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Self-Concept in China: Validation of the Chinese Version of the Five-Factor Self-Concept (AF5) Questionnaire

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Abstract: The principle of invariance is a mandatory methodological requirement for the psychological measures, even when items such as self-concept measures frequently present asymmetric heavy-tailed distributions. Few validated self-concept instruments can be applied in Eastern–Western cross-cultural studies. The Five-Factor Self-Concept Questionnaire (AF5) is one of the few psychometrically sound instruments used to assess multidimensional self-concept in Spanish-speaking samples. The availability of the AF5 in Spanish and Chinese would facilitate cross-cultural research. To validate the Chinese version of the AF5, we used multisample confirmatory factor analysis with transformed dichotomous scales from the median to compare four alternative theoretical models. The sample consisted of 2507 participants (52.3% women) from China ($n = 1298$) and Spain ($n = 1209$), ranging in age from 19 to 35. Analyses confirmed the five-factor structure of the Chinese AF5 (i.e., academic, social, emotional, family, and physical) compared to the Spanish sample. Moreover, the Chinese version of the AF5 was found to be invariant in terms of item-factor weights, factor variance, and between-factor covariance, compared to the original Spanish version. The findings from this first validation study indicate that the Chinese version of the AF5 is an acceptable measure for use with Chinese-speaking adolescents and young adults.

Keywords: self-concept; validation; confirmatory factor analyses; Chinese adolescents and young adults; asymmetric distributions

1. Introduction

Self-concept is usually conceptualized as an individual's self-perception formed by experiences with significant others, attributions for one's own behavior, and environmental reinforcements. The adequate perception, organization, and integration of the experiences that differentiate human beings have been positively related to adequate behavioral, cognitive, affective, and social functioning [1–3]. From this perspective, in the literature, self-concept has been considered an important indicator of psychosocial adjustment [4–6].

However, self-concept is one of the most difficult measures for psychological science because people tend to indicate very high values on the response scale in some sensitive questions (e.g., my family cares for me, or, in reverse form, my family hates me) [7–9]. When a higher rate denotes a good personal valuation, a negative skew is observed (where the tail is on the left side of the distribution); when a high answer implies a poor personal valuation, a heavy positive skew is observed (where the

tail is on the right side of the distribution). Although response distributions are usually unimodal, they present at least two widely recognized technical problems: (1) it is difficult to differentiate the responses that are not in the tail of the distribution [7–9] and (2) wide tails are challenging in that they cause the statistical error to increase more seriously when researchers apply parametric statistics [10–14]. This behavioral pattern observed in psychological science does not seem clearly correlated with behavioral instability newly studied in *Symmetry* [15] but has caused serious problems in confirming invariance [8,9,12], among other well-known problems [11,16,17]. In the present work, we transformed the original response scale, from 1 to 99, to a new scale that is dichotomized by median, which resolves the problem with the skewness of the original distributions [18,19].

This paper addresses whether the AF5 questionnaire, initially designed to measure self-concept in a Western cultural context, is also valid in the non-Western context (here, the Chinese culture). The principle of invariance is a methodological requirement for psychological measures. The AF5 Five-Factor Self-Concept Questionnaire is one of the most common measures used to capture self-concept in Spanish-speaking samples. The AF5 questionnaire is a 30-item scale validated in Spain with more than 6000 participants from 10 to 62 years old. It is designed to assess five domains of self-concept (i.e., academic, social, emotional, family, and physical) rated on a scale of 1 to 99, with six items in each of the five subscales. The AF5 theoretical structure is based on the hierarchical and multidimensional approach proposed by Shavelson and colleagues (1976) [2], where self-concept is multifaceted rather than a unidimensional construct.

Previous research supports the structural validity of the AF5 Questionnaire. Exploratory factor analyses from studies carried out in Spain [20], Italy [21], and Mexico [22] provide evidence of the validity of the AF5 factorial structure. Additionally, confirmatory factor analyses across samples from different regions and countries, such as Spain [12,23], Peru [24], Chile [19], the United States [18], Portugal [7], the Basque Country [25], and Catalonia [26], have widely support the validity of the AF5 questionnaire. Findings from these studies revealed that all the AF5 items loaded in their specific factors, and complex items were not found. It is important to note that, in contrast with other unidimensional measures such as the Rosenberg Scale [27], the AF5 Questionnaire did not show method effects related to negatively worded items [12,19].

Findings from previous research examining the relationships between the AF5 dimensions and other related constructs confirmed the expected theoretical relationships. For example, these studies used indicators of psychosocial adjustment such as behavior problem profiles during adolescence [28], traditional bullying and cyberbullying victimization [29], video game use among university students [30], long-term socialization outcomes [31], antisocial tendency during adolescence [32], drug use [33,34], self-determined motivation and well-being [35], and adolescent psychosocial maladjustment [36]. Along the same lines, as expected, higher AF5 self-concept scores are related to greater life satisfaction [37] and physical activity [38] and less food neophobia [39]. Furthermore, the AF5 questionnaire has been used as an indicator to validate other measures of self-concept [40] and self-esteem [41]. Finally, the AF5 scale is usually used in the validation of questionnaires to evaluate relevant constructs such as parental psychological control [42], sport motivation [43], academic motivation [44], emotional intelligence [13], or risk of sexual abuse [45].

The impact of cultural values on self-presentation—including self-concept—has been examined by cross-cultural research. The culture might determine, at least in part, self-representation in terms of collectivism (i.e., perceiving the self as part of a collective) and individualism (i.e., perceiving the self as an autonomous individual) [46–49]. It is argued that self-conceptions in individualistic societies are predominantly abstract and decontextualized, while in collectivistic societies they tend to be more influenced by the social context [50]. Overall, self-concept has been considered an important indicator of psychosocial adjustment in children, adolescents, and adults [5,6,31,51], regardless of cultural background (although some cross-cultural scholars have described differences in self-concept scores across ethnic and cultural contexts) [52–54].

Nevertheless, cross-cultural research questions the extent to which empirical findings about self-concept, mainly obtained from studies conducted in Western societies (e.g., Anglo-Saxon and European countries), can be extended to Eastern societies [49,50]. For example, individuals from Western societies have greater self-concept clarity (i.e., the extent to which self-beliefs are clearly and confidently defined, internally consistent, and stable) than their counterparts from Eastern societies [55]. Therefore, an important question is whether the structure of self-concept (i.e., global or multidimensional) is the same or different by cultural context. It seems that individuals from Anglo-Saxon and European countries perceive different but related domains of themselves (i.e., multidimensional self-concept), although these main findings should be tested more exhaustively in other cultural contexts. Specifically, China has received special attention due to its particular cultural traits based on Confucianism and the pursuit of the supreme Chinese virtue, *jen* [46,48]. Previous studies examining self-concept in China have focused only on Chinese participants [56], or have compared Chinese and their counterparts from a Western country but have not analyzed the invariance of the measures [53], or found difficulties in translating the meaning of some items to Chinese language [57], or have examined the invariance of the measures in a sample of adolescents without including adults [58].

In order to compare different constructs (e.g., self-concept or parenting) in cross-cultural research, it is necessary to find out whether the measures of the constructs are culturally invariant, in other words, whether the meaning of the items is the same for respondents in different cultural contexts [58]. To verify that the specific measure consistently evaluates the same construct across various cultural contexts, invariance analysis is usually conducted with multigroup confirmatory factor analyses. Previous studies have examined the invariance of the five-dimensional AF5 structure in different cultural contexts, such as those of Portugal [7], Chile [19], Brazil [14], and the United States [18]. However, all these previous studies were conducted in Western countries, and the multidimensional structure of AF5 has not yet been examined in non-Western cultural contexts. Therefore, the present study aims to test (i) the multidimensionality of the Spanish and Chinese versions of the AF5 using CFA analysis and (ii) the invariance of the multidimensional structure of AF5 in Spanish and Chinese samples.

2. Materials and Methods

2.1. Participants and Procedure

The Chinese sample consisted of 1298 participants (589 adolescents and 709 young adults), ranging from 12 to 31 years old ($M = 17.85$, $SD = 2.99$); there were 684 females (52.7%) and 614 males (47.3%). The Spanish sample consisted of 1209 participants (597 adolescents (49.4%) and 612 young adults (50.6%)), ranging from 12 to 35 years old ($M = 20.20$, $SD = 4.60$); there were 627 females (51.9%) and 582 males (48.1%).

To obtain the adolescent participants, we contacted the heads of high schools, whereas young adults were recruited from universities. In China, four public and private high schools and four public universities were contacted, all of them from a region in Western China. In Spain, six public and private high schools and four public and private universities were contacted, all of them from a region on the East Coast of Spain. All the participants in the present study (88% response rate) (a) were Chinese or Spanish speaking, as were their parents and four grandparents; (b) had received their parents' approval (adolescent participants) and signed informed consent forms; and (c) attended the designated classroom where the research was conducted.

To translate the AF5 from Spanish to Chinese, we used the back-translation method [59]. Thus, the 30 AF5 items were translated from Spanish to Chinese by one group of experts, and then from Chinese to Spanish by another group of experts (for a similar procedure, see [18]). This procedure prevents errors during translation and ensures conceptual equivalence.

2.2. Measures

2.2.1. Self-Concept

The AF5 Five-Factor Self-Concept Questionnaire [20] evaluates five self-concept domains: “academic/professional”, which evaluates individuals’ perceptions of their performance as a student or worker (an example of an item is “I work very hard in class [at work]”, “我很勤奋地学习 [工作]”); “social”, which denotes individuals’ perceptions of their social relationships (an example of an item is “I have many friends”, “我有很多的朋友”); “emotional”, which includes individuals’ perceptions of their emotional state and their reactions to specific situations (an example of a reversed item is “I feel nervous”, “我感到焦虑”); “family”, which refers to individuals’ perceptions of their involvement, participation, and integration in the family context (an example of an item is “I am happy at home”, “我在家感到快乐”); and “physical”, which includes individuals’ perceptions of their physical appearance and performance (an example of an item is “I am good at sports”, “我擅长做运动”). The scale has 30 items (six for each domain) and a 99-point response scale ranging from “1, strong disagreement” to “99, strong agreement”. Higher scores represent a greater sense of self-concept.

2.2.2. Parental Socialization

The acceptance/involvement dimension was measured with the 20 items on the Warmth/Affection Scale (WAS) [60,61]. This scale captures the degree to which adolescents value their parents’ responses as caring and faithful (examples of items are “talk to me in a warm and loving way”, “他们用亲密的方式与我交流” and “make it easy for me to tell them things that are important to me”, “他们让我觉得很容易倾诉一些重要的事情”). Young adult participants were instructed to reflect on how their parents treated them during their adolescence, and so they responded to the adult version (examples of English items are “talked to me in a warm and loving way” and “made it easy for me to tell them things that were important to me”). The strictness/imposition dimension was measured with the 13 items on the Parental Control Scale (PCS) [60,61]. This scale captures the degree of rigid and demanding control that the participants’ parents have over them (examples of items are “they make sure that I know exactly what I can and cannot do”, “他们让我清晰地知道什么是我能做的, 什么是我不能做的事情” and “they give me certain jobs to do and will not let me do anything else until I am done”, “他们会给我布置任务, 并且在我做完之前不允许我做其他任何事情”). The young adult participants also responded to the adult version (examples of English items are “they made sure that I knew exactly what I could and could not do” and “they gave me certain jobs to do and would not let me do anything else until I was done”). The two measures share a Likert-type response scale ranging from 1 to 4, with 1 being “almost never true” and 4 being “almost always true”. Higher scores on the WAS and the PCS indicate greater degrees of acceptance/involvement and strictness/imposition, respectively. These scales have been intensively tested in many studies and found to be significantly correlated with other commonly used measures in this area [60,61]. It is noteworthy that the parental acceptance/involvement dimension has been associated with a high adolescent self-concept, and the strictness/imposition dimension has been related to a low adolescent self-concept [6,31,33,34,60,62].

2.3. Data Analysis

We compared the fit of the four alternative theoretical models. In the first step, a one-factor model was tested. The fit of one-factor or one-dimensional conception of self-concept to data samples was examined [27,63]. In the second step, the orthogonal five-factor model was tested, where self-concept was considered a multidimensional construct with five dimensions (i.e., academic, social, emotional, family, and physical), but these dimensions were orthogonal (i.e., non-related) [2,14,64]. In the third step, the correlated five-factor model was tested, in which the five dimensions of self-concept were correlated with each other [2,7,14]. In the fourth step, the model was the same as in the third step, but we freed the error covariance restriction for the more correlated pairs of items in each factor [65]. The maximum likelihood (ML) estimation method was used for the CFA analysis.

Then, as in previous studies, the negative effect of large standard error on confirmatory fit indexes was examined following the reduction variance method. After converting the 99-point scale to a discrete scale (below or above the median value), all the analyses of the four alternative theoretical models were conducted again (for the same procedure, see also [18], p. 551). In order to examine the fit index, the following statistics were used: Satorra–Bentler chi-squared statistic [66], root-mean-squared error of approximation (RMSEA), comparative fit index (CFI), and Akaike information criterion (AIC). We used the EQS 6.1 [67] software to calculate the fit indexes of the models to the data. We applied the robust Satorra–Bentler chi-squared statistic since all AF5 items are not always normally distributed [66]. Additionally, with the transformed dichotomous scale, we applied tetrachoric correlations [67]. As chi-squared tests of goodness-of-fit models are overly sensitive to sample size [7,68,69], other standard fit indexes were calculated: RMSEA, which values lower than 0.08 are considered acceptable; CFI, whose value must exceed 0.90; and AIC, where the lowest value indicates the highest parsimony [70].

Finally, after the four alternative theoretical models were compared, the invariance between Spanish and Chinese version was tested. Once the baseline model had been identified for each version, the next invariance test was conducted for both the Spanish and Chinese samples under the following conditions: (i) unconstrained, without any restrictions across parameters; (ii) factor pattern coefficients; (iii) factor variances and covariances; and (iv) the equality of the error variances. To prove whether imposing constraining parameters in all samples does not produce a meaningful decrease in fit, the χ^2 test has traditionally been used [71]; however, this test has been widely criticized due to its sensitivity to sample size [69,72]. To test the invariance, we applied the strictness criteria of Cheung and Rensvold (2002) [69], which has been widely evidenced to be robust for testing the multigroup invariance with nested models. When Δ CFI was not more than 10 millesimal, i.e., 0.010, the constrained parameters were considered to be invariant across groups [69]. Conversely, if the restricted model is differentiated by a larger increment, i.e., if Δ CFI was more than 10 millesimal, the invariance is rejected, and the constrained model was confirmed to have led to a meaningful decrease in fit as compared to the unconstrained model.

3. Results

3.1. Confirmatory Factor Analysis

Results obtained for the four models tested in each sample are shown in Table 1. As the table shows, all the fit indexes consistently improved when the models were examined based on the discrete scale.

Table 1. Confirmatory factor analysis and multisample analysis for the invariance between the original Spanish version and the Chinese adaptation.

Model	χ^2	df	RMSEA (90% CI)	CFI	\Delta CFI	AIC
Chinese						
Oblique er.	1858.76	390	0.054 (0.051–0.056)	0.868	0.031	1078.77
Oblique	2206.92	395	0.059 (0.057–0.062)	0.837	0.132	1416.92
Orthogonal	3681.59	405	0.079 (0.077–0.081)	0.705	0.078	2871.59
Unidimensional	4544.71	405	0.089 (0.086–0.091)	0.627		3734.71
Discrete Scale						
Oblique er.	1183.73	390	0.040 (0.037–0.042)	0.919	0.019	403.73
Oblique	1381.38	395	0.044 (0.041–0.046)	0.900	0.073	591.38
Orthogonal	2103.11	405	0.057 (0.054–0.059)	0.827	0.097	1293.11
Unidimensional	3059.65	405	0.071 (0.069–0.073)	0.730		2249.65
Spanish						
Oblique er.	1668.48	390	0.052 (0.050–0.055)	0.899	0.060	888.48
Oblique	2421.28	395	0.065 (0.063–0.068)	0.839	0.043	1631.28
Orthogonal	2971.60	405	0.072 (0.070–0.075)	0.796	0.481	2161.60
Unidimensional	8251.06	405	0.127 (0.124–0.129)	0.378		7441.06

Table 1. Cont.

Model	χ^2	df	RMSEA (90% CI)	CFI	\Delta CFI	AIC
Discrete Scale						
Oblique er.	1064.18	390	0.038 (0.035–0.041)	0.928	0.034	284.18
Oblique	1382.06	395	0.051 (0.048–0.053)	0.894	0.029	592.06
Orthogonal	1658.44	405	0.051 (0.048–0.053)	0.865	0.305	848.44
Unidimensional	4501.61	405	0.092 (0.089–0.094)	0.560		3691.61
Multisample						
Country						
Unrestricted	24,663.35	870	0.040 (0.039–0.041)	0.869		2347.45
Equal loadings	4137.60	805	0.041 (0.039–0.042)	0.860	0.009	2527.60
Equal var./cov.	4310.99	820	0.041 (0.040–0.042)	0.853	0.007	2670.99
Equal errors	6546.97	850	0.052 (0.051–0.053)	0.776	0.077	4846.97
Equal errors 2	4628.05	834	0.043 (0.041–0.044)	0.844	0.009	2960.05

In both samples, the worst fit was shown when the data were constrained to be congruent with the one-dimensional model, obtaining the most distant values from the conventional standards. After that, when the five-dimensional model was introduced, data fit progressively improved. In this regard, the orthogonal five-dimensional model improved the data fit in comparison with the one-dimensional model, and the oblique five-dimensional model obtained a better fit than the orthogonal model. Finally, the best fit was shown when the error covariances of the strongly correlated item pairs within the same factor were freed in the model with five oblique dimensions.

3.2. Multisample Analysis of Invariance between the Original Spanish Version and the Chinese Adaptation

Fit index results obtained from the multisample analysis to test the equivalence across languages are shown in Table 1. Thus, in the unrestricted model (the oblique five-dimensional model), the factor loadings for each item did not differ across groups; the relative importance of each of the five factors was equivalent, and they followed the same relational pattern ($\Delta CFI \leq 0.01$). Finally, with regard to the equivalence of the errors, although at first this constrained step did not provide adequate fit values ($\Delta CFI > 0.01$), after introducing some changes (equal error 2), the pattern of item residual variances and covariances was the same in the two languages ($\Delta CFI \leq 0.01$) for the items with the equal value for both samples. Table 2 gives an overview of the parameters estimated with the most restricted model.

Table 2. Confirmatory factor analysis loadings, variances, covariances, and errors in the most constrained model.

Item	AC	SO	EM	FA	PH	Errors Spain/China
			Factor Loading			
1	0.69					113.4/305.1
6	0.79					86.8/239.3
11	0.72					244.2
16	0.68					298.6
21	0.81					104.0/213.8
26	0.77					98.9/280.8
2		0.81				88.4/220.9
7		0.58				110.5/254.2
12		0.66				325.9
17		0.66				155.4/353.0
22		0.45				650.2
27		0.73				250.0
3			0.46			449.1/662.8
8			0.63			434.1
13			0.57			480.7
18			0.54			494.8
23			0.57			555.0

Table 2. Cont.

Item	AC	SO	EM	FA	PH	Errors Spain/China
28			0.63			388.1/572.8
4				0.49		562.0
9				0.65		180.9/374.6
14				0.63		160.7/415.3
19				0.57		133.9/514.0
24				0.74		200.3
29				0.76		80.8/242.3
5					0.30	407.0/744.0
10					0.37	778.8
15					0.50	534.4
20					0.77	187.4/370.3
25					0.42	645.5
30					0.85	120.2/293.5
Factor variances, [covariances], and (correlations)						
AC	186.7	(0.41)	(0.13)	(0.40)	(0.46)	
SO	[120.8]	295.5	(0.35)	(0.34)	(0.47)	
EM	[27.4]	[83.8]	155.2	(0.22)	(0.19)	
FA	[87.7]	[101.6]	[40.2]	186.1	(0.23)	
PH	[56.1]	[75.2]	[27.9]	[37.9]	59.3	

Note: AC = Academic; SO = Social; EM = Emotional; FA = Family; PH = Physical. All estimated parameters were statistically significant for $\alpha = 0.001$, except the covariance between EM and AC ($p = 0.008$). Negatively worded items (3, 4, 8, 12, 13, 14, 18, 22, 23, and 28) were inverted.

3.3. Reliability

Alpha values for the Spanish and Chinese versions were 0.896 and 0.869 (academic), 0.818 and 0.783 (social), 0.765 and 0.732 (emotional), 0.863 and 0.748 (family), and 0.788 and 0.675 (physical), respectively.

3.4. Convergent Validity

Results of the correlations between the AF5 self-concept dimensions and the main parenting dimensions confirmed the expected theoretical relations [62,73–75] (Table 3). Specifically, a positive relationship was found between the AF5 dimensions (i.e., academic/professional, social, emotional, family, and physical) and parenting acceptance/involvement. Additionally, the highest correlation value was found between family self-concept and parental acceptance/involvement ($r = 0.63$, $r^2 = 0.40$), and only family self-concept was negatively related to the strictness/imposition dimension (robust r^2 intervals (0.07–0.04) did not include the zero value) [16,76–79].

Table 3. Correlations and R^2 between two main parental socialization dimensions and five Self-Concept Dimensions.

AF5 Dimensions	M(SD)	Acceptance/Involvement		Strictness/Imposition	
		r (95% CI)	R^2 (95% CI)	r (95% CI)	R^2 (95% CI)
Academic	6.93 (1.74)	0.335 (0.300–0.370)	0.11 (0.09–0.14)	−0.036 (−0.075 to 0.003)	0.00 (0.01–0.00)
Social	7.23 (1.61)	0.222 (0.184–0.259)	0.05 (0.03–0.07)	0.036 (−0.003 to 0.075)	0.00 (0.00–0.01)
Emotional	5.33 (1.82)	0.147 (0.108–0.185)	0.02 (0.01–0.03)	−0.078 (−0.117 to −0.039)	0.01 (0.01–0.00)
Family	7.83 (1.60)	0.631 (0.607–0.654)	0.40 (0.37–0.43)	−0.232 (−0.269 to −0.195)	0.05 (0.07–0.04)
Physical	6.10 (1.74)	0.205 (0.167–0.242)	0.04 (0.03–0.06)	0.018 (−0.021 to 0.057)	0.00 (0.00–0.00)

4. Discussion

The present study examined the Chinese version of the AF5 Multidimensional Self-Concept Questionnaire using confirmatory factor analysis with multigroup invariance analyses. Overall, findings showed that the theoretical structure proposed for the original Spanish AF5 Questionnaire, where

self-concept is a multidimensional construct (i.e., academic, social, emotional, family, and physical) with five correlated factors, was confirmed in the Chinese sample. Specifically, comparing the fit of the alternative theoretical models to the data, the correlated five-factor model had a better fit than the one-factor model and the orthogonal five-factor model. Additionally, findings also corroborated the measurement invariance between the Chinese and Spanish versions of the AF5 Questionnaire. The Chinese version of the AF5 has good invariant properties on different multisample index criteria, such as factor loadings, and factor variances and covariances; it partially met the criteria regarding error variance of the items. Therefore, the Chinese version of the AF5 Questionnaire has the same multidimensional theoretical pattern as the original Spanish version, and it can be used as a reliable and valid measure of self-concept.

The present study examined the Chinese version of the AF5 Questionnaire, adding new and relevant evidence about self-concept measures. Results from this study confirmed some previous research supporting the correlated five-factor theoretical structure of the AF5, based on studies using exploratory factor analysis [20] and confirmatory factor analysis [12,23]. Results from this study also confirmed those of previous studies concerning the invariant pattern between the original Spanish version of the AF5 Self-Concept Questionnaire and later versions, such as those from Portugal [7], Chile [19], Brazil [14], and the United States [18], extending the evidence to the Chinese version of the AF5 Questionnaire. Additionally, the present results indicated adequate convergent validity of the Chinese version of the AF5 Questionnaire. As expected, theoretical associations between the self-concept domains and the criterion variables (i.e., parental warmth and strictness) were found; as expected, the greatest relationship between the criterion variables and the self-concept dimensions was found in the family domain.

Importantly, the present findings about the multidimensional structure, which was invariant in both the Chinese and Spanish samples, and the convergent validity of the AF5 Questionnaire, make a relevant contribution to the self-concept literature. Specifically, some students of self-concept, such as Baumesiter [63], following a unidimensional approach based on an overall evaluative component of the self [27,63], have seriously questioned the use of self-concept (labeled self-esteem) as a criterion for psychosocial adjustment. Nevertheless, different studies adopting a multidimensional approach to self-concept have revealed that specific dimensions (e.g., academic self-concept) can be consistently related to particular areas of psychosocial adjustment (e.g., school adjustment, including grade point average or intrinsic motivation) (for a review, see [14,51]). The present study found that the multidimensional self-concept structure of the AF5 Questionnaire was invariant in the Spanish and Chinese samples, and a congruent and expected relationship was also found between the AF5 self-concept dimensions and the criterion variables. Thus, the study provides new evidence about self-concept as a multidimensional construct, rather than a global concept, predicting specific areas of psychosocial adjustment.

Even though the more abstract psychological variables may not be commonly used in symmetry literature, the present paper can offer an easy alternative to resolve similar problems with asymmetric distributions. Asymmetric and symmetric diagnoses have been extensively studied [11,17], and different robust tests have been proposed for asymmetric non-normal data [16]. The main concern about transformed data has been that the new scale does not have the original units (e.g., milliseconds in reaction time). However, self-concept units are produced by the 100 possible alternatives that have been drawn in a thermometer for respondents. The authors of the AF5 questionnaire also could have defined five-point rating scale, or even the dichotomous rating scale. On the other hand, although in this case asymmetry could be interpreted as an indicator of behavioral instability (i.e., a question implicating an unacceptably bad self-concept for the respondent) [15], in this concrete scenario it represents at least a serious problem for probing the invariance. This scale change can seem similar to using a dichotomous response format (Yes/No) directly, but it differs because it is the wide 99-point scale of the AF5 which allows splitting the original scores into two equal groups, assuring that the two scale points are nearly equal.

Another crucial contribution of the present study is that, despite the importance of multidimensional self-concept as an indicator of psychosocial adjustment [51,80,81], few measures of self-concept have been shown to be culturally invariant, which is important in making cross-cultural comparisons using valid and reliable measures. Overall, cross-cultural research implies that the relationships between several constructs are examined in different cultural contexts. However, although the same constructs should be captured with the same measures, the measures cannot merely be translated from one language into another assuming that the same statements (i.e., items on the questionnaire) are interpreted equally in different places. Instead, invariance should be tested because, without it, findings across groups will be more difficult to interpret and can even lead to erroneous conclusions [58,82,83].

In sum, the present study offers empirical evidence showing that the AF5 Questionnaire is a reliable and valid measure to capture self-concept in the Chinese language, thus extending research about AF5 self-concept to a non-Western cultural context. Nevertheless, findings from the present study are preliminary and should be viewed with some caution. The sample was recruited from a single Asian country (i.e., China), and so future studies should examine the AF5 self-concept measure in other non-Western countries such as India, Japan, or Arabic countries. Additionally, both the Spanish and Chinese samples include adolescents and young adults. Future studies should examine other adult populations, for instance, middle-aged or older adults.

5. Conclusions

The present study represents a relevant contribution to the literature on self-concept. The AF5 Self-Concept Questionnaire, originally developed in Spain, is one of the most popular measures of self-concept in Spanish language widely used by psychologists and researchers. Previous studies have tested the invariance of the five-dimensional AF5 structure in Portugal [7], Chile [19], Brazil [14], and the United States [18]. In the same line, the present findings extend the empirical evidence about the invariant structure of AF5 to Chinese culture. Additionally, cross-cultural research questions the extent to which results about self-concept in Western societies, such as Anglo-Saxon and European countries, can be extended to Eastern societies such as, for example, China [49]. Therefore, a crucial question is whether the structure of self-concept (i.e., global or multidimensional) is the same or different by cultural context. The main findings from the present study suggest that, despite some cross-cultural variations in self-concept among individuals from Western and non-Western societies, both European (Spanish) and Eastern (Chinese) individuals perceived themselves by a multidimensional related structure of self-concept.

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