Confirmatory Factor Analysis of the Supports Intensity Scale for Children

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Abstract

Support needs assessment instruments and recent research related to this construct have been more focused on adults with intellectual disability than on children. However, the design and implementation of Individualized Support Plans (ISP) must start at an early age. Currently, a project for the translation, adaptation and validation of the Supports Intensity Scale for Children (SIS-C) is being conducted in Spain. In this study, the internal structure of the scale was analyzed to shed light on the nature of this construct when evaluated in childhood. A total of 814 children with intellectual disability between 5 and 16 years of age participated in the study. Their support need level was assessed by the SIS-C, and a Confirmatory Factor Analysis (CFA), including different hypotheses, was carried out to identify the optimal factorial structure of this scale. The CFA results indicated that a unidimensional model is not sufficient to explain our data structure. On the other hand, goodness-of-fit indices showed that both correlated first-order factors and higher-order factor models of the construct could explain the data obtained from the scale. Specifically, a better fit of our data with the correlated first-order factors model was found. These findings are similar to those identified in previous analyses performed with adults. Implications and directions for further research are discussed.

Keywords: intellectual disability, support needs, assessment, confirmatory factor analysis, Support Intensity Scale for Children.

1. Introduction

Diagnosis and classification of intellectual disability has been a topic of major interest to those attempting to understand this phenomenon in relation to the complexity of intervention in this field. However, since the adoption of the new socio-ecological approach to the study of intellectual disability, evaluation in this field is currently defined as a systematic collection of information to fulfill three functions (Schalock et al., 2010; Schalock & Luckasson, 2013a, 2013b): (1) diagnosis; (2) classification; and (3) support profile/ planning, which emphasizes the importance of intervention systems based on support needs assessment.

Support needs are defined as “a psychological construct that refers to the pattern and intensity of supports necessary for a person to participate in activities linked with normative human functioning” (Thompson et al., 2009, p.135). Most psychological constructs are not directly observable and latent variable methodologies must be used to capture them. Specifically, Verdugo (1994) claimed that the most recommended tools to infer such constructs in people with intellectual disabilities and help professionals develop clinician judgments were standardized measurement scales.

However, developing proper instruments requires a long and rigorous process yet assessments have not kept pace with the rapid developments in theoretical understanding of intellectual disability. Specifically, the shortage of support needs assessment instruments is an obstacle to the implementation of Individualized Support Plans (ISP) and, ultimately, to organizational change (Schalock & Verdugo, 2012).

One of the methods used to solve this problem was to estimate support needs once the scores had been obtained using adaptive behavior scales. The Inventory for Client and Agency Planning (ICAP) (Bruininks, Hill, Weatherman, & Woodcock, 1986) was one of the scales most commonly used for this purpose. However, many differences between the two constructs and the way in which they should be evaluated have been showed (Thompson, McGrew, & Bruininks, 2002; Thompson et al., 2009). In assessing adaptive behavior, respondents report on whether a person performs specific skills; however, assessing supporting needs requires clarification of the support a person needs in order to perform life activities (Shogren et al., 2014). Furthermore, other related studies (Arnold, Riches, & Stancliffe, 2014b; Wehmeyer et al., 2009) have found that the support needs construct better predict allocation and funding needs.

For that reason, creating an assessment scale to provide indices and profiles for specific support needs has become one of the greatest demands of planning teams and the scientific community (Thompson et al., 2002). Specific support needs assessment instruments have recently been developed for people with intellectual and developmental disabilities: (a) Service Need Assesment Profile, SNAP (Gould, 1998; Guscia, Harries, Kirby, Nettelbeck, & Taplin, 2005); (b) North Carolina Service Need Assessment Profile, NC-SNAP (Hennike, 2002; Hennike, Myers, Realon, & Thompson, 2002; Hennike, Myers, Realon, & Thompson, 2006); (c) Instrument for the Classification and Assessment of the Support Needs, I-CAN (Arnold, Riches, & Stancliffe, 2014a; Llewellyn, Parmenter, Chan, Riches, & Hindmarsh, 2005; Riches, Parmenter, Llewellyn, Hindmarsh, & Chan, 2009a, 2009b); and (d) Supports Intensity Scale for Adults, SIS or SIS-A (Thompson et al., 2004; Thompson, Bryant et al., in press).

However, the lack of valid instruments and research regarding support needs in people with intellectual disability is still evident. The SIS is the only scale with considerable international evidence of reliability and validity (e.g., Schalock et al., 2008; Thompson, Tassé, & McLaughlin, 2008) that has been translated in Spanish (Verdugo, Arias, Ibáñez, & Gómez, 2006; Verdugo, Arias, Ibáñez, & Schalock, 2010; Verdugo Ibáñez, & Arias, 2007).

This scale measures the type, frequency, and daily time of the support that the person needs in a total of 49 daily activities, which are grouped into six life-activity areas (Home Life, Community Living, Lifelong Learning, Employment, Health and Safety and Social). Similarly, the SIS gathers supplementary information related to protection/advocacy support needs, and exceptional medical and behavioral conditions.

Although the SIS has been specifically developed to assess support needs in adults (16-64 years old) with intellectual disability, its potential for a modified version to be used for assessing support needs in adults with support needs relating to disabilities other than intellectual disability has also been explored (Bossaert et al., 2009; Cruz, Jenaro, Pérez, & Robaina, 2010; Jenaro, Cruz, Pérez, Robaina, & Vega, 2011; Smit, Sabbe, & Prinzie, 2011). Moreover, this instrument has demonstrated its usefulness as part of the development of ISP (van Loon, 2006, 2009), its efficacy to predict resource allocation (Chou, Lee, Chand, & Yu, 2013; Fortune et al., 2008; Giné et al., 2014; Wehmeyer et al., 2009) and its relationships with clinical scores (Weiss, Lunsky, Tassé, & Durbin, 2009).

Despite the multiple advantages and the widespread use of this scale, it cannot be administered to children with intellectual disability, as the development of this scale was based only on typical adult activities. Therefore, taking into account the positive impact of this tool, as well as the right of children with intellectual and developmental disabilities to receive early interventions that guarantee their participation in the community (Colver, 2005), the American Association on Intellectual and Developmental Disabilities (AAIDD) has built up an international project focused on developing a Support Intensity Scale for Children (SIS-C) (Thompson, Wehmeyer et al., in press).

After the creation and study of an original pool of items (Thompson et al., 2014) to adapt this scale to the typical activities in childhood, a rigorous procedure was carried out to adapt and validate these items in the Spanish context (Guillén, Verdugo, Arias, & Vicente, 2015; Verdugo, Arias, Guillén, & Vicente, 2014). The development of the SIS-C in Spanish has been successfully developed according to the seven-step process proposed by Tassé and Craig (1999) as required to effectively adapt items to any context different from the original: (1)

translation/adaptation; (2) consolidation of translation/adaptation; (3) validation of preliminary translation; (4) revisions/adjustments; (5) pilot testing; (6) revisions/adjustments; and (7) field testing validation.

The aim of this paper is to describe an empirical study focused on examining the internal factor structure of the support needs construct as measured by the Spanish version of the SIS-C. Regarding the same structures previously analyzed in the Spanish version of the SIS-A (Verdugo et al., 2007), three factor solutions are defined and tested by a Confirmatory Factor Analysis (CFA): (1) support needs is a unidimensional construct; (2) support needs consists of seven-correlated factors; and (3) support needs can be understood through a hierarchical model with one second-order factor created by seven subscales of the SIS-C.

2. Method

2.1. Instrument

The SIS-C (Thompson, Wehmeyer et al., in press) is a measure designed to determine the profile and intensity of the support needs of children with intellectual disability. It was originally developed by the AAIDD and it is nowadays being translated in different languages in a manner parallel to validation of the original version.

This assessment scale has been developed according to the characteristics of the SIS for adults (Thompson et al., 2004) and based on the assumptions of the new socio-ecological concept of intellectual disability (Schalock et al., 2010). The aim of developing this scale for children and adolescents (5-16 years old) is to allow the assessment of individualized support needs at an early age to facilitate provision of individualized support and improve the quality of life of people with intellectual disability since their childhood.

The SIS-C is divided into two main sections and accompanied by an instruction document, which includes information about the support needs construct, its evaluation, and some examples of its items. Section I describes a set of 32 items (ranged from 0 to 2) that includes potential extraordinary support needs (18 medical and 14 behavioral support needs) that may influence a person's support needs. Section II deals with the assessment of the support needs construct and includes a pool of 61 items, divided into seven domains, which reflect the different activities of any child's daily life. The intensity profile and the index of the person assessed are drawn from the scores obtained in this final part of the scale. Specifically, each activity is ranked from 0 to 4 according to three indices (type, frequency, and daily time of the support needed) and the items score is generated by the sum of the scores for each index. To provide better understanding of the SIS-C, below we present two Tables (1-2) showing the characteristics of this section and describing both its domains and response format.

Table 1. SIS-C domains

SIS-C Domains	Description	Number of Items (61)
A. Home Life	Activities completed as a function of living in a household.	9
B. Community & Neighborhood Living	Activities completed as a function of being a member of a community or neighborhood.	8
C. School Participation	Activities associated with participating in the school community.	9
D. School Learning	Activities associated with acquiring knowledge and/or skills while attending school.	9
E. Health & Safety	Activities that assure health and safety across home, school, and community environments.	8
F. Social	Activities that pertain to social integration with other, both children and adults.	9
G. Advocacy	Activities related to acting as a causal agent in one's life, making choices and decisions, and availing oneself of leadership opportunities.	9

Table 2. SIS-C rating metric

TYPE OF SUPPORT	FRECUENCY OF SUPPORT	DAILY TIME OF SUPPORT
0= None **1**= Monitoring **2**= Verbal/gestural prompting **3**= Partial physical assistance **4**= Full physical assistance	**0= Negligible**; the child's support needs are rarely if ever different than same-aged peers in frequency. **1=Infrequently**; the child will occasionally need someone to provide extraordinary support that same-aged peers will not need, but on most occasions will not need any extra support. **2= Frequently**; in order for the child to participate in the activity, extra support will need to be provided for around half the occasions of the activity. **3= Very Frequently**; in most occasions of the activity the child will need extra support that same-aged peers will not need; only occasionally will the child not require any extra support. **4= Always**; on every occasion that the child participates in the activity, the child will need extra support that peers of the same chronological age will not need.	**0**= None **1**= Less than 30 minutes **2**= 30 minutes to less than 2 hours **3**= 2 hours to less than 4 hours **4**= 4 hours or more

As described by Seo et al. (in press), although the SIS-C is based on the SIS-A, adjustments were carried out to make the instrument's items more appropriate for children and young people. Specifically, two activity domains in the SIS-A (Employment and Lifelong Learning) were replaced in the SIS-C with more age-appropriate distinct activity domains (School Participation and School Learning), and the Advocacy domain was included in the main part of the scale. Similarly, some of the items included in the parallel domains across SIS-A and SIS-C were modified to accurately reflect differences in the environmental demands associated with the new age group (e.g. in the Home Life domain, 'Housekeeping and cleaning' on the SIS-A was modified to 'Performing household chores' on the SIS-C).

Moreover, additional modifications were made to the rating scale for frequency on the SIS-C to improve how this aspect worked. On the SIS-A a five-point scale was also used, but the descriptions of each category were different: 0 = none or less than monthly; 1 = at least once a month, but not once a week; 2 = at least once a week, but not once a day; 3 = at least once a day, but not once an hour; 4 = hourly or more frequently.

However, the SIS-C also has many aspects in common with the SIS-A, including the administration procedure. Although some studies criticize the SIS because requires respondents to estimate support needs for activities that a person has not yet had an opportunity (Riches et al., 2009b), which causes confusion for the informants, this aspect was not changed in the SIS-C. Thompson and Viriyangkura (2013) highlighted that the scale should be administered by a trained interviewer to guide the estimation process. The authors also argued that moving respondents out of their comfort zone and forcing them to envision people engaged in a variety of life activities in the community are useful byproducts of this tool assessment process.

2.2. Participants

Participants were selected using non-probabilistic and incidental sampling due to the practical impossibility of random sampling when working with people, as these cases require the express consent of those involved in the evaluations. In any case, a minimum number of 600 participants was set, ensuring that the number of participants was at least 10 times greater than the number of the items (61). A letter was sent to numerous organizations and schools in Spain to recruit the required number of participants. A notice was also posted on the Institute of Community Integration at the University of Salamanca (INICO) website requesting voluntary cooperation. After initial contact, all the professionals who expressed interest and agreed to participate in our project received a formal letter and an informed consent form, which had to be voluntarily signed by the families of all of the children (5-16 years old) with intellectual disabilities who were to be assessed. Finally, more than 50 organizations and schools (mostly special schools, 60.6%) from 11 different Autonomous Communities in Spain participated in the study, and a total of 833 evaluations were performed. After eliminating all the cases in which there were missing data, 814 evaluations were analyzed.

Demographic information about all the people involved in the assessment was gathered through an initial questionnaire included on the cover page of the scale. The participants were all Caucasian and born in Spain. As far as age is concerned, all the subjects were between 5 and 16 years old (*M* = 11.15; *SD* = 3.44) and had already been diagnosed as having mild, moderate, severe or profound intellectual disability, as these characteristics were required for participation in the study. Other useful information about the socio-demographic characteristics of the children assessed is presented in Table 3.

Table 3. Demographic characteristics of the sample (*n* = 814)

VARIABLES	*N*	*%*	*VARIABLES*	*N*	*%*
Gender			**Scholar setting**		
Male	528	64.6	Private	550	67.5
Female	286	35.1	Public	252	31.0
Missing Data	3	0.4	Missing Data	12	1.5
Total	*814*	*100*	*Total*	*814*	*100*
Age			**Home Residence**		
5-6 years old	110	13.5	Family Home	778	95.6
7-8 years old	108	13.3	Foster Family Home	9	1.1
9-10 years old	100	12.3	Small Group Home (<7)	7	0.9
11-12 years old	148	18.2	Midsize Group home (7-15)	9	1.1
13-14 years old	195	24.0	Large Residential Facility (>15)	3	0.4
15-16 years old	153	18.8	Missing Data	11	1.4
Total	*814*	*100*	*Total*	*814*	*100*
Intellectual Disability Level			**Primary Language Understood**		
Mild	206	25.3	Castilian	784	96.3
Moderate	290	35.6	Catalan, Basque, Galician, Sign Lang.	14	1.8
Severe	195	24.0	Arabic	3	0.4
Profound	65	8.0	Others (English, Romanian…)	3	0.4
Missing Data	58	7.1	Missing Data	9	1.1
Total	*814*	*100*	*Total*	*814*	*100*
Etiology			**Presence of Other Disabilities**		
Non-Specific	317	38.6	None	281	34.5
Down syndrome	111	13.6	Physical	33	4.1
Autism Spectrum Disorder	248	30.5	Sensory	17	2.1
Cerebral Palsy	101	12.4	Language	211	25.9
Rare diseases	35	4.3	Other (Mental Health…)	82	10.1
Co-occurrence	5	0.6	Two or more	190	23.3
Total	*814*	*100*	*Total*	*814*	*100*
Type of classroom placement			**Assistive Technologies Use**		
Regular classes in regular schools	179	22.0	Yes	155	19.1
Special classes in special schools	493	60.5	No	657	80.7
Special classes in regular schools	55	6.8	Missing Data	2	0.2
Others	87	10.7			
Total	*814*	*100*	*Total*	*814*	*100*

The assessment was not carried out directly on the child being assessed but instead was based on the judgment of other respondents who knew the assessed child very well and had had the opportunity to observe their behavior in various natural settings over an extended period of time. According to the requirements in administering the SIS-C, the collaboration of two respondents who are very familiar with the assessed person was inquired. A second respondent collaborated on the information gathering in 661 of the assessments (81.2%)

Specifically, 783 of the 814 main respondents were direct-care professionals (96.3%) and 31 were relatives (3.7%). Considering the second respondent, 65.7% were relatives and 37.3% were other direct-care professionals. The instrument was administered by qualified professionals trained through a previous session given by the research team (37%) or by an interviewer from the research team (63%).

2.3. Data Analysis

A Confirmatory Factor Analysis (CFA) was carried out to determine the SIS-C factor structure. The LISREL program [version 8.8] (Jöreskog & Sörbom, 2006) was used for this analysis.

CFA is included within Structural Equation Modeling (SEM) and allows us to determine, through goodness-of-fit indices, whether data is consistent with the theoretical models related to the psychological construct assessed. Therefore, it was necessary to identify and specify the models before performing the analysis to ensure more relevant hypotheses about the nature of this construct were included and that our data met the criteria required to carry out a CFA. So as to reduce model complexity (the SIS-C comprises more than 60 items), parcels were created as indicators of a latent construct by combining individual items and using them as observed variables.

3. Results

3.1. Preparing the data: Use of parcels

Taking into account the aim of our study was to examine of the relations among latent variables assessed and that the SIS-C is composed of more than 60 indicators, the items of the SIS-C were divided into 21 unidimensional parcels averaging groups of two or three items (Table 4) and following the same correlative method used in the SIS-A analyses (Verdugo, Arias, & Ibañez, 2007). Although using parcels could limit data analysis (e.g., parcels may mask model misspecifications and the interpretation of what constitutes the construct can be muddied), its disadvantages are reduced if parcel application is well-informed as well as making sure of the parcels' unidimensionality (Little, Rhemtulla, Gibson, & Schoemann, 2013). Following the recommendations of Courntey (2013), we used both absolute and relative criteria to assure the unidimensionality of each parcel: (a) just the first component had an eigenvalue greater than 1; (b) the eigenvalue of the first factor extracted was four times higher than the eigenvalue of the second factor; (c) the percentage of variance explained by the first factor was greater than 60%; and (d) the difference between the proportion of variance explained by the first and second factors was higher than 40.

Table 4. Parcels creation and unidimensionality

Domains	*Parcels*	*Items*	*Mean*	*Standard Deviation*	PARCELS UNIDIMENSIONALITY			
					Eigenvalue 1	*Eigenvalue 2*	*Explained Variance E1 (%)*	*Explained Variance E2 (%)*
A. Home Life	P_A1	A1, A2, A3	6.65	3.33	2.55	.29	85.01	9.75
	P_A2	A4, A5, A6	5.24	3.54	2.50	.35	83.43	11.83
	P_A3	A7, A8, A9	6.21	3.64	2.51	.24	83.97	08.10
B. Community & Neighborhood Living	P_B1	B1, B2, B3	7.33	3.30	2.62	.21	87.49	7.28
	P_B2	B4, B5, B6	7.74	3.03	2.63	.20	87.77	6.91
	P_B3	B7, B8	7.45	3.36	1.77	.22	88.92	11.07
C. School Participation	P_C1	C1, C2, C3	7.90	3.22	2.52	.33	84.27	11.18
	P_C2	C4, C5, C6	7.43	3.08	2.27	.44	75.79	14.81
	P_C3	C7, C8, C9	6.74	3.77	2.68	.24	89.36	9.06

D. School Learning	P_D1	D1, D2, D3	9.72	2.52	2.69	.17	89.69	5.87
	P_D2	D4, D5, D6	8.89	2.77	2.59	.22	86.38	7.32
	P_D3	D7, D8, D9	8.67	2.75	2.47	.27	82.61	9.14
E. Health & Safety	P_E1	E1, E2, E3	7.21	3.30	2.46	.27	82.16	9.10
	P_E2	E4, E5, E6	8.15	3.01	2.54	.28	84.89	9.63
	P_E3	E7, E8	8.11	3.28	1.79	.20	89.60	10.39
F. Social	P_F1	F1, F2, F3	7.21	3.47	2.48	.33	82.81	11.27
	P_F2	F4, F5, F6	7.64	3.22	2.43	.34	81.16	11.60
	P_F3	F7, F8, F9	7.48	3.35	2.34	.38	78.17	12.97
G. Advocacy	P_G1	G1, G2, G3	7.77	3.10	2.50	.41	83.50	13.74
	P_G2	G4, G5, G6	7.97	3.18	2.59	.23	86.53	7.74
	P_G3	G7, G8, G9	8.06	3.12	2.51	.30	83.67	10.26

Finally, related to the suitability of each parcel as part of a CFA, we also analyzed the Kaiser-Meyer-Olkin (KMO) index (Kaiser, 1970) and Barlett's test of sphericity (Barlett, 1954). KMO results were higher than 0.5 (inferior limit) and the values obtained in the Barlett's test were significant ($p < .001$), as expected.

3.2. Specification and identification of the models

According to the SIS literature, support needs are explained by a correlational model (i.e., SIS domains are first-order factors that correlate with one another) in the original version (Thompson et al., 2004) and its adaptations to other countries (e.g., Kuppens et al., 2010), including Spain (Verdugo et al., 2007), where there were also some attempts to confirm a higher-order factor model. However, other studies showed that a unidimensional approach to the construct fits SIS data (Harries, Guscia, Kirby, Netttelbeck, & Taplin, 2005). Considering the three previous perspectives of the support needs construct, we designed three hypotheses for the structure of the SIS-C (Table 5).

Moreover, in order to carry out a confirmatory analysis (Arias, 2008; Kline, 2010), it is needed to ensure that the models analyzed are over-identified (positive *df*), which means that there should be more observations than parameters to be estimated. In our data, we obtained 231 observations (21 variances and 210 covariances). The number of parameters to be estimated depends on each model tested (Table 5). According to the common method of setting the scale of latent variables, one path from each latent variable was set to 1 (Unit Loading Identification, ULI).

Table 5. Models tested by CFA

MODEL SPECIFICATION			MODEL IDENTIFICATION
Hypothesis	**Factors Number**	**Description**	
H1.Unidimensional Model	1	'Support needs' is explained by one factor (Support Needs)	*Over-identified Model (189 df)* 231 observed variables minus 42 parameters to estimate (21 measurement error variances od the indicators; 1 factor variance; and 20 direct effects).
H2. Correlated First-Order Factors Model	7	'Support needs' consists of correlated factors (7 subscales of the SIS-C)	*Over-identified Model (168 df)* 231 observed variables minus 63 parameters to estimate (21 measurement error variances of the indicators; 7 factor variances; 21 factor covariances; and 14 direct effects of the factors on the indicators).
H3.Higher-Order Factor Model	8	'Support needs' consists of correlated factors (1 second-order factor created by seven subscales of the SIS-C)	*Over-identified Model (182 df)* 231 observed variables minus 49 parameters to estimate (21 measurement error variances of the indicators; 7 measurement error variances of the endogenous variables, 1 exogenous variable variance, 14 direct effects of the endogenous variables on the indicators; and 6 direct effects of the exogenous variable on the endogenous variables).

3.3.Parameter estimation and model fit

The term parameter estimation refers to the process of using sample data to estimate the parameters of the selected distribution. Our hypotheses state that there will be no significant differences between the sample variance-covariance matrix and the variance-covariance matrix estimated by each model. Although using parcels improves the data's properties in terms of normality, it was not possible to arrive at the univariate normality. Consequently, the multivariate normality needed to use Maximum Likelihood estimation procedures was rejected ($p<.001$) when it was tested through the procedures of Mardia (1970).

In the cases in which the assumption of normality is severely violated, the Diagonally Weighted Least Squares (DWLS) method provides more accurate parameter estimates (Arias, 2008). The DWLS belongs to the robust WLS methods but only uses the diagonal of weights, reducing the amount of data needed. The DWLS method is based on the polychoric variances-covariances matrix and the estimation of asymptotic covariances. The standardized solution for the three models (Figures 1-3) is set out below.

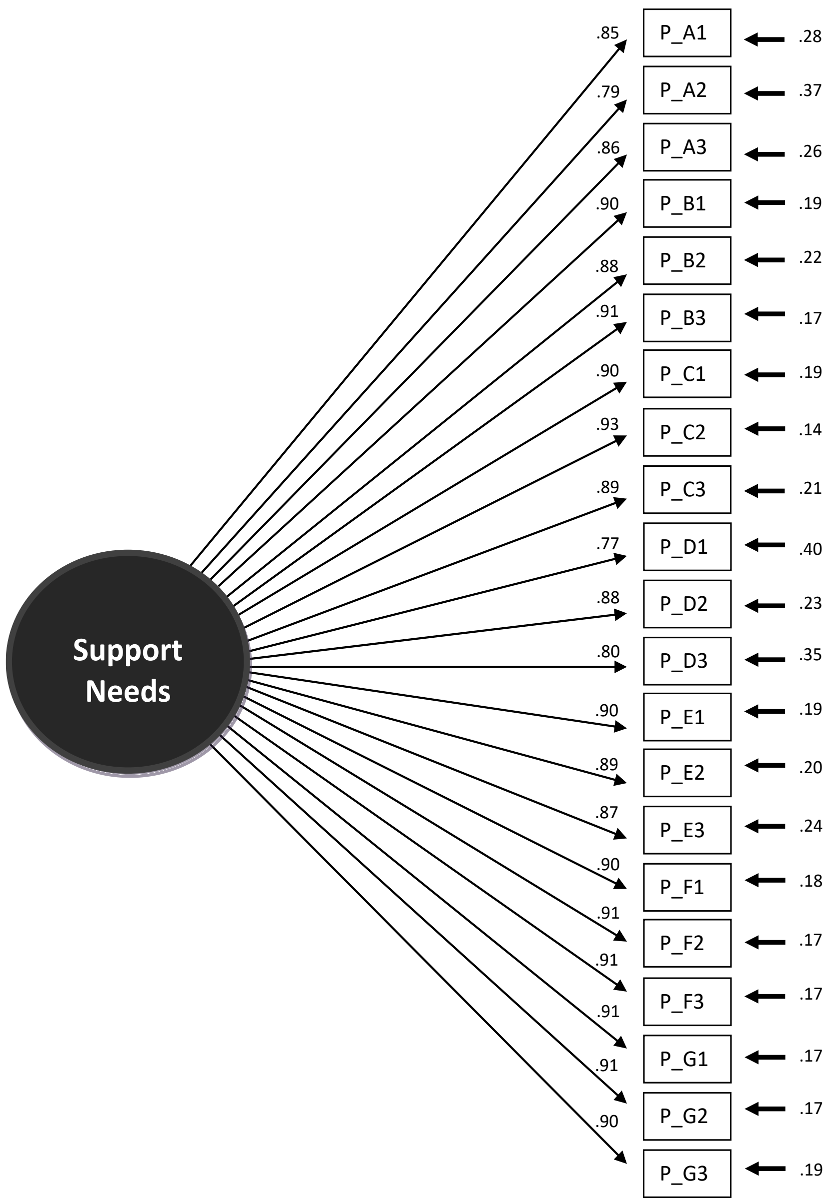

Figure 1. Standardized solution for the factorial representation of the unidimensional model (H1)

In the first solution, for the unidimensional model, we noticed that the measurement error ranged between .14 (P_C2) and .40 (P_D1). It was thus deduced that the squared coefficient of multiple correlation or the amount of variance explained by the latent variable fell within a range of between .86 and .60. Similarly, all the factor loadings had values equal to or greater than .77.

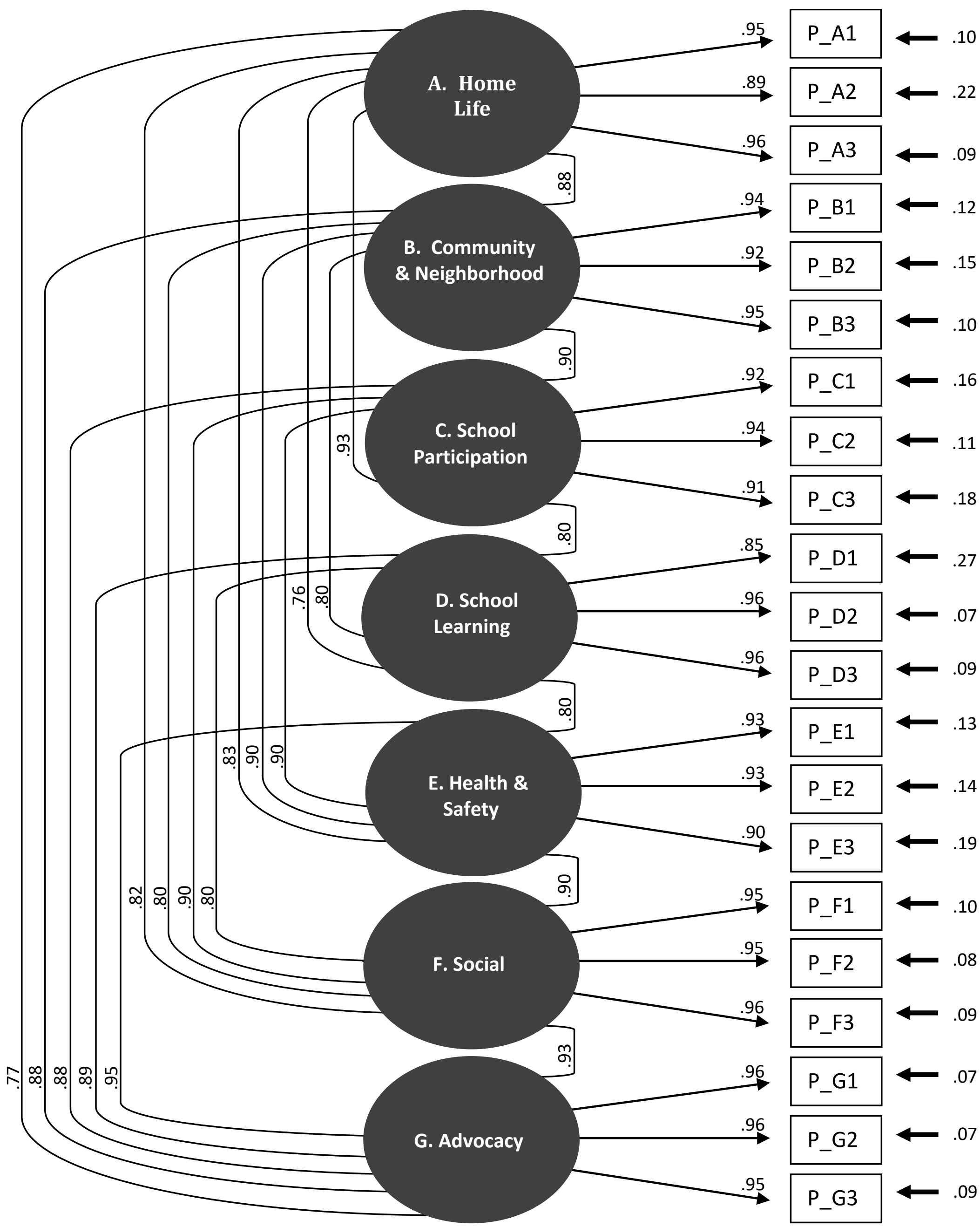

Figure 1. Standardized solution for the factorial representation of the correlated first-order factors (H2)

In the second solution, corresponding to the correlated first-order factors model, we noticed that the measurement error ranged between .07 (P_D2; P_G1; P_G2) and .27 (P_D1). It was thus deduced that the squared coefficient of multiple correlation or the amount of variance explained by the latent variables ranged between .93 and .73. The correlations between latent constructs ranged between .76 and .95. All the factor loadings had values equal to or greater than .85.

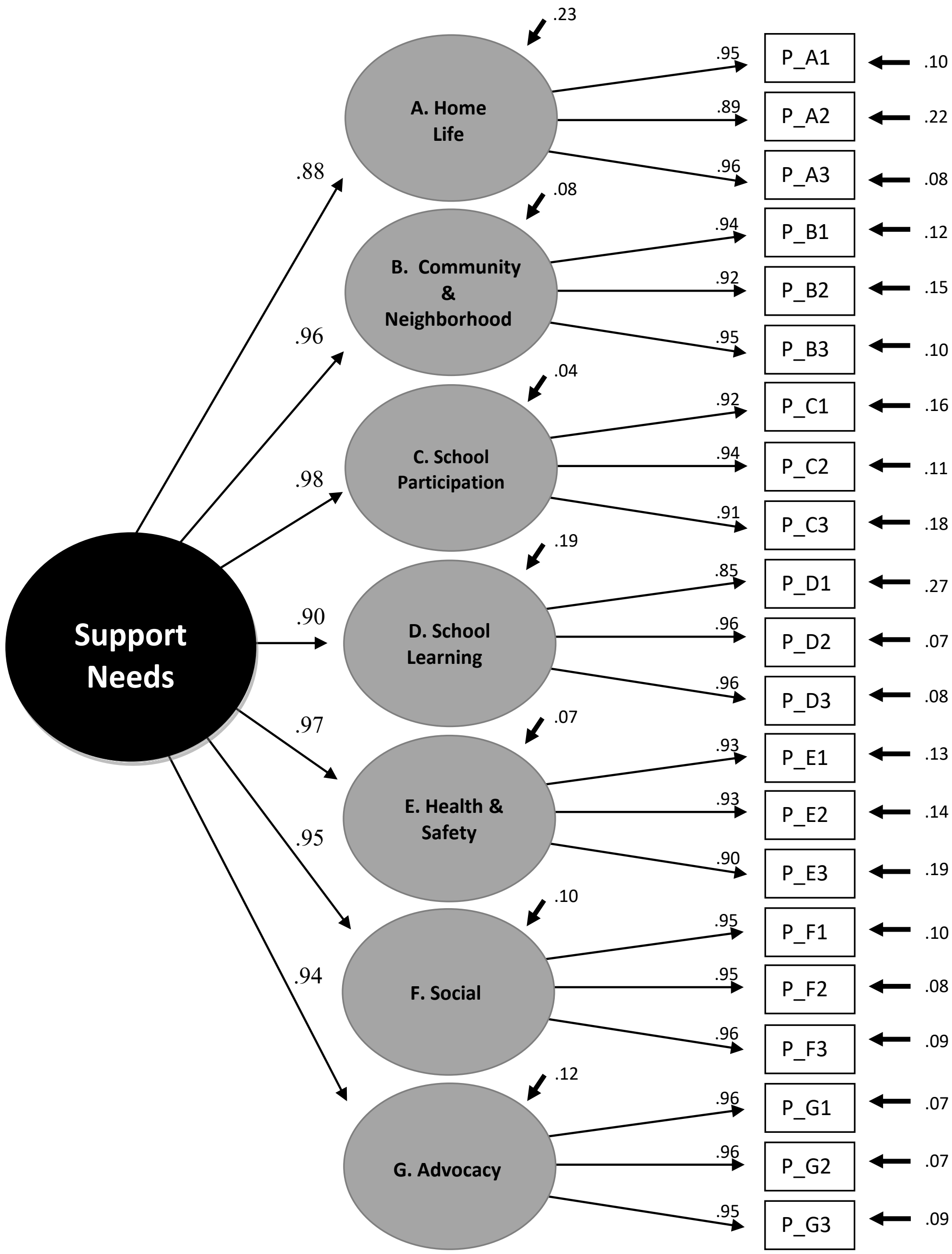

Figure 3. Standardized solution for the factorial representation of the higher-order factor model (H3)

The higher-order model showed that the measurement error for the parcels ranged between .07 (P_D2; P_G1; P_G2) and .27 (P_D1). It was thus deduced that the squared coefficient of multiple correlation or the amount of variance explained by the endogenous variables ranged between .93 and .73. Similarly, the residual variance for the endogenous variables ranged between .04 (C. School Participation) and .23 (A. Home Life) and the amount of variance explained by the exogenous variable ranged between .96 and .77. All the factor loadings had values equal to or greater than .88.

Once the parameters had been estimated, we analyzed both absolute and partial goodness-of-fit indices for each model (Table 6). The absolute index used for verifying the null hypothesis was the Chi-Square Index (χ^2). When we analyzed the values shown by the models, we had to reject the null hypothesis in all cases ($p < .001$), however, this criterion is often unmet when working with a large sample (Hu & Bentler, 1999). In these cases it is recommended to take into account the χ^2 magnitude (considering a better fit when smaller) and other common partial indices (Arias, 2008; Kline, 2010): (a) Root Mean Square error of Approximation (RSMEA); (b) Tucker-Lewis Index (TLI); (c) Comparative Fit Index (CFI); and (d) Standardized Root Mean Square Residual (SRMR).

Table 6. Goodness-of-fit indices

FIT INDICES	INTERPRETATION	*Unidimensional Model (H1)*	*Correlated First-Order Factors Model (H2)*	*Higher-Order Factor Model (H3)*
χ2 (df)	To accept H_0 ($p > .01$)	4625.11 (189)	981.57 (168)	1402.92 (182)
p		<.001	<.001	<.001
RMSEA	Acceptable values until .08. Other values lower than .10 could be accepted.	.17	.077	.091
RMSEA (90%)		(.17-.17)	(.073-.082)	(.086-.095)
TLI	It should be higher than .95	.95	.99	.99

CFI	It should be higher than .95	.96	.99	.99
SRMR	Values less than .05 show a good fit	.047	.020	.033

These findings clearly show that the data obtained by administering the SIS-C do not fit the first hypothesis (unidimensional model). On the other hand, there were good results for both the correlated first-order factors and the higher-order factor hypotheses when partial indices were taken into account. In view of these results, it is necessary to analyze which of the two models has a better model fit.

Satorra and Bentler (2001) proposed conducting a specific corrected Chi-Square difference test in order to analyze nested models when data presents a lack of normality. The results obtained (χ^2_d = 423.65; *df* =14; $p < .001$) showed significant differences, allowing us to reject the null hypothesis and conclude that the model that presents lower RSMEA and SRMR values and a smaller Chi-Square (i.e., the correlated first-order factors model) is significantly better than the comparison model (i.e., the higher-order factor model).

Although it was shown that the correlated first-order factors model was the best solution to represent the factorial structure of the scale, the multicollinearity or the high correlations found between some of the factors can affect discriminant validity. To determine the degree of multicollinearity, we computed the Variance Inflation Factor (VIF) for each independent variable. VIF values did not exceed the value of 10, which is often regarded as indicating severe multicollinearity (Neter, Kutner, Nachtsheim, & Wasserman, 1996).

At this point, the model’s consistency was tested. For each of the seven latent variables, we analyzed both the composite reliability (ρ_c), which indicates the overall reliability of a collection of heterogeneous but similar items within underlying traits; and the average variance extracted (ρ_V), which indicates how accurately the construct is measured. Values should be greater than .50 (Hair, Ringle, & Sarstedt, 2011). As one can see in Table 7, both indices were within a satisfactory range (>.70).

Table 7. Composite reliability an average variance extracted of the correlational model

DOMAINS	$\rho_C = \frac{(\Sigma\lambda)^2}{(\Sigma\lambda)^2 + \Sigma(\Theta)}$	$\rho_V = \frac{(\Sigma\lambda^2)}{[\Sigma\lambda^2 + \Sigma(\Theta)]}$
A. Home Life	.950	.865
B. Community & Neighborhood Living	.948	.858
C. School Participation	.957	.880
D. School Learning	.955	.877
E. Health & Safety	.950	.864
F. Social	.955	.877
G. Advocacy	.945	.850

4. Discussion

The SIS-C is the first attempt to assess support needs in children with intellectual disability within the Spanish context and the main tool to gain knowledge on the support needs construct from a childhood perspective. In this paper, a study of the internal structure of this instrument was carried out using a CFA to analyze the nature of the construct and reveal thus how the SIS-C should be scored.

The scale's structures that were tested were those previously analyzed in different research on the SIS-A (e.g., Harries et al., 2005; Kuppens, et al., 2010; Thompson et al., 2004; Verdugo et al., 2007): (1) support needs is a unidimensional construct; (2) support needs is a correlated first-order factors construct; (3) support needs is a higher-order factor construct. Goodness-of-fit analysis showed that a single domain was not enough to reproduce the original matrix and explain the nature of support needs. However, this construct seemed to be multidimensional according to fit indices. Specifically, the correlated first-order factors model was best suited. CFA findings of multidimensionality potentially have important applied consequences in term of scale scoring an interpretation. Although it does not necessarily mean that a total scale score is an inadequate indicator of the intended construct, subscales might not be interchangeable indicators of a single construct, which have distinct implications for health policy and psychological intervention (Reise, Bonifay, & Haviland, 2013).

These findings confirm the correlational model obtained from the SIS structure (Kuppens, et al., 2010; Thompson et al., 2004; Verdugo et al., 2007) providing initial evidence of the pattern of this construct in childhood. It is important to note that the correlational factor structure found in the SIS-C includes the domain ‘Advocacy’, which was considered a supplementary subscale in the SIS-A and was not included as part of the main model obtained. However, due to its special interest in the transition to adulthood and the consistency shown by this subscale in recent studies (Shogren et al., 2014), the relevance of including this domain as part of the support needs index and profile is assured.

The SIS-C, as well as the SIS-A, will be useful in designing intervention strategies adapted to the individual characteristics of the participants, evaluating the functioning improvements achieved through the implementation of ISP (Thompson et al., 2009); and, ultimately, implementing evidence-based practices (Schalock, Verdugo, & Gómez, 2011). Furthermore, these instruments tackle the challenge of requiring assessors to envision people with ID engaged in a variety of ordinary life activities, including those in which they might not have the opportunity to participate regularly (Thompson & Viriyangkura, 2013). Use of this scale leaves behind the traditional focus on intellectual deficit and starts from a position of interest in human strengths and their development through the support provided by the social context, which can be easily framed within ‘positive psychology’ (Schalock, 2004).

Additionally, SIS-C provides an element of added value in that it can be incorporated into school environments and help teachers to provide individualized support in a diverse range of academic and non-academic activities, promoting the rights and inclusion of children with intellectual and developmental disabilities.

Despite the various useful implications of this work, some limitations must be identified. Firstly, this study involves an incidental sample, which does not ensure representativeness. Taking into account this limitation, the research team worked to achieve a large number of participants (*n* = 814), increasing the chances that a diverse range of individuals were sampled, and attempted to obtain an appropriate representation of the population regarding age and intellectual disability level. However, it was not possible to reach the participation of two respondents in all the assessments. Secondly, although a previous session was given by the research team to guarantee that the interviewers were qualified to administrate the SIS-C, the effect of interviewers on data was not analyzed (e.g., inter-interviewer reliability). Thirdly, the children were classified into the different types of disability and into the specific categories of intellectual disability (mild, moderate, severe and profound) on the basis of the clinical judgment of professionals from the collaborating centers when an objective evaluation was not available. Another limitation worth pointing out is that parcels (not items) were used as indicators in the CFA. Although the use of parcels is appropriate for this study, it may be one of the reasons why the models fit so closely. Moreover, item-level analyses were not conducted, so it is difficult to know how well individual items were related to the latent trait of interest.

Finally, although the correlated first-order factors model produces suitable goodness-of-fit indices, and composite reliability and average variance extracted indicate that each subscale is by itself a reliable factor without needing to turn to a higher-order factor model, we would like to remark the high correlations found between some of the first-order factors, which could affect discriminant validity. Although VIF values did not indicate severe multicollinearity, it would be relevant to check other factorial solutions, which could help address concerns about the internal structure of the support needs construct when measured in childhood.

In this context, the use of more complicated, multidimensional latent variable model specifications, such as second-order or bi-factor measurement models must be considered (Reise et al., 2013). Following the recommendations of these authors, further research should be also conducted to determine the appropriateness of reporting subscales scores. To address this aim, it would be necessary to confirm that: (a) total scale scores are not better estimators of subscales true scores than the subscales scores themselves; and (b) subscales scores provide 'add value' beyond total scores.

Results obtained in this work contribute to the breakthrough in the understanding of the support needs of children with intellectual disability and show construct validity evidences of the SIS-C. However, further research in this field is needed to provide more validity and reliability evidences and ensure the clinical utility of this instrument.

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