our results are consistent with those obtained in Portugal, Spain, and Brazil (Formiga, Viseu, & Jesus, 2014; Lopez-Núñez et al., in press; Viseu et al., 2012) who also describe a four-correlated factors model and equally represent Latin cultures, different from the population that led to the creation of the PCQ-12, providing new information about the behavior of this construct in cultures with languages other than English, possibility previously suggested by Rus et al. (2012). Azanza, Domínguez, Moriano, and Molero (2014) underlined how tests performed with different samples and with varied compositions may lead to distinct factor arrangements.

The results showed a very good global internal consistency for the PCQ-12 in the studied sample. The option to present a global value was based on the works of Avey et al. (2011), Rus et al. (2012), and Viseu et al. (2012). This situation allows to resolve an issue raised by past studies (e.g., León-Pérez et al., 2017), where it was verified that there is great variability in the reliability values of this instrument, thus an overall reliability value should be presented, and the CFA results must be valued (Rus et al., 2012; Urbina, 2004). The results obtained are in line with the reliability analyses performed in other countries (e.g., China, Australia, and Romania reported overall values of .68, .88, and .90, respectively, not presenting results by dimension) (Wernsing, 2014).

Regarding the analysis performed by dimension, Dawkins et al. (2013) observed in a review of 29 psychometric studies that optimism and resilience dimensions tend to be lower than the dimensions self-efficacy and hope. As for the resilience dimension, previous validation studies in other populations also reported a poor reliability (León-Pérez et al., 2017; Lopez-Núñez et al., in press; Viseu et al., 2012). This seems to indicate that the resilience dimension tends to show a lower reliability, suggesting that there is a great fluctuation of answers and that this dimension does not properly discriminate this construct (Martínez, Hernández, & Hernández, 2014). This situation was also observed in our study where, except for resilience, all the other dimensions obtained very good results (Sharma, 1996). The factor loadings of the items varied between acceptable and exce-

llent, except for item nine (belonging to the dimension resilience) in models 2 and 3 (Comrey & Lee, 1992). Given that model 3 had a better fit, we tested its functioning with the removal of the item in question. Thus, it was possible to verify that in this situation, the items of the four-correlated factors model possessed factor loadings that ranged from very good to excellent (Comrey & Lee, 1992). These results were higher than those obtained in previous studies (e.g., López-Núñez et al., in press; Rus et al., 2012; Viseu et al., 2012).

The results suggest that, although being complementary concepts and act synergistically, self-efficacy, optimism, resilience, and hope are different constructs (Bagozzi & Yi, 1988; Fornell & Larcker, 1981; Sharma, 1996). However, these results are far from diminishing the interest of this paper but add interesting information to the research on the PCQ 12 and the theoretical conceptualization of psychological capital in cases in which it has a different behavior from that referred by the authors of the instrument (Rego, Marques, Leal, Sousa, & Pina e Cunha, 2010). Dawkins et al. (2013), go beyond these considerations and point out that: “additional studies, outside the core PsyCap authorship team (so to encourage independent replication)” (p. 355-357) and in this sense, “a contra-theoretical result may be as valuable as a supportive one” (Rego et al., 2017, p. 1533).

The results indicate that the PCQ-12 may be considered a valuable instrument to measure positive psychological capital in samples of Mexican workers, but it is necessary to fill some of the gaps found in the dimension resilience, as verified in studies conducted in other countries (e.g., López-Núñez et al., in press; Viseu et al., 2012). The data obtained from the reliability and validity analysis suggest that item nine in this dimension is deleted. By deleting it, it was possible to observe an improvement in individual reliability. However, reliability and convergent validity values for the resilience dimension did not significantly improve. Therefore, the limitations identified may not be of the item nine *per se*, but of the resilience dimension. One possibility is that the resilience dimension should be reformulated trying new combinations of items. To achieve this goal, items of the resilience dimension of the PCQ-24 could be selected and included in the PCQ-12 replacing the original items. Future studies can follow this line in two ways, (a) perform an exploratory factor analysis (EFA) of the items in the PCQ-24 and select the best items for each dimension, including resilience, while trying to keep the original number of items of each dimension; or (b) conduct a CFA with the original items of the PCQ-12 for the self-efficacy, hope, and optimism dimensions, and include new combinations of items for resilience to test those that best suit the factorial solution.

This paper is not exempt from limitations that should be considered, for example the sample size. The number of participants is not representative of the Mexican working population, so the sample should be expanded both geo-

graphically and in employment characteristics, as well as using procedures that represent the sample assessed (whether by population, by economic sector, by status, etc.). Regarding the use of the assessment instrument and research design, it would have been useful to evaluate other variables (e.g., job satisfaction) to observe the behavior of the PCQ-12. The use of a cross-sectional design also presents its difficulties, because positive psychological capital can be influenced by sociodemographic variables, such as years of experience, and organizational culture, climate, and organizational health.

Future research should analyze the convergent and discriminant validity of positive psychological capital with respect to other constructs (Antunes et al., 2017). Another line of research would be the use of longitudinal studies with antecedent variables that may influence this construct (e.g., demographic variables and variables linked to the job context) as suggested by Avey (2014). Also, it would be useful to understand how positive psychological capital behaves as a moderating and mediating variable, an aspect that would promote a development in this research field, since so far it has solely focused on the outcomes of this construct (Newman, Ucbasaran, Zhu, & Hirst, 2014). Other validation studies should consider the content of the items of the PCQ-12, using simultaneously other assessment tools of psychological capital (e.g., OREA Questionnaire; Meseguer-de Pedro et al., 2017), because the formulation of some items may not be relevant for all types of workers (Meseguer-de Pedro et al., 2017). Finally, cross-cultural studies are also needed to measure how this construct behaves both in terms of factor structure and in terms of its relationship with other variables in different contexts.

It is also desirable to highlight the implications of this paper, which provides interesting and novel data with respect to the PCQ-12 and the theoretical conceptualization of positive psychological capital. Also, it overcomes some limitations regarding the psychometric assessment of this instrument, since typically only reliability values of the PCQ-12 are reported, without including validity evidences (Viseu et al., 2012). In this work we tested alternative solutions to eliminate the psychometric limitations observed, particularly at the reliability level of some dimensions and individual reliability of the items (Dawkins et al., 2013), and included data on discriminant and convergent validity. In our sample, it was observed that all dimensions of the presented instrument have an adequate convergent validity, excluding the resilience dimension. In terms of discriminant validity, it is possible to affirm that the dimensions of positive psychological capital are independent, even if they act synergistically, to promote the positive psychological resources of individuals, which have practical implications in the organizational environment because each dimension can be identified and developed to improve performance, as well as to promote the psychological capital of employees (Dawkins et al., 2013; Rego et al., 2010).

References

- Alessandri, G., Borgogni, L., Consiglio, C., & Mitidieri, G. (2015). Psychometric properties of the Italian version of the Psychological Capital Questionnaire. *International Journal of Selection and Assessment*, 23, 149-159. doi: 10.1111/ijsa.12103
- Antunes, A. C., Caetano, A., & Pina e Cunha, M. (2017). Reliability and construct validity of the Portuguese version of the Psychological Capital Questionnaire. *Psychological Reports*, 120, 520-536. doi: 10.1177/0033294116686742
- Avey, J. (2014). The left side of psychological capital: New evidence on the antecedents of PsyCap. *Journal of Leadership & Organizational Studies*, 21, 141-149. doi: 10.1177/1548051813515516
- Avey, J. B., Avolio, B. J., & Luthans, F. (2011). Experimentally analyzing the impact of leader positivity on follower positivity and performance. *Leadership Quarterly*, 22, 282-294. doi: 10.1016/j.leaqua.2011.02.004
- Avey, J. B., Reichard, R. J., Luthans, F., & Mhatre, K. H. (2011). Meta-Analysis of the impact of positive psychological capital on employee attitudes, behaviors, and performance. *Human Resource Development Quarterly*, 22, 127-152. doi: 10.1002/hrdq.20070
- Azanza, G., Domínguez, Á. J., Moriano, J. A., & Molero, F. J. (2014). Capital psicológico positivo: Validación del cuestionario PCQ en España. *Anales de Psicología*, 30, 294-301. doi: 10.6018/analesps.30.1.153631
- Badran, M., & Youssef-Morgan, C. (2015). Psychological capital and job satisfaction in Egypt. *Journal of Managerial Psychology*, 30, 354-370. doi: 10.1108/JMP-06-2013-0176
- Bagozzi, R., & Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the Academy of Marketing Science*, 16(1), 74-94.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York, NY: Freeman.
- Block, J., & Kremen, A. M. (1996). IQ and ego-resiliency: Conceptual and empirical connections and separateness. *Journal of Personality and Social Psychology*, 70, 349-361. doi: 10.1037/0022-3514.70.2.349
- Byrne, B. (2010). *Structural equation modeling with AMOS: Basic concepts, application, and programming* (2nd ed.). New York, NY: Routledge.
- Cheung, G., & Rensvold, R. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling*, 9, 233-255. doi: 10.1207/S15328007SEM0902_5
- Comrey, A., & Lee, H. (1992). *A first course in factor load analysis* (2nd ed.). New York, NY: Erlbaum.
- Csikszentmihalyi, M. (2014). *Flow and the foundations of positive psychology: The collected works of Mihaly Csikszentmihalyi*. Claremont, CA: Springer.
- Curran, P., West, S., & Finch, J. (1996). The robustness of test statistics to non-normality and specification error in confirmatory factor load analysis. *Psychological Methods*, 1, 16-29. doi: 10.1037/1082-989X.1.1.16
- Dawkins, S., Martin, A., Scott, J., & Sanderson, K. (2013). Building on the positives: A psychometric review and critical analysis of the construct of psychological capital. *Journal of Occupational and Organizational Psychology*, 86, 348-370. doi:10.1111/joop.12007
- Formiga, N., Viseu, J., & Jesus, S. N. (2014). Empirical verification of a measure of positive psychological capital in Brazilian workers. *Eureka*, 11, 284-300.
- Fornell, C., & Larcker, D. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18, 39-50. doi: 10.2307/3151312
- Gupta, V., & Singh, S. (2014). Psychological capital as a mediator of the relationship between leadership and creative performance behaviors: Empirical evidence from the Indian R&D sector. *The International Journal of Human Resource Management*, 25, 1373-1394. doi: 10.1080/09585192.2013.870311
- Hu, L., & Bentler, P. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, 6, 1-55. doi: 10.1080/10705519909540118
- Iacobucci, D. (2010). Structural equation modeling: Fit indices, sample size, and advanced topics. *Journal of Consumer Psychology*, 20, 90-98. doi: 10.1016/j.jcps.2009.09.003
- Léon-Pérez, J. M., Antino, M., & Léon-Rubio, J. M. (2017). Adaptation of the short version of the Psychological Capital Questionnaire (PCQ-12) into Spanish. *Revista de Psicología Social*, 32, 196-213. doi: 10.1080/02134748.2016.1248024
- Lloret-Segura, S., Ferreres-Traver, A., Hernández-Baeza, A., & Tomás-Marco, I. (2014). El análisis factorial exploratorio de los ítems: Una guía práctica, revisada y actualizada. *Anales de Psicología*, 30, 1151-1169. doi: 10.6018/analesps.30.3.199361
- López-Núñez, M. I., Jesus, S. N., Viseu, J., & Santana, C. S. (en prensa). Capital psicológico de los trabajadores españoles: Análisis factorial confirmatorio del PCQ-12. *Revista Iberoamericana de Diagnóstico y Evaluación – e Avaliação Psicológica*.
- Lorenz, T., Beer, C., Pütz, J., & Heinitz, K. (2016). Measuring psychological capital: construction and validation of the compound PsyCap scale (CPC-12). *PLoS one*, 11, e0152892. doi: 10.1371/journal.pone.0152892
- Luthans, F., Avey, J., Clapp-Smith, R., & Li, W. (2008). More evidence on the value of Chinese workers' psychological capital: A potentially unlimited competitive resource? *The International Journal of Human Resource Management*, 19, 818-827. doi:10.1080/09585190801991194
- Luthans, F., Avolio, B. J., Avey, J. B., & Norman, S. M. (2007). Positive psychological capital: Measurement and relationship with performance and satisfaction. *Personnel Psychology*, 60, 541-572. doi: 10.1111/j.1744-6570.00083.x
- Luthans, F., Avolio, B. J., & Avey, J. B. (2014). *Psychological capital questionnaire: Manual development, applications, & research*. Menlo Park, CA: Mind Garden Inc.
- Luthans, B., Luthans, K., & Avey, J. (2014). Building the leaders of tomorrow: The development of academic psychological capital. *Journal of Leadership & Organizational Studies*, 21, 191-199. doi: 10.1177/1548051813517003
- Luthans, F., Luthans, K. W., & Luthans, B. C. (2004). Positive psychological capital: Beyond human and social capital. *Business Horizons*, 47, 45-50. doi: 10.1016/j.bushor.2003.11.007
- Luthans, F., & Youssef, C. M. (2004). Human, social, and now positive psychological capital management: Investing in people for competitive advantage. *Organizational Dynamics*, 33, 143-160. doi:10.1016/j.orgdyn.2004.01.003
- Luthans, F., & Youssef, C. M. (2007). Emerging positive organizational behavior. *Journal of Management*, 33, 321-349. doi: 10.1177/0149206307300814
- Luthans, F., Youssef, C., & Avolio, B. (2007). *Psychological capital: Developing the human competitive edge*. New York, NY: Oxford University Press.
- Luthans, F., Youssef-Morgan, C., & Avolio, B. J. (2015). *Psychological capital and beyond*. New York, NY: Oxford University Press.
- Marôco, J. (2010). *Análise de equações estruturais: Fundamentos teóricos, software e aplicações*. Pêro Pinheiro, Portugal: ReportNumber.
- Martínez, A., Hernández, L., & Hernández, L. (2014). *Psicometría*. Madrid, España: Alianza Editorial.
- Meseguer-de Pedro, M., Soler-Sánchez, M. I., Fernández-Valera, M. M., & García-Izquierdo, M. (2017). Evaluation of psychological capital in Spanish workers: design and empirical structure of the OREA questionnaire. *Anales de Psicología*, 33, 713-721. doi: 10.6018/analesps.33.3.238571
- Myers, D. (2000). The funds, friends and faith of happy people. *American Psychologist*, 55, 56-67. doi: 10.1037/0003-066X.55.1.56
- Newman, A., Ucbasaran, D., Zhu, F., & Hirst, G. (2014). Psychological capital: A review and synthesis. *Journal of Organizational Behavior*, 35(S1), S120-S138. doi: 10.1002/job.1916
- Pais-Ribeiro, J. (2008). *Metodologia de investigação em psicologia e saúde*. (2.^a ed.). Porto, Portugal: Legis Editora.
- Rego, A., Marques, C., Leal, S., Sousa, F., & Pina e Cunha, M. (2010). Psychological capital and performance of Portuguese civil servants: Exploring neutralizers in the context of an appraisal system. *The International Journal of Human Resource Management*, 21, 1531-1552. doi: 10.1080/09585192.2010.488459
- Rus, C., Baban, A., Jesus, S. N., & Andrei, D. (2012). An analysis of the psychometric properties of the Psychological Capital Questionnaire-12. *Journal of Educational Sciences & Psychology*, 2, 110-122.

- Rus, C., & Jesus, S. N. (2010). Psychological capital in organizational context: A meta-analytic study. In M. Milcu (Ed.), *Modern Psychology Research: Quantitative research vs. Qualitative research?* (pp. 142-151). Sibiu, Romania: Editura Universitara.
- Sánchez-Teruel, D., & Robles-Bello, M. A. (2015). Escala de resiliencia 14 ítems (RS-14): propiedades psicométricas de la versión en español. *Revista Iberoamericana de Diagnóstico y Evaluación – e Avaliação Psicológica*, *40*, 103-113.
- Schaufeli, W., & Salanova, M. (2007). Work engagement: An emerging psychological concept and its implications for organizations. In S. Gilliland, D. Steiner, & D. Skarlicki (Eds.), *Research in social issues in management: Vol. 5 managing social and ethical issues in organizations* (pp. 135-177). Greenwich, CT: Information Age.
- Scheier, M. F., & Carver, C. S. (1985). Optimism, coping, and health: Assessment and implications of generalized outcome expectancies. *Health Psychology*, *4*, 219-247. doi: 10.1037/0278-6133.4.3.219
- Seligman, M. (2003). *La auténtica felicidad*. Barcelona, España: Ediciones B.S.A.
- Seligman, M., & Csikszentmihalyi, M. (2000). Positive Psychology: An introduction. *American Psychologist*, *55*, 5-14. doi: 10.1037/0003-066X.55.1.5
- Sharma, S. (1996). *Applied multivariate techniques*. New York, NY: John Wiley and Sons Inc.
- Snyder, C., Irving, L., & Anderson, J. (1991). Hope and health. In C. Snyder & Forsyth (Eds.), *Handbook of social and clinical psychology* (pp. 285-305). Elmsford, NY: Pergamon.
- Urbina, S. (2004). *Essentials of psychological testing*. Hoboken, NJ: John Wiley & Sons.
- Van Widenfelt, B., Treffers, P., Beurs, E., Siebelink, B., & Koudijs, E. (2005). Translation and cross-cultural adaptation of assessment instruments used in psychological research with children and families. *Clinical Child and Family Psychology Review*, *8*, 135-147.
- Viseu, S., Jesus, N. S., Rus, C., Nunes, H., Lobo, P., Cara-Linda, I. (2012). Capital Psicológico e sua avaliação com o PCQ-12. ECOS. *Estudos Contemporâneos da Subjetividade*, *2*, 4-16.
- Wagnild, G. M., & Young, H. M. (1993). Development and psychometric evaluation of the resilience scale. *Journal of Nursing Management*, *1*, 165-178.
- Waite, P., & Richardson, G. (2004). Determining the efficacy of resiliency training in the work site. *Journal of Allied Health*, *33*, 178-183.
- Weeks, A., Swerissen, H., & Belfrage, J. (2007). Issues, challenges, and solutions in translating study instruments. *Evaluation Review*, *31*, 153-165.
- Wernsing, T. (2014). Psychological capital: A test of measurement invariance across 12 national cultures. *Journal of Leadership & Organizational Studies*, *21*, 179-190. doi: 10.1177/1548051813515924
- Wooley, L., Caza, A., & Levy, L. (2011). Authentic leadership and follower development: Psychological capital, positive work climate, and gender. *Journal of Leadership & Organizational Studies*, *18*, 438-448. doi: 10.1177/1548051810382013
- Youssef-Morgan, C., & Luthans, F. (2015). Psychological capital and well-being. *Stress and Health*, *31*, 180-188. doi: 10.1002/smi.2623.

(Article received: 24-01-2018; revised: 27-03-2018; accepted: 18-04-2018)