

VALIDATING THE TEMPORAL SATISFACTION WITH LIFE SCALE IN SPANISH ELDERLY: A BIFACTOR MODEL APPLICATION

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Abstract

The purpose of this research is to disentangle how much of life satisfaction is due to its stable dimension and how much is due to temporal dimensions on a Spanish elderly sample, studying the Temporal Satisfaction with Life Scale's (TSLS) factorial structure. It is a panel design of 737 people attending the University of Valencia available programs for long life learning (response rate 77.54%). Good levels of internal consistency of the scale were found, alpha for the TSLS was .91, and .83, .81 and .86 for the subscales. Criterion-related and nomological validity evidence was adequate too. Confirmatory models showed that a bifactor (one general dimension of life satisfaction and three domain specific factors of past, present and future satisfaction) structure represented the data more appropriately. TSLS incorporates the time axis measurement with psychometric guarantees, as shown in this first validation of the Spanish version with elderly population.

KEY WORDS: *temporal life satisfaction; long life learning; structural equation modeling; quality of life.*

Resumen

El propósito de esta investigación es desentrañar cuánto de la satisfacción vital se debe a su dimensión estable y cuánto a las dimensiones temporales en una muestra de mayores españoles, estudiando la estructura factorial de la "Escala de satisfacción temporal con la vida" (TSLS). Es un diseño de panel de 737 personas que atienden a los programas de educación a lo largo de la vida de la Universidad de Valencia (tasa de respuesta del 77,54%). Se encontraron buenos niveles de consistencia interna, el alfa para la TSLS fue de 0,91, y de 0,83, 0,81 y 0,86 para las subescalas. La evidencia de validez de criterio y nomológica también fue adecuada. Los modelos confirmatorios mostraron una estructura bifactorial (una dimensión general de satisfacción vital y tres factores específicos temporales de satisfacción pasada, presente y futura) como la mejor representación de los datos. La TSLS incorpora la medida de un eje temporal con garantías psicométricas, tal y como se puede ver en esta primera validación de la versión española en población mayor.

PALABRAS CLAVE: *satisfacción con la vida temporal; aprendizaje a lo largo de la vida; modelos de ecuaciones estructurales; calidad de vida.*

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Introduction

Well-being and mental health research have gained increasing attention over the last decade, becoming a key topic in scholar and political circles alike. Although most of researchers agree with the general definition positing that well-being is an “optimal psychological functioning and experience” (Ryan & Decy, 2001, p. 142), there is still a debate on its nature.

Hedonic and eudaimonic views are the two traditional perspectives in the study of well-being (Ryan & Decy, 2001). The eudaimonic or psychological well-being (PWB) model encourages people to live in accordance with their true self (Waterman, 1993). Within this perspective, those mechanisms that are associated with healthy human functioning and adjustment are emphasized. The hedonic or subjective well-being (SWB) approach, in turn, is focused on immediate human functioning and experience, and equates well-being with happiness. This perspective consists in conceptualizing well-being as subjective happiness, the experience of pleasure vs. displeasure (Ryan & Deci, 2001). As this, happiness is not just physical hedonism, but it is also derived from outcomes and the attainment of goals (Diener, Sapyta, & Suh 1998).

From this last point of view, two different parts of the construct of subjective well-being have been identified: an affective part (Diener & Emmons, 1984), and a cognitive component, traditionally known as life satisfaction (Andrews & Withey, 1976). Life satisfaction is a conscious cognitive judgment, based on the comparison of one’s life with a self-imposed standard or set of standards, which lead to a global assessment of life (Pavot & Diener, 1993).

A key aspect when dealing with such a complex construct is its operationalization. Indeed, a great number of life satisfaction measures have been developed. Among them, the most widely used has been the Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985). Proof of its ubiquity is the large number of adaptations of the scale made in the most diverse languages and populations. The SWLS includes five items measuring overall satisfaction with life. It is a global assessment, but item contents include sentences referred to present conditions as well as two items referred to the past. Therefore, the disentangling of the temporal axis in life satisfaction should be important.

Following that same reasoning, Pavot, Diener, and Suh (1998) developed a measure based on the SWLS that included the same five items but temporally referred to the past, the present, and the future. They named this new scale the Temporal Satisfaction with Life Scale (TSLS). The inclusion of a temporal frame may help to avoid measurement bias and also may be interesting in applied research where different conditions may have a differential effect (or be affected) by past, present and future (expected) life satisfaction. Additionally, given that humans anchor events and experiences in time to make sense of them, time perspective is expected to influence attitudes, behavior and goals (Sailer et al., 2014). To our knowledge, the TSLS has been validated in the original presentation (Pavot et al., 1998), a Canadian sample of university students (McIntosh, 2001) and undergraduates in Mainland China (Ye, 2007). The first external validation found support for a three-factor structure of the scale with past, present and future life

satisfaction as correlated factors (Pavot et al., 1998). In order to achieve acceptable fit, three pairs of errors were freed to correlate. McIntosh (2001) also found a slight acquiescence bias for some items in the scale. Ye (2007) tested the same three factors model and found a good model fit, but only after some modifications were made (error covariances among the similar items in past, present, and future life satisfaction subscales). To date, there is no study of validity for the Spanish version of the TSLS, and moreover, there is no validity study in elderly people, an age in which life satisfaction is usually employed as a marker of successful aging.

Important as it is across the whole lifespan, the construct of satisfaction with life is of particular interest in the aging process (Gutiérrez et al., 2013). Accordingly, there is growing evidence on predictors of life satisfaction, among others: social support (Gow et al., 2007; Okabayashi, Liang, Krause, Akiyama, & Sugisawa, 2004), social network (McLaughlin et al. 2011; Newsom & Schultz 1996), or enrolling in long life learning programs (Villar, Pinazo, Triadó, Celdrán, & Solé, 2010). In general, meta-analyses on life satisfaction have shown that social network and/or loneliness are consistently related to satisfaction with life and more strongly than income or educational level in old people (Pinquart & Sörensen 2000, 2001). Nevertheless, almost all of this research has used measures of life satisfaction that did not consider the temporal axis.

In light of the popularity that life satisfaction has in the research arena, especially among the elderly, the lack of research on life satisfaction considering the temporal axis, and the lack of a validation of the TSLS for Spanish-speaking populations, the aim of this study is threefold: 1) to study the factorial validity of the TSLS on a sample of Spanish old adults; 2) to disentangle how much of the variance in life satisfaction is due to an stable dimension of life satisfaction and how much is due to “temporal” or trait-specific dimensions; and 3) to offer evidence on reliability and validity for the aforementioned scale and population.

Method

Participants

The sample consisted of 737 people 55 years old or older that attended University of Valencia available programs for long life learning in older adults (Older People Education Programs as *Aulas de la Tercera Edad* and *Unimajors*) during the academic year 2014-2015. Their age ranged from a minimum of 55 to a maximum of 92 years old, with mean age of 65.41 years ($SD=6.6$). 69% were women. Regarding the marital status, the majority of them were married (67.5%), 15.7% were widows or widowers, 10% were single, and 6.7% were divorced. Finally, and as regards the level of studies, 28.4% had primary studies, 41.9% secondary studies, and 29.7% university studies.

Instruments

The survey included socio-demographic variables, and several scales to measure sociological and psychological variables. Among them, the ones related to current study were:

- a) *Temporal Satisfaction with Life Scale* (TSLS; Pavot et al., 1998). The TSLS has 15 items and is composed of the original five items assessing global life satisfaction in the SWLS reworded to measure past, present and future life satisfaction. The original scale was Likert-type with seven points, and Cronbach's alphas ranged from .91 to .93 (Pavot et al., 1998). The scale was back-translated from the original English to Spanish.
- b) A single indicator of general life satisfaction, "currently, how satisfied are you with all your life, globally considered?". Responses may range from 1 (nothing) to 5 (a lot).
- c) *Duke-UNC-11 Functional Social Support Questionnaire* (Duke-UNC-11; Broadhead, Gehlbach, DeGruy, & Kaplan, 1988). The Spanish version of the Duke-UNC-11 (Bellón, Delgado, Luna, & Lardelli, 1996) was used to assess two dimensions of social support: confidential support, with 7 items, and affective support, with 4. Confidential support regards communication of intimate feelings, whereas affective support is referred to the expression of positive feelings of empathy. Alphas for the two dimensions were .64 for affective support and .76 for confidential support. Alpha for the scale was .82.

Procedure

All the older people that attended the program were informed and their consent was asked for. The survey was self-administered in their classrooms, with a trained interviewer present to avoid doubts or problems. The response rate was 77.54%.

Data analyses

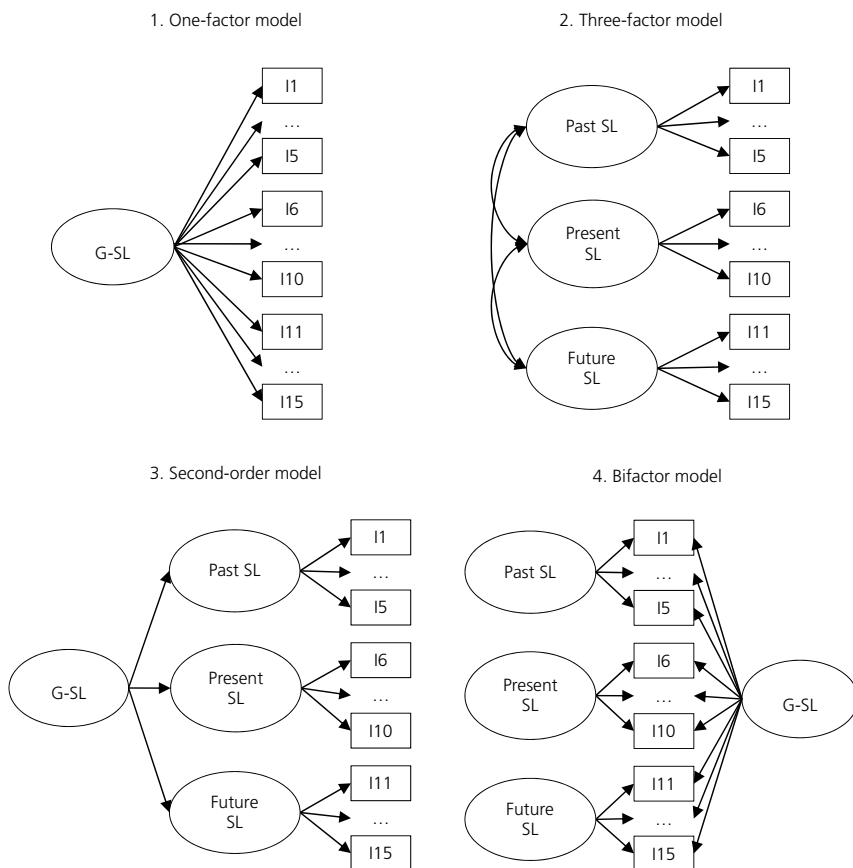
Factorial validity of the TSLS was tested via a set of competitive structural models (confirmatory factor analyses, CFA). The models tested, shown in Figure 1, were:

- a) One-factor model. One factor of life satisfaction underlying the 15 items of the TSLS was specified. This model assumes a general, trait construct of satisfaction with life.
- b) Three-factor model. Three correlated factors underlying the 15 items of the TSLS. Items 1 to 5 loaded in the past satisfaction with life factor, items 6 to 10 loaded in the present satisfaction with life factor, and items 11 to 15 loaded in the future satisfaction with life factor.
- c) A second-order factor model, with three first-order life satisfaction dimensions (past, present and future) and a second-order factor of life satisfaction.
- d) Bifactor model. A factor underlying the 15 items of the TSLS, a general-trait life satisfaction, a second factor underlying items 1 to 5, past satisfaction with

life factor, a third factor underlying items 6 to 10, present satisfaction with life factor, and a fourth factor underlying items 11 to 15, future satisfaction with life factor, were specified. In other words, in bifactor models, two factors are modeled to underlie each indicator (item) a general factor and a domain specific factor (for example, both global self-esteem and physical appearance self-esteem). In bifactor models, by definition, factors are orthogonal.

Figure 1

Structural equation models specified and tested for the Temporal Satisfaction with Life Scale



Note: Errors not shown for the sake of clarity.

Bifactor models specify that the covariance among a set of item responses can be accounted for by a single general or global factor that reflects the common variance running among all scale items, and domain-specific factors that reflect additional common variance among items. General and domain-specific factors correlations are set to zero (Reise, 2012). That is, the covariance among the domain-specific is expected to be explained by the general dimension.

Substantively, the general factor represents the conceptually broad construct a scale was designed to measure, while domain-specific factors are subdomain constructs (Reise, Moore, & Haviland, 2010). In conventional confirmatory models, covariance between scale items is assumed to be explained in terms of one or more latent variables, whereas in bifactor models, this covariance is assumed to be explained by both “general factors” and “grouping factors” which exist at the same conceptual level. Bifactor modeling techniques were developed for use in situations where both single and multidimensional latent structures seem to provide an adequate representation of the scale (Reise et al., 2010; Reise, Morizot & Hays, 2007).

The plausibility of these confirmatory models has been assessed using several fit criteria (Hu & Bentler, 1999; Tanaka, 1993): (a) chi-square statistic; (b) the comparative fit index (CFI; Bentler, 1990); (c) the root mean squared error of approximation (RMSEA; Steiger & Lind, 1980) of .05 or less (the RMSEA uses errors of prediction and measurement to assess the degree of match between the hypothesized and true models. Given the ordinal nature of the data WLSMV (weighted least square mean and variance corrected) estimation method was used.

Internal consistency estimates for items, dimensions and scale were calculated both from a Classical Test Theory framework (i.e., Cronbach’s alpha and items homogeneity) and a structural equation modeling perspective (i.e., composite reliability, expected common variance coefficient). Criterion-related validity and nomological validity were assessed relating past, present and future life satisfaction with life with the aforementioned criteria, both with traditional correlations and also within a structural equation modeling.

All statistical analyses were conducted with IBM SPSS Statistics, v. 20.0 (IBM Corp., 2011) and Mplus 7.3 (Muthén & Muthén, 1998-2012).

Results

Factorial validity

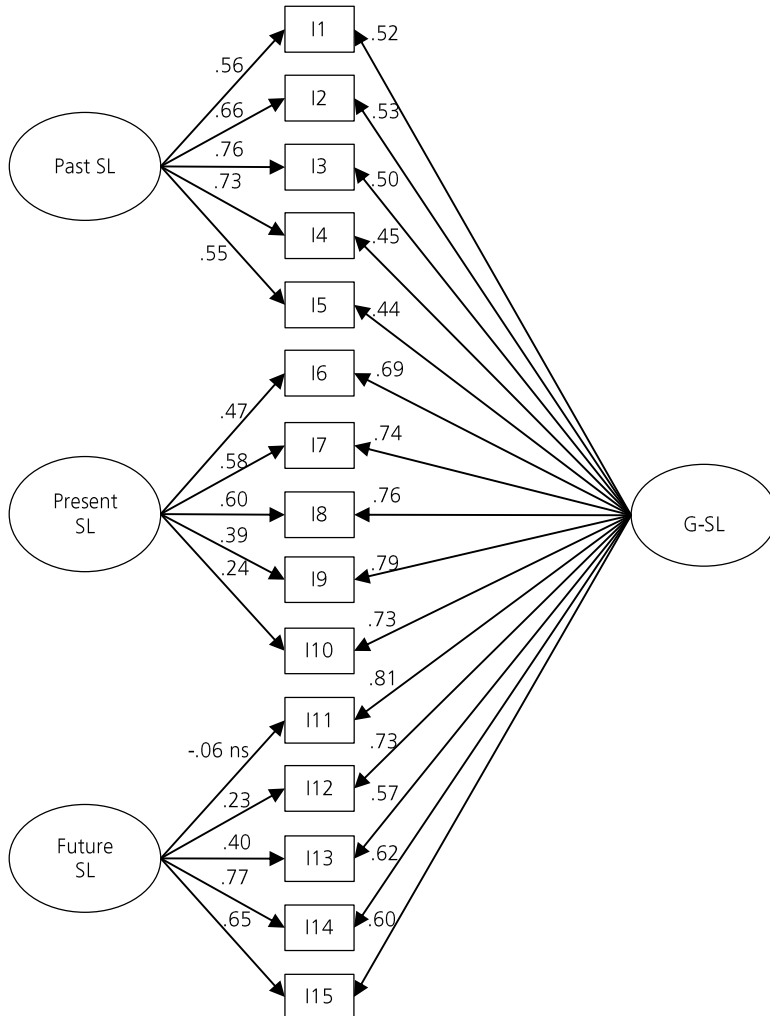
As stated in the method section four competitive factor structures were tested. These models were: a) one-factor model; b) three-factor model; c) second-order factor model; and d) bifactor model (Figure 1).

Table 1 presents fit indices for the four *a priori* models. Best fitting model is model four, the bifactor structure. Overall fit indices showed an adequate fit for the four models, but only fit indices of model 4 were all good. Standardized factor loadings are presented in Figure 2. With the exception of the loading of item 11 on the domain-specific factor of future life satisfaction all were statistically significant ($p < .05$). Without having into account this particular non-significant item, standardized loadings ranged from a minimum of .23 to a maximum of .77. The average standardized loading was .51 ($SD = .21$). The relationships with the general factor were large, but the relationships with the domain-specific factors were also statistically significant and non-trivial at all.

Table 1
Fit indices for the structural equation models for the Temporal Satisfaction with Life Scale

Models	χ^2	df	p	CFI	RMSEA	RMSEA 90% CI
One-factor model	4688.147	91	< .001	.805	.263	.257 - .270
Three-factor model	1095.541	87	< .001	.957	.126	.119 - .133
Second-order model	1095.541	87	< .001	.957	.126	.119 - .133
Bifactor model	378.863	75	< .001	.987	.075	.067 - .082

Figure 2
Factor loadings for the bifactor model of the Temporal Satisfaction with Life Scale



Notes: All factor loadings statistically significant ($p < .05$), unless differently noted; ns= statistically non-significant.

Internal consistency

Alpha coefficients for the overall scale, as well as the domain-specific factors have been calculated. Overall alpha was .91, whereas the subdomains past, present and future respectively had alphas of .83, .81, and .86. Some problems arise when interpreting alphas in the framework of bifactor models (Reise et al., 2010). Therefore, additional indices of internal consistency were calculated: The composite reliability of the general life satisfaction factor and the domain-specific factors (Raykov, 2001), and the Expected Common Variance (ECV) coefficient were calculated based on the results of the best-fitting model, the bifactor model. Composite reliability for the general factor was .59, while composite reliabilities for past, present and future factors were .57, .50 and .46, respectively. Additionally, the expected common variance (ECV) coefficient was calculated using the results of the bifactor model. The ECV for the general factor was .58 (57.79% common variance explained), and the ECVs for the past, present and future life satisfaction dimensions were .21, .10 and .11.

Convergent and nomological validity

Criterion-related validity was established by correlating general life satisfaction, past life satisfaction, present life satisfaction, and future life satisfaction, with the single indicator of life satisfaction. Evidence of nomological validity has been established by correlating the four aforementioned dimensions of life satisfaction (one general and three temporal) with the two dimensions of social support, confidential and affective support, constructs with which life satisfaction has been clearly connected in the literature. As it is shown in Table 2, results of all correlations were positive and statistically significant, as expected.

Table 2

Correlations between the dimensions of the Temporal Satisfaction with Life Scale, the indicator of global life satisfaction, and the dimensions of social support

Dimensions of the TSWLS	Results of bivariate correlations			
	G-SL	Past SL	Present SL	Future SL
General SL	1			
Past SL	.788**	1		
Present SL	.855**	.455**	1	
Future SL	.805**	.420**	.635**	1
Global SL	.565**	.484**	.503**	.374**
Confidential support	.399**	.386**	.326**	.237**
Affective support	.421**	.378**	.371**	.243**
	Results of correlations of the structural equation modeling			
	G-SL	Past SL	Present SL	Future SL
Global SL	.597**	.310**	.253**	.048
Confidential support	.355**	.264**	.099*	-.037
Affective support	.411**	.233**	.166**	-.061

Notes: TSWLS= Temporal Satisfaction with Life Scale. * $p < .05$; ** $p < .01$.

Additionally, these relations were also estimated in a structural equation model, in which together with the bifactor model for the TSLS, two social support factors, confidential and affective support, and a single observable indicator of global life satisfaction, were included. Correlations were specified between the four factors of the TSLS, the two factors of social support, and the indicator of global life satisfaction. The model had an appropriate overall fit ($\chi^2= 978.468$, $df= 295$, $p < .01$; CFI= .979; RMSEA= .057 [.053 - .061]). Analytical results were mimetic for the general life satisfaction factor to those found in bivariate correlations, very similar for the past life satisfaction dimension, in the same direction but with lower values for the present life satisfaction, and not statistically significant for the future life satisfaction factor.

Discussion

“What you measure affects what you do. If you don’t measure the right thing, you don’t do the right thing” (Stiglitz cited in Goodman, 2009). In these Nobel prize-winning words, we try to capture the importance of a psychometrically sound measuring of life satisfaction in order to define public policy. The importance of satisfaction recognizes the value of intangible but key elements of human life encompassing social, political, cultural, psychological needs, aspirations and values of individuals and the social collective.

Although the SWLS (Diener et al., 1985) is the most used scale for measuring life satisfaction, their same authors (Pavot & Diener, 1993) suggested it would be interesting to further explore the construct in terms of the three time frames of reference. A later scale with a brief measure of life satisfaction across the three temporal axis: past, present and future, the TSLS, was therefore developed and validated in Pavot et al. (1998), fulfilling this suggested approach. Adding the time perspective may help in disentangling the broad measurement of both: “affective happiness” understood as the ups and downs of daily emotions, and “evaluative happiness” as individual’s overall evaluation of life (Sachs, 2013).

The aim of this study is to validate the TSLS with a twofold contribution, on a language and population of particular interest. With respect to the importance of language, Spanish has already become the second language of international communication and obviously researchers on this language need validation studies for their instruments. With respect to the population under study, elderly satisfaction is a marker of successful aging and particularly, elderly in higher education programs are of particular interest, because, previous literature has reinforced the value of education, particularly higher education programs, in promoting the elderly quality of life. Perceived benefits were particularly high among the less educated and the older students (Villar et al., 2010).

The current validation offers results on internal consistency, factorial, criterion-related and nomological validity in a sample of Spanish elderly people. Overall, the results show a clear factor structure, satisfying reliability, and good validity when assessed in its application to old people.

Factorial validity of the TSLS was tested using competitive structural models (Confirmatory Factor Analyses, CFA). Among the four tested models, a bifactor

model arose as the best fitting one. It posits four uncorrelated underlying factors for the TSLS, a single dimension of life satisfaction plus three specific dimensions of past, present and future life satisfaction. Thus, current paper provides evidence on how much of the variance in life satisfaction is due to a stable dimension of life satisfaction and how much is due to “temporal” specific dimensions, avoiding the concerns expressed by Pavot and Diener (1993) themselves when they pointed that the SWLS may mix two different meanings of life satisfaction. Current results are important for several reasons. First, they demonstrate that there is a general dimension of life satisfaction that it is unrelated to time. That is, a larger part of the variance in life satisfaction is predicted by a stable trait. Second, the most precise items are those that correspond to past satisfaction, which may have important theoretical implications. Third, the results pointed out that the potential bias that the authors of the scale (Pavot & Diener, 1993) were afraid of, that is, the mixed meanings of the SWLS due to temporal differences in the sentences were indeed present, as the percentage of variance explained by the temporal dimensions is not negligible.

The factor loadings for the general life satisfaction were large, so the factorial validity of the TSLS has again been replicated. Regarding the temporal axis factor loadings, these ranged differently: loadings on the past dimension ranged from .55 to .76, showing the highest values, whereas present and future dimensions exhibited slightly lower factor loadings. Lower loadings for present and future items of life satisfaction indicate less discriminant power of these items compared to the past items. In other words, the global perception of life satisfaction is related closer to what happened to you in the past rather than the present or your expectative for the future. These appealing results suggest new questions for further research: Are present and future of life satisfaction appraisals more sensitive or perception biased than past ones?

Internal consistency estimates for items, dimensions and scale were calculated both from a Classical Test Theory framework and a structural modeling perspective providing composite reliability, and expected common variance coefficients. The analyses provide evidence for good levels of internal consistency of the scale. Cronbach’s alpha were adequate for the total scale as well as for the temporal dimensions, similar results to those found in Proyer et al. (2011) in their adapted application to German-speaking women with .90, .88, and .88 values for past, present and future, respectively; and to those found in Swedish students by Sailer et al. (2014), with alphas of .86, .93, and .88. No internal consistency results were provided for comparison, neither in the original report of construct validity by Macintosh (2001) nor in the Chinese university students’ validation (Ye, 2007).

Criterion-related and nomological validity were assessed relating past, present and future life satisfaction with the aforementioned criteria, both with traditional correlations and also within a structural equation model, as the bifactor structure found to adequately represent the observed data needed this perspective in order to disentangle the specific relations among the criteria and the general and domain-specific dimensions of life satisfaction. Previous research (mostly on young students) considered a variety of criteria, such as values of strengths, positive & negative affect, psychological well-being, past positive and negative time

perspective dimensions, self-anchoring measures of happiness,...Current study, provides evidence on two additional criteria: a single indicator of overall satisfaction with life as in Ye's study (Ye, 2007), together with the Duke-UNC-11 Functional Social Support Questionnaire (Broadhead et al., 1988). Results were in line with previous studies, with statistically significant, positive, and high correlations among the dimensions of life satisfaction and the single indicator, with especially higher values for the correlation for the general/stable life satisfaction dimension. This closer relation was even more clear in the structural equation model, where the rest of correlations were lower or non-significant (i.e., for future life satisfaction). With regard to the relations among TSLS dimensions and social support, bivariate correlations were positive and statistically significant, again with higher values for general life satisfaction. As with the single indicator of life satisfaction, when TSLS was related to social support within a structural model framework, correlations were higher for the general dimension of life satisfaction and correlations decreased as temporal axis advanced, with no statistically significant relation between social support dimensions and future life satisfaction.

This paper provides evidence on how TSLS incorporates the time axis with psychometric guarantees. Its use can stimulate future research on what factors influence the appraisal of wellbeing and quality of life in older adults. Elaborations from respondents about past, present and future could be addressed over different time situations. Given that satisfaction with life is not a completely stable construct (Venhooven, 1994), its measurement including the three time frames is promising. Additionally, a measurement of life satisfaction with time scope in a still relatively short questionnaire may be of particular interest for large surveys, as well as longitudinal studies focusing in the temporal axis influence and monitoring changes disentangling the affective and the cognitive views.

Another strength is that it is the first validation with confirmatory analyses of the TSLS in the Spanish version and with elderly population. Only a few validation studies have used confirmatory factor analysis (Macintosh, 2001; Ye, 2007; Proyer et al., 2011), mostly in students' samples, and none of them on a population in which the concept of life satisfaction has been widely studied.

We opened the discussion with Stiglitz' words and we close these lines with other influent Nobel Prize. Present research puts a bit on the aim of measuring which most agree, the remembering self and the experiencing self must both be considered, as their interests do not always coincide (Kahneman, 2011). This contribution to measurement can be of particular interest in long life learning outcomes to fulfill successful aging, as satisfaction with life is one of its traditional proxies. Future studies should address some of current limitations, such as the predictive power of past life over present life satisfaction, and present life satisfaction over future life satisfaction, when assessed longitudinally. Thus, longitudinal studies focused should be welcomed.

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