DOCTORAL DISSERTATION

-International PhD-

Salamanca, 2014

DEVELOPMENT AND VALIDATION OF A SUPPORT NEEDS SCALE FOR CHILDREN WITH INTELLECTUAL DISABILITIES

-Summary and Conclusions-

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INTRODUCTION

This document represents a summary in English of the PhD Dissertation entitled *Development and Validation of a Support Needs Scale for Children with Intellectual Disabilities* defended at the University of Salamanca (Spain) under the assumptions of the 'International Doctorate' mention.

The research presented has been funded by the Ministry of Economy and Competitiveness (R&D Projects) (PSI2009-10953; PSI2012-36278) and carried out within the Institute on Community Integration (INICO) with the aim of adapting and validating the Supports Intensity Scale for Children (SIS-C) in Spain. In this regard, the dissertation has been developed in Spanish and divided into the following main three sections:

(1) A theoretical framework, where the new concept of 'intellectual disability' is analyzed and the provision of individualized supports is presented as the main bridge to reach a better functioning and quality of life. The importance of the assessment as the previous step of any intervention is also pointed out, showing in turn the lack of valid scales able to evaluate support needs in people with intellectual disabilities, especially during their childhood.

(2) The empirical study description, including the process and the results of the adaptation and validation of the SIS-C in the Spanish context. After administering the Spanish version of the scale to a sample of 814 participants, the adequacy of the SIS-C to assess individualized support in children with intellectual disabilities is examined following three different methodologies: Classical Test Theory (CTT); Structural Equation Modeling (SEM); and Item Response Theory (IRT).

(3) A set of general and specific conclusions about the properties of the scale are shown in this section. The strengths and weaknesses of the work, some practical implications of the SIS-C, and the future research lines related to this issue are also taken into account in this last part.

All the sections from the original version of the dissertation have also been included in this summary. The main points of the framework, the steps followed for the adaptation and validation of the SIS-C as well as the most important results, and the most important conclusions are here recapitulated in English.

In this work, the American Psychological Association (APA) publications style has been followed. Specifically, the format used for the bibliographic references corresponds to the guidelines proposed in the 6th edition of the APA manual (2010).

PART I

SUMMARY OF THE THEORETICAL FRAMEWORK

1.1. THE IMPORTANCE OF SUPPORTS IN THE CURRENT CONCEPT OF INTELLECTUAL DISABILITY

Through the different definitions proposed by the American Association of Intellectual and Developmental Disabilities (AAIDD) on 'Mental Retardation' (Grossman, 1973, 1983; Heber, 1959, 1961; Luckasson et al., 1992: Luckasson et al., 2002), currently referred to as 'Intellectual Disability' (Schalock et al., 2010), society has been interested in improving people's understanding of intellectual disabilities. The evolution of the concept of disability has meant substantial changes in understanding people with intellectual disabilities (Mercer, 1992). Currently, 'Intellectual disability' is conceptualized from socio-ecological and multidimensional perspectives where disability is not understood as a defect within the individual (as it was traditionally) but as a poor fit between a person's capacities and the context in which a person functions (Thompson, Wehmeyer, & Hughes, 2010).

In recent decades, this new perspective has progressively emphasized the role played by supports in the functioning and quality of life of people with intellectual disabilities (Schalock, 2011). This support paradigm has consequently brought new and better approaches for the diagnosis, assessment and intervention (Verdugo & Schalock, 2010; Schalock & Luckasson, 2013a, 2013b). Similarly, innovative proposals for the provision of support services and public policies based on the new concept have begun to be developed (Shogren et al., 2009; Shogren & Turnbull, 2010). In this sense, people with intellectual disabilities must be understood within inclusive contexts and we must focus on their support needs instead of their deficits, because identifying people's support needs and then matching them to supports will decrease the misfit between abilities and environment. Likewise, it is claimed that the main difference between people with and without intellectual disability is the intensity of the support need to participate satisfactorily in the daily activities of life (Thompson & Viriyangkura, 2013).

In brief, the gradual change in the concept of disability and, specifically, of intellectual disability (Schalock et al., 2007) implies a more positive conception (Schalock, 1995a; Verdugo, 1999) which needs a consequent change in terminology (from 'mental retardation' to 'intellectual disability') as well as in their definitions, including both operational and constitutive definitions (Wehmeyer et al., 2008).

1.1.1. Operational definition: Adaptive behavior as diagnostic and classification criterion

Nowadays, to make an accurate diagnosis of intellectual disability, three criteria must be met (Schalock et al., 2010): (1) significant limitations in intellectual functioning; (2) significant limitations in adaptive behavior; and (3) onset during the developmental period, being usually accepted that intellectual disability must be manifested before the age of 18.

These criteria have been accepted since mid-twentieth century, and are currently used in the major international classification systems: the International Classification of Diseases (ICD-10), developed by the World Health Organization (WHO, 1993); and the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), developed by the American Psychiatric Association (APA, 2013).

With regards to the intellectual functioning criteria for the diagnosis of intellectual disability, significant limitations are defined as performance that is, at least, two standard deviations below the mean in the score for a standardized test. Although there are diverse theories about the construct of 'intelligence', the assessment of intelligence is usually understood as the evaluation of IQ, since the theory of intelligence as a single factor provides the strongest psychometric evaluation of intelligence (Gottfredson, 2002). It is usually believed that the criteria related to significant limitations in intellectual functioning is met when a person obtains an IQ score of 70 or below in standardized tests (e.g., Brown, Sherbenou, & Johnsen, 1995; Kaufman & Kaufman, 1997; McCarthy, 2006; Wechsler, 2012).

Although adaptive behavior criteria have been included in the operational definition of intellectual disability since 1963 and there are more 200 adaptive behavior standardized tests, the clinical practice, diagnosis and classification of intellectual disability has been constrained to the assessment of intelligence until recently. This has been due to the absence of agreement about its structure (Bruininks, McGrew, & Maruyama, 1988; Bruininks, Woodcock, Weatherman, & Hill, 1985; Greenspan & Granfield, 1992; Kamphaus, 1987; Meyers, Nihira, & Zetlin, 1979; Nihira, Foster, Shellhaas, & Leland, 1967; Thompson, McGrew, & Bruininks, 1999; Widaman, Gibbs, & Geary, 1987; Widaman & McGrew, 1996; Widaman, Stacy, & Borthwick-Duffy, 1993), and the consequent shortage of standardized tests able to evaluate this construct for diagnostic purposes (Tassé, 2013; Tassé et al., 2012).

With the arrival of the supports paradigm, however, an innovative approach began to emerge that places great importance on the behavior typically learned to suit a given society (Montero, 2003), and adaptive behavior research has increased considerably.

Authors eventually reached a consensus about the multidimensionality of the adaptive behavior construct, derived from extensive criticism of the univariate approach (Widaman, Borthwick-Duffy, & Little, 1991), and adaptive behavior scales began to be developed for diagnostic purposes (e.g., Tassé et al., in press). Nowadays, in order to diagnose intellectual disability, it is also necessary to prove that there are significant limitations in adaptive behavior, and the need is accepted for a test score that is two standard deviations below the mean of either: a) one of the following three types of adaptive skills: conceptual, social or practical, or b) an overall score of adaptive behavior.

The weight assigned to IQ scores in the diagnosis of intellectual disabilities has thus been gradually reduced, and intellectual functioning is currently considered as important as the criterion for adaptive behavior (Luckasson et al., 2002; Schalock et al., 2007; Schalock et al, 2010; Verdugo, 1994, 1999, 2003a; Wehmeyer et al., 2008). Similarly, whereas IQ scores have been the traditional criteria for classifying people with intellectual disabilities in different categories (mild, moderate, severe and profound), the various levels of severity are nowadays defined on the basis of adaptive functioning, because it is adaptive functioning, and not the IQ, that determines the level of supports required (APA, 2013).

1.1.2. Constitutive definition: Understanding intellectual disability through theoretical models

This kind of definition involves a construct's relationship to other constructs. One of the best approaches through which to explain and relate a specific construct to others is by developing framework models. In the field of intellectual disabilities we use three reference models (Buntinx & Schalock, 2010): (1) human functioning model; (2) support model; and (3) quality of life model.

These models appeared two decades ago, with the change from the medical/traditional paradigm to the new socio-ecological perspective and have been modified progressively until reaching their current form, fitting better with the new approaches to this concept (Verdugo, 2003b).

1.1.2.1. Human Functioning Model

The current AAIDD human functioning model (Schalock et al., 2010) defined 'intellectual disability' under the umbrella of the term 'disability' as it is conceptualized in WHO's system (The International Classification of Functioning, Disability and Health [ICF], 2001): a limitation in human functioning (considering human functioning as all the life activities in which one would be typically engage). From the AAIDD model (Figure 1), the socio-ecological and multidimensional perspectives of intellectual disability are highlighted, showing the importance of both personal characteristics and environmental factors (*intellectual abilities; adaptive behavior; health; participation; context*), and the worth of supports as a tool to improve the human functioning.

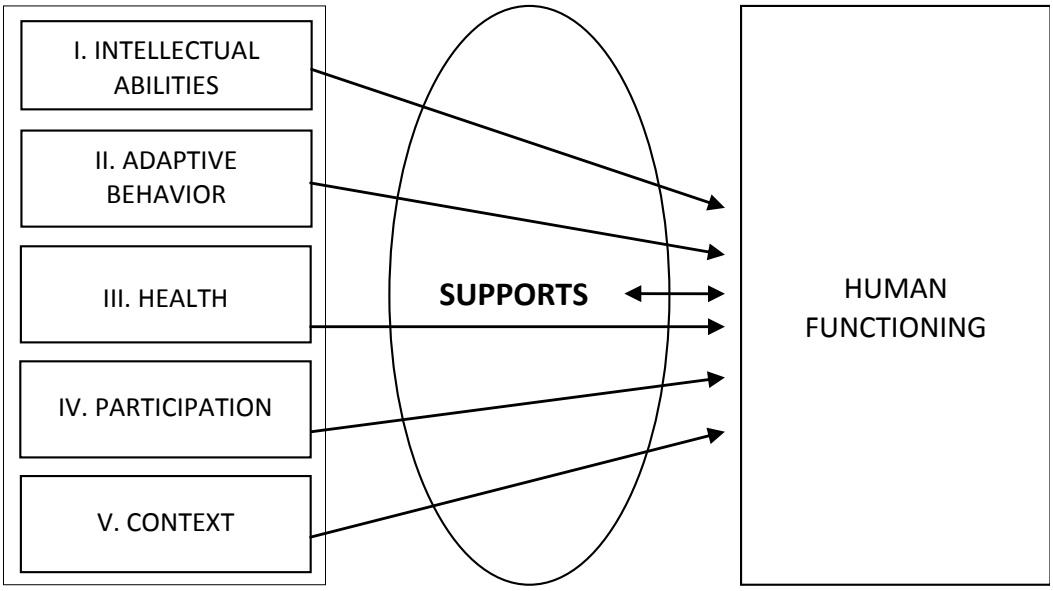


Figure 1. AAIDD conceptual framework for human functioning (Schalock et al., 2010)

1.1.2.2. Supports Model

Taking into account the importance of support in the life of people with intellectual disability, a specific model for supports was also developed (Thompson et al., 2009). In this context, supports are nowadays defined as the resources and strategies that enhance human functioning (Luckasson et al., 2002; Schalock et al, 2010) and they are considered the main bridge to improve the functioning of people with intellectual disabilities in their daily lives.

The current aim in providing supports is not just 'fixing' the individual, but also improving their functioning and community participation by reducing environmental demands. In other words, this model's 'supports' are not only oriented to making a person more capable of an activity via learning skills, but also fit the different contexts of that person's current ability (Figure 2). Nine areas must be specifically considered in order to provide individualized support (Luckasson et al., 2002: Schalock et al., 2010): (1) 'Human Development'; (2) 'Teaching and Education'; (3) 'Home Living'; (4) 'Community Living'; (5) 'Employment'; (6) 'Health and Safety'; (7) 'Behavior', (8) 'Social'; and (9) 'Protection and Advocacy'.

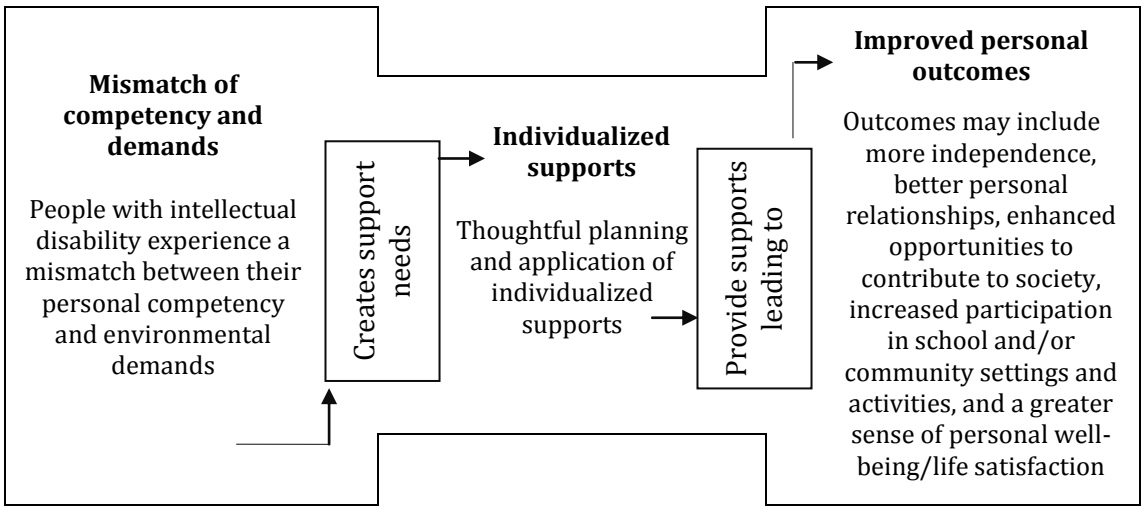


Figure 2. Supports Model (Schalock et al., 2010; Thompson et al., 2009)

Within this model, not only does the construct of support have a very substantial role, but also the concept of 'support needs' (Thompson et al., 2009). Support needs are defined as a psychological construct referring to the pattern and intensity of the support a person requires to participate in activities associated with regular human functioning and must be understood in the same ways as typical human needs (Bradshaw, 1972): (1) normative needs; (2) felt needs; (3) expressed needs; and (4) comparative needs.

Under this assumption, people both with and without disability have needs; but people with intellectual disabilities have extraordinary support needs in terms of intensity (*type; frequency; and daily time*) in order to participate in their daily life activities (Thompson & Viriyangkura, 2013). Support needs vary as a function of personal abilities and the specific contexts in which a person lives (Figure 3), therefore, people with intellectual disabilities have different support needs from each other.

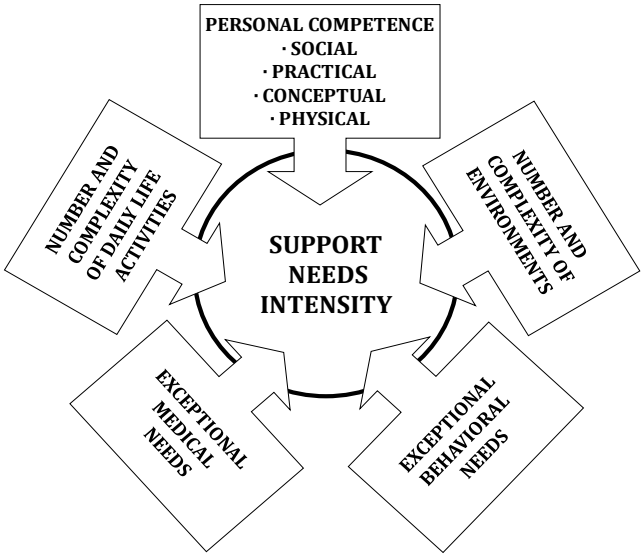


Figure 3. Support Needs Predictors (Thompson et al., 2004)

The pattern and intensity of the supports provided for a person with intellectual disability must be individualized, as they are meant to meet individual support needs. Since 1992 (Luckasson et al.,) the intensity of support needs has been categorized in four levels: (1) intermittent; (2) limited; (3) extensive; and (4) pervasive (Luckasson et al., 2002; Schalock et al., 1999). Arnold, Riches and Stancliffe (2014a) have recently proposed a different classification to overcome the limitations of the previous divisions (Greenspan & Switzky, 2003). This new classification is more specific and includes three indices, and several categories within: *Time modifier* (limited; intermittent; ongoing); *Level/Qualifier* (no formal support; mild; moderate; substantial; and pervasive); and *Support network* (consistent & stable; inconsistent or unstable, absent; and in crisis).

Finally, it is important to highlight that although both natural and technological tools can be considered adequate supports to meet support needs, it has been demonstrated that natural supports are more effective in improving the quality of life and facilitating the inclusion of people with disabilities (Petito & Cummins, 2000; Petry, Maes, & Vlaskamp; 2005, Renty & Roeyers, 2006). Unfortunately, there is usually a significant negative correlation between the support needs level and the availability of natural supports (Claes et al., 2012).

1.1.2.3. Quality of life model

Since improving individual performance is not the main goal of the supports, enhancing the quality of life of people with intellectual disabilities has become one of the main focuses when providing individual supports.

Different models centered on conceptualizing, assessing and implementing the construct 'quality of life' have therefore begun to be developed (e.g., Campbell, Converse, & Rodgers, 1976; Cummins, 1997, 2000; 2005; Felce & Perry, 1995, 1996; Petry et al., 2005; Petry, Maes, & Vlaskamp, 2007; Schalock & Verdugo, 2002). The model proposed by Schalock and Verdugo (2002, 2007, 2008, 2013b) is the most cited today, and seems to be the most generally accepted by the scientific community (Gómez, Verdugo, Arias & Arias, 2011), as it meets the principles of formulation, assessment, and application expected for a theoretical model (Schalock, 2000). It includes eight domains (related to three different factors) and their respective indicators (Table 1). Several pieces of evidence for reliability and validity have been demonstrated in both Spain and across different cultures and countries (Gómez, Arias, Verdugo, & Navas, 2011; Gómez, Verdugo, & Arias, 2010; Jenaro et al., 2005; Keith & Schalock, 2000; Schalock et al., 2005; Schalock, Keith, Verdugo, & Gómez, 2010; Wang, Schalock, Verdugo, & Jenaro, 2010), including its usefulness for people with profound disabilities (Verdugo, Gómez, Arias, Navas, & Schalock, 2014).

Table 1. Quality of life domains, indicators and life measurement strategies (Buntinx & Schalock, 2010)

Factors	Domains	Exemplary indicators
Independence	Personal development	Education status, personal skills, adaptive behavior
	Self-determination	Choices/decisions, autonomy, personal control, goals
Social Participation	Interpersonal relations	Social networks, friendships, social activities, interactions, relationships
	Social inclusion	Community integration/participation, community roles, supports
	Rights	Human (respect, dignity, equality) legal (legal access, due process)
Well-being	Emotional well-being	Safety and security, positive experiences, contentment, self-concept, lack of stress
	Physical well-being	Health status, recreation, leisure
	Material well-being	Financial status, employment status, housing status, possessions

This quality of life model can be understood within a system approach which includes its application in three different levels (Schalock & Verdugo, 2008, 2013a): the *microsystem* (where the stress is on personal outcomes), the *mesosystem* (focused on the actions that organizations and the community have to carry out) and the *macrosystem* (framework for public policies oriented to facilitate that community and organizations to improve the quality of life for people with intellectual disabilities).

1.1.3. Supports in the community and organizational change: Implementing the new concept of intellectual disabilities in practice

It is clear that people with intellectual disabilities face challenges in their development, demonstrate more difficulties when participating in daily life activities in their communities, and express, at the same time, characteristics of candor, gullibility or innocence in their behavior that makes them vulnerable to abuse and exploitation by others (Greenspan, 2012). The current conception of intellectual disabilities, however, provides an evident contextual emphasis referring to the discrepancies between people's abilities or skills and environmental demands by proposing supports as a fundamental tool to decrease that discrepancy.

The supports paradigm in which the new concept of intellectual disability has been developed (Schalock et al., 2010) is closely related to the quality of life model proposed by Schalock and Verdugo (2002, 2008, 2012), where supports are proposed as an essential tool to improve individual performance, achieve personal results and increase the quality of life of persons with disabilities. In this sense, successful participation in daily life activities, according to their own interests and preferences, is essential in order to obtain that quality of life, and the supports provided by organizations are the essential bridge to achieving this goal (van Loon, 2009a; Shogren, Luckasson, & Schalock, 2014).A few years ago the priority of organizations which assisted people with intellectual disabilities was to develop programs and build infrastructures with the intention of placing the person in a protective environment. Under the current conception of disability, organizations must also provide supports in order to connect the person with the society.

Organizational effectiveness and efficiency, concepts that were not involved in the traditional services, are nowadays the key to guaranteeing the change that the organizations needed in order to: (1) respond to the demands of the new concept of intellectual disability; and (2) meet the current standards, where quality of life for people with disabilities is the expected result of any intervention (Schalock & Verdugo 2013b, 2014). Considering the great difficulty of the organizational transformation, which requires a total change from the traditional services, it is necessary to develop strategies for change (e.g., Schalock & Verdugo, 2012, 2013a; Schalock, Verdugo, Bonham, Fantova, & van Loon, 2008), understanding these strategies as the integration of visions, missions and values into an action plan designed to achieve personal results (Schalock, Gardner & Bradley, 2007).

These strategies include specific actions that need to be carried out within an organization such as leadership, person-centered planning, self-assessment and team learning (Claes, Van Hove, Vandevelde, van Loon, & Schalok, 2010; Schalock et al., 2007; Schalock, Gardner et al., 2007; van Loon, 2009a) as well as external actions related to both practices in the community and changes in public policies (Shogren et al., 2009; Shogren, 2013). So as to achieve organizational change, professional practices have also started to increase their involvement with research (Schalock & Luckasson, 2004) and the concept of 'evidence-based practices' has emerged. It enables successful interventions, as these practices are based on current best evidences obtained by credible sources, which use reliable and valid methods and have been supported both theoretically and empirically (Schalock , Verdugo, & Gómez, 2011).

In recent years, the concept 'evidence-based outcomes' has taken on a special relevance (van Loon et al., 2013), which also includes the importance of right-to-left thinking (Schalock, 1995b), focused on personal outcomes (objectives) rather than on an organization's (rules) (Schalock & Verdugo, 2007, 2012, 2013; Schalock, Verdugo et al, 2008; van Loon, 2009b). Right-to-left thinking is person-centered and requires that, first, expected personal outcomes are specified (usually related to quality of life) and, the organization then acting to achieve them (Andrews, 2004; Drucker, 1994).

Finally, Schalock and Verdugo (2012) claim that the current main challenge of organizations for people with disabilities is to prepare and implement 'support systems'. These systems are conceptualized as the planned and integrated use of individualized support strategies and resources that encompass multiple aspects of human performance in multiple settings (Thompson et al., 2009) and provide structure for organizations that allows the enhancement of human performance, personal outcomes, and quality of life Support systems must also take into account different issues, such as independent living, opportunities to participate in activities, the use of alternative and augmentative communication systems, accessibility in the environment and, on the top of that, the strengths of people with intellectual disabilities to be able to train the skills needed to achieve success in daily life (Thompson, Hughes et al., 2002).

In short, organizations must provide support to guarantee independent life and self-determination (van Loon, 2006a), as provided in the United Nations Convention (Navas, Gómez, Verdugo, & Schalock, 2012; Verdugo, Navas, Gómez, & Schalock) and, for that, it is necessary to assess individual support needs through proper scales which take into account different personal and environmental characteristics.

1.2. ASSESSING SUPPORT NEEDS IN PEOPLE WITH INTELLECTUAL DISABILITIES: INDIVIDUALIZED SUPPORTS PROFILE AND PLANNING

The 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. The adoption of new approaches to the study of intellectual disability has highlighted the importance of intervention systems based on a support needs assessment (Thompson et al., 2009). Evaluation is currently defined as a systematic collection of information to fulfill three functions (Schalock et al., 2010): (1) diagnosis; (2) classification; and (3) support profile/ planning.

Since most psychological constructs must be inferred because need is not directly observed, the most recommended tools for the assessment of people with intellectual disabilities are measurement scales. In order to determine the scale as valid for assessment, it is necessary to carry out a standardization process to ensure that the information obtained in the test is consistent with the specific construct and allows the comparison of a person's score with that of their peers (Salvia & Isseldyke; Verdugo, 1994). This requires a long and rigorous process and, due to the recent emergence of the new understanding of intellectual disability, there is still a shortage of valid tools able to assess key constructs in this field, as is the case of the 'support needs' constructs. Despite various attempts to develop scales of needs (Table 2), the lack of valid instruments in this area is still evident, which is an obstacle to the implementation of individualized plans and, ultimately, to the organizational change (Schalock & Verdugo, 2012).

One of the methods used to solve this problem was the estimation of support needs once the scores have been obtained using adaptive behavior scales. In Spain, the 'Inventory for Client Agency Planning (ICAP) (Bruininks, Hill, Weatherman, & Woodcock, 1986; Montero, 1993) was the scale most commonly used for this purpose; however, the many differences between the two constructs and the way in which they must be evaluated have been demonstrated (e.g., Thompson, McGrew, & Bruininks, 2002; Thompson, Tassé, & McLaughlin, 2008). In assessing adaptive behavior, respondents report on whether a person performs specific skills; furthermore, assessing support needs requires clarification of the frequency, time and type of support a person needs in order to participate in complex activities (Shogren, Thompson, et al., 2014), predicting better allocation and funding needs (Arnold, Riches, & Stancliffe, 2014b). Creating an assessment scale to offer indices and profiles for specific support needs has become the greatest demand of planning teams and the scientific community (Thompson, Hughes et al., 2002).

Table 2. Characteristics of the supports assessment tools (adapted from Howard Research, 2007; Ibáñez, 2009)

INSTRUMENTS	GOALS	STRUCTURES (Domains and response formats)	PSYCHOMETRIC PROPERTIES (Reliability and Validity)	REFERENCES
***Service Need Assessment Profile* (SNAP)**	• Designed to measure the service needs of any individual with disability • Distribution and economic purposes. • It provides a support profile that allows us to know the support services needed by a person, including staff time required for the support.	Five Domains: • Personal Care • Physical Health • Behavioral Support • Night Support • Social Support The scores range from 1 (minimum) to 5 (maximum)	Internal Consistency: .97 Construct Validity: .46 Convergent Validity: -SIS: .79	**Original Scale** Gould (1998) *Other references* Guscia, Harries, Kirby, Nettelbeck & Taplin (2005, 2006)
***North Carolina Service Need Assessment Profile* (NC-SNAP)**	• This tool measures the support needs of any person with intellectual disabilities. • Economic and resource allocation objectives. It was developed as a substitute for ICAP. • A score for each domain is obtained; the overall score remains the highest score in the domains.	Three Domains: • Daily Living Supports • Complex Health Care • Behavior The scores range from 1 (minimum) to 5 (maximum)	Internal Consistency: .97 Interrespondent Reliability: .86 Test-retest reliability .92 Convergent Validity: -SIS: .72	**Original Scale** Hennike, Myers, Realon, & Thompson (2002) *Other references* Hennike (2002) Hennike, Myers, Realon, & Thompson (2006)
***Instrument to Classify Support Needs for people with disability* (I-CAN)**	• Created to identify and classify the support needs of adults with disabilities. • Related to the domains based on the ICF framework. • Focused on making individualized planning systems.	• Four subscales of Health & Well Being • Seven subscales of Activities & Participation • Personal questions about interests and happiness. Scores based on two different indices (support frequency and level), six response options.	Internal Consistency: .86 Interrespondent Reliability: .89 Criterion Validity: .60	**Original Scale** Lewellyn, Parmenter, Chan, Riches, & Hindmarsh (2005) *Other references* Riches, Parmenter, Llewellyn, Hindmarsh, & Chan (2009a; 2009b) Arnold et al. (2014a)
***Supports Intensity Scale* (SIS)**	• This scale provides a Support Needs Index for the allocation of resources and services for adults with intellectual disabilities. • It also shows Support Needs Profile oriented to plan supports.	• Six support areas • Supplemental Protection and Advocacy Scale • Medical and Behavioral Exceptional Support Needs Scores based on three different indices (type, frequency and daily time of support), ranged from 0 (minimum) to 4 (maximum).	Internal Consistency: .97 Interrespondent Reliability: .87 Construct Validity: .51 *Good properties in different adaptations	**Original Scale** Thompson et al. (2004) *Other references* Hughes, Thompson, & Wehmeyer (2011) Thompson, Tassé, & Thompson (2008) **Adaptations*: see Schalock, Thompson, & Tassé (2008)

1.2.1. Supports Intensity Scale (SIS)

The lack of support needs assessment scales becomes greater when we take into account the Spanish context. Nowadays, there is only one scale available that is able to measure support needs in people with intellectual disabilities, 'The Supports Intensity Scale (SIS), focuses on evaluating extraordinary support needs in adults with intellectual disabilities. The SIS was originally developed in English by members of the AAIDD according to the new concept of intellectual disability and greater international repercussions.

This scale has been adapted into 13 languages, including both Castilian (Verdugo, Arias, & Ibáñez ,2007) and Catalan (Giné et al., 2007), with adequate reliability and validity evidences (Buntinx, 2008; Buntinx, Van Unen, Speth, & Groot, 2006; Cottini, Fedeli, Leoni, & Croce, 2008; Claes, Van Hove, van Loon, Vandevelde, & Schalock, 2009a; Giné et al., 2006; Kuppens, Bossaert, Buntinx, Molleman, & van den Abbeele, 2010; Lamoureux-Hebert & Morin, 2009; Verdugo, Arias, Ibáñez, & Gómez, 2006; Verdugo, Arias, Ibáñez, & Schalock, 2010; Verdugo Ibáñez, & Arias, 2007; Schalock, Thompson et al., 2008). The SIS has also shown its capacity for assessing support needs in people with other limitations (Bossaert et al., 2009; Cruz, Jenaro, Pérez, & Robaina, 2010; Jenaro, Cruz, Pérez, Robaina, & Vega, 2011; Smit, Sabbe, & Prinzie, 2011).

The SIS gathers information about the nine areas proposed in 2002 (Luckasson et al.) as key contexts in the life of people with disabilities. For their evaluation, the scale is divided into the following three different sections:

- The primary section, The Support Needs Scale, involves 49 life activities divided into six subscales or domains: (a) 'Home Living'; (b) 'Community Living'; (c) 'Lifelong Learning'; (d) 'Employment'; (e) 'Health and Safety'; and (d) 'Social'. Each of the 49 items is rated on a five-point scale (0-4) with regard to the three different indices proposed in the theoretical level: frequency of the support (0= *none or less than monthly*, 4= *hourly or more frequently*); daily support time (0= *none*, 4= *four hours or more*); and type of support (0= *none*, 4= *full physical assistance*).
- The second section includes a supplementary domain related to Protection and Advocacy, rated on the same five-point scale.
- The last section lists 28 exceptional support needs related to 15 medical and 13 behavioral conditions. In this case, it uses a scale ranging from 0 to 2 (0= *no support needed*; 1= *some support needs*; and 2= *extensive support needed*).

Although in the original version the support needs profile included only domains from the first section, the results of new studies (Shogren, Thompson et al., 2014) suggest that the supplemental subscale 'Protection and Advocacy' has strong reliability and validity, and it may be appropriate to consider it as part the support needs index and profile.

Despite several reliability and validity evidences obtained for the SIS, it has received some bad reviews regarding the complexity of its response format. Arnold, Riches, and Stancliffe (2011) claimed that SIS asks how much support is needed for an activity (even when a person does not normally complete this activity in their daily life), and the measurement of support needs must be based on an assessment of the individual in the context of their specific environment, not support needed for some standardized set of activities.

Thompson and Viriyangkura (2013) object that it is important to have norm-referenced support needs scores and it is not possible to compare people's scores without the assurance that their scores are based on the same item set. Asking respondents to envision people with intellectual disabilities engaging in activities in which they are not currently involved has the potential to promote creative thinking and problem solving. In this sense, it is important to point out that the SIS has clearly demonstrated its strong association with clinical scores (Weiss, Lunsky, Tassé, & Durbin, 2009), its effectiveness in resource allocation (Chou, Lee, Chand, & Yu, 2013; Fortune et al., 2008; Giné et al., 2014; Wehmeyer, 2009) and its proper functioning in the design and planning of individualized supports (van Loon, 2006b, 2009a, 2009b).

1.2.2. Individualized Support Planning (ISP)

Since there is a discrepancy perspective, there is a gap between what a person with intellectual disabilities is able to do and what the environment demands, and they need extraordinary support to meet the requirements of daily life that the general population does not (Thompson & Viriyangkura, 2013).

Not all people with intellectual disabilities are equal, however, and they do not all need the same supports. It is therefore important to develop individualized support planning (ISP), taking into account the individual differences and the specific characteristics of daily life activities and contexts (Thompson et al., 2009).

Since the supports paradigm, different ISP models have been developed so as to provide steps, strategies and recommendations for carrying out an efficient plan (Luckasson et al., 1992; Luckasson et al., 2002; Schalock et al., 2010; Thompson et al., 2009). Nowadays, the ISP that is more accepted involves five different components (Figure 4), with the first two components related to the assessment of the support needs of the person and their interests, according to Person-Centered Planning (PCP) (O'Brien, 2004).

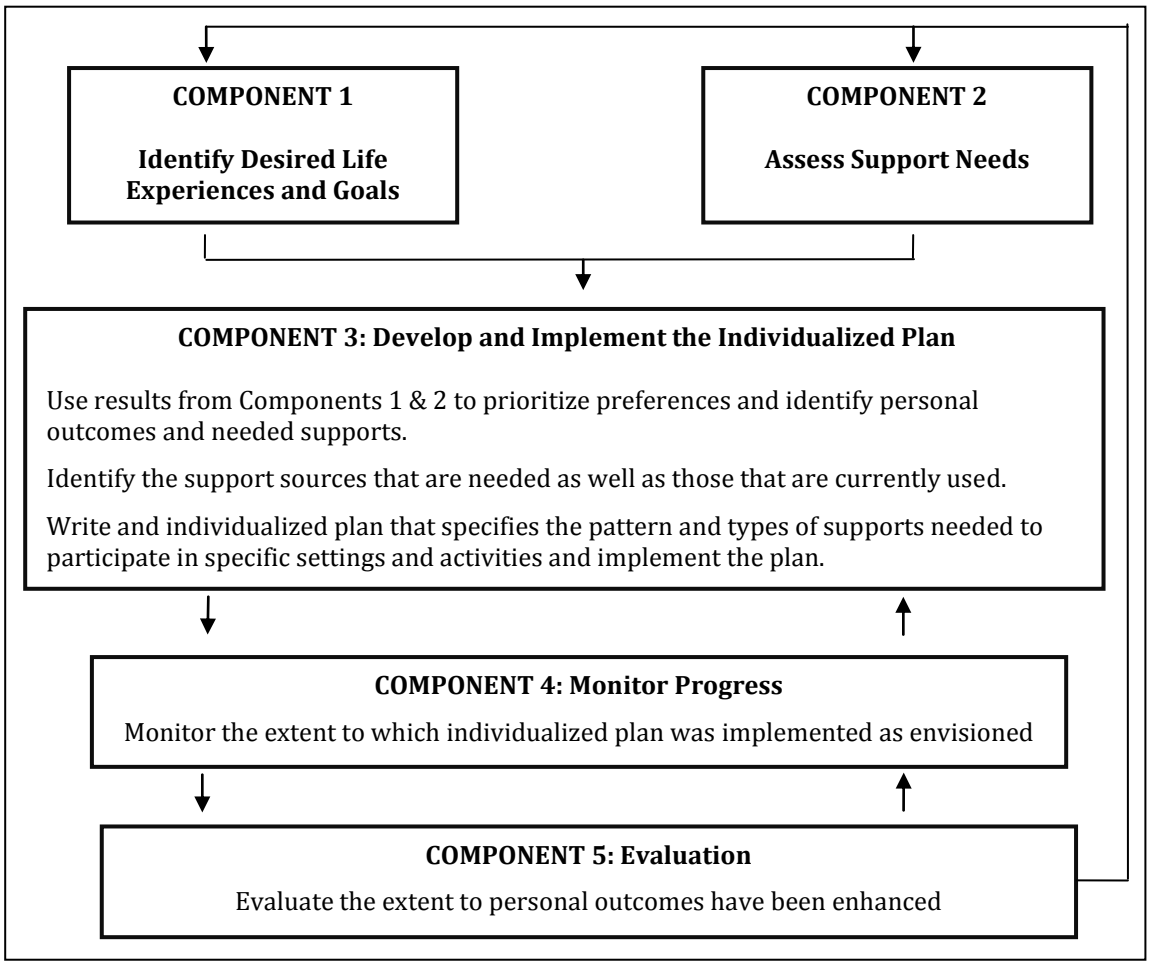


Figure 4. A process for assessing, planning, monitoring, and evaluating individualized supports (Schalock et al., 2010; Thompson et al., 2009)

1.2.3. Alignment of supports and quality of life in the organizational practice

In 2001, van Loon and Van Hove published the initial process of organizational change carried out in Arduin, a Dutch organization for people with intellectual disabilities. As procedural strategy, it used a three-component system (*input, throughput, and output/outcome*) combining both assumptions about support planning and the expected quality of life results (van Loon, Claes, Vandevelde, Van Hove, & Schalock, 2010).

After gathering all relevant information about personal interests, support needs and the quality of life (*Input*) it is important to create a report which provides a general view of the person, aligned with quality of life domains, support needs areas and individualized supports, giving priority to those activities more related to their personal interests (*throughput*). Finally, it is necessary to evaluate the results obtained (*output/outcome*); this data will offer useful information about personal outcomes and the effectiveness of the programs, allowing professionals to make the changes needed as flexible and continuous progress.

This system emphasizes the importance of assessment and the need for using valid tools to determine the support needs intensity and the quality of life level. The SIS was used for the support needs assessment (van Loon 2006b, 2009b) and the Personal Outcomes Scale (POS) (van Loon, van Hove, Schalock, & Claes, 2008) was used for the quality of life evaluation (Claes, Van Hove, van Loon, Vandevelde, & Schalock, 2009b). Aligning quality of life domains and SIS areas thus becomes the key to elaborating on specific strategies for inclusion in individualized support plans. In Table 3 we can see the alignment proposed for quality of life domains, SIS areas and examples of individualized supports.

Table 3. Alignment of quality of life domains, individualized support and SIS areas (Schalock & Verdugo, 2007; van Loon, 2008; van Loon et al., 2010)

Quality of Life Domains	**SIS Areas**	***Individualized supports (examples)***
Self-Determination	Protection & Advocacy	Elections, personal control , decisions, personal goals
Emotional Well-Being	Health & Safety, Protection & Advocacy, Exceptional Medical and Behavioral Needs	Security , stable environments , positive feedback , predictability , self-identification (e.g., mirrors)
Physical Well-Being	Health & Safety, Exceptional Medical Needs	Medical care, mobility, wellness, exercise, nutrition
Material Well-Being	Employment Activities	Property, possessions
Rights	Protection & Advocacy, Health & Safety	Privacy, civic responsibility, respect, dignity
Personal Development	Health & Safety, Protection & Advocacy, Exceptional Behavior Needs	Functional skills training , assistive technology, communication systems
Social Inclusion	Community Living Activities, Social Activities	Community roles , community activities, volunteering
Interpersonal Relations	Social Activities	Friendships, privacy protection, family support , community interactions

1.2.4. Support needs assessment in children with intellectual disability

Since the Convention on the Rights of Persons with Disabilities (United Nations, 2006), it has been pointed out that children and adolescents with intellectual disabilities must be guaranteed the same rights as all other children and young people, including their health, safety, respect, education, participation and the opportunity to contribute to their community (McConachie, Colver, Forysth, Jarvis, & Parkinson, 2006). Similarly, considering the social model of intellectual disability, interventions centered on optimizing the participation of children with intellectual disability in different contexts such as home, school and community life should be encouraged (Colver, 2005).

In recent years there has thus been a growing interest in knowing and implementing interventions for different aspects of people with intellectual disabilities at earlier ages (e.g., WHO, 2007), including the development of assessment tools related to: (a)adaptive behavior (e.g., Tassé et al., in press); (b)participation in ordinary contexts (e.g., Aymerich et al., 2005; Ravens-Sieberer et al., 2007); and quality of life (e.g., Gómez-Vela & Verdugo, 2009; Sabeh, Verdugo, Prieto, & Contini, 2009). There is still, however, a total absence of assessment tools in the international framework that are able to assess support needs in children with intellectual disabilities.

Taking into account the advantages of supports in the lives of people with disabilities, the importance of early interventions, and the positive impact of the SIS, the AAIDD has built up an international project focused on developing a Support Intensity Scale for Children (SIS-C) (Thompson, Wehmeyer et al., 2008). The differences between both scales are strongly related to the age of the participants (e.g., the child version includes contexts and activities related to school). Similarly, considering that infants cannot survive without support from others (Thompson & Viriyangkura, 2013), measuring extraordinary support needs by SIS-C requires that the respondents compare the supports needed by the child assessed with those needed by typically developing peers (of the same age). Finally, the analysis of the SIS functioning carried out in recent years allows some improvements in the SIS-C (e.g., the response index 'frequency of support' is simplified).

Although SIS-C is still not empirically validated in the original version, it was considered appropriate regarding the impact on the SIS in Spain (e.g., Verdugo, et al., 2010) and the strict process followed to create the initial pool of items by AAIDD (Thompson, Wehmeyer, Hughes, Shogren, Palmer et al., 2014) to adapt and validate this tool to assess the support needs of Spanish children with intellectual disability.

PART II

SUMMARY OF THE EMPIRICAL STUDY

2.1. GOAL

The overall aim of this work is to adapt and validate the Supports Intensity Scale for Children (SIS-C) (Thompson, Wehmeyer et al., 2008) in the Spanish context. This general goal breaks down into two specific objectives:

- To conduct rigorous processes of translation and adaptation into Spanish according to the guidelines proposed by Tassé and Craig (1999). The requirements of the International Test Commission (ITC) are also met, and a pilot test is included to identify and overcome potential problems.
- To guarantee the functioning, reliability and validity of the scale in Spanish using the best psychometric approaches. After administering the scale to a representative sample, the data must be analyzed through three methodologies:
  - Classical Test Theory (CTT), oriented to analyze the psychometric properties of the instrument.
  - Structural Equation Modeling (SEM), used as a confirmatory technique to test hypotheses about the structure of latent variables and their relationships according to the theoretical framework.
  - Item Response Theory (IRT) especially centered to identify the data fit to the model assumptions and the item calibration.

2.2. METHOD

2.2.1. Instrument

The SIS-C (Thompson, Wehmeyer et al., 2008) represents a multidimensional measure designed to determine the profile and intensity of the support needs of children with intellectual disability. It was originally developed by the American Association on Intellectual and Developmental Disabilities (AAIDD) and it is nowadays being adapted into different languages, simultaneously to the validation in the original version (Hughes et al., 2011).

This assessment scale has been developed according to the characteristics of the SIS for adults (Thompson et al., 2004), previously validated in Spanish (Verdugo, Arias et al., 2007), and under the assumptions of the new concept of intellectual disability (Luckasson et al., 2002; 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 in early ages, facilitating the provision of individualized supports and improving the quality of life of people who have had intellectual disabilities since childhood.

The SIS-C is divided into two sections. The scale is accompanied by an instruction document which includes information about the support needs construct, its evaluation, and some examples of its items.

- Section I describes information about all the people involved in the assessment, particularly the socio-demographic characteristics of the evaluated child, the respondent and the interviewer, which will allow the control of all those variables that might influence the support needs score.

- Section II corresponds to the assessment of the support needs construct and, in turn, is divided into three parts, each shown in a different response format:

    - (a) An initial overall estimate to identify the general perceptions of the respondents regarding a child's support needs before administering the scale. Respondents were asked to make an estimation from 1 (no extra support needed) to 5 (total support needed) for each domain, and in total. These perceptions will be used as external criteria in the data analyses.

    - (b) A set of 32 items that included potential extraordinary support needs (18 medical and 14 behavioral support needs) that may influence the support needs of a person. It must be answered using a rating scale from 0 (no support needed) to 2 (extended support needed).

    - (c) A pool of 61 items, divided into seven subscales (domains), which reflect the different activities of any child's daily life. Each activity is ranked from 0 to 4 according to three indices (type, frequency and daily time of the support needed). The items score is generated by the sum of the score in each index.

The intensity profile and the index of the person assessed are drawn from the scores obtained in this final part of the scale. To reach a better knowledge of the SIS-C, we present two tables (4-5) which show the characteristics of this section, describing both its domains and response format.

Table 4. SIS-C domains

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

Table 5. SIS for Children rating metric (Thompson, Wehmeyer et al., 2008)

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

2.2.2. Procedure

The translation, adaptation, and validation of the SIS-C in Spanish has been developed according to the seven-step process proposed by Tassé and Craig (1999) as required to effectively adapt an assessment tool to any context different from the original. It has been previously used in several adaptations of the SIS (Schalock, Thompson et al., 2008) and the AAIDD recommends its use in the adaptation of the SIS-C to the different countries interested in this scale.

2.2.2.1. Translations/Adaptations

The first stage in the cross-cultural adaptation process was the forward translation. The initial translation of the SIS-C items (version 1.0) (Thompson, Wehmeyer et al, 2008) was made by following the guidelines for the translation and adaptation of the International Commission of Test (Muñiz & Hambleton, 1996; Muñiz et al, 2013). These guidelines are aimed at ensuring not just a linguistic translation, but also a semantic, conceptual and cultural adaptation. The first item translations were therefore carried out independently by two different professionals in the field of disabilities with a good command of English and whose first language was Spanish. Once this parallel translation process was complete, the few disagreements between the two translators were reconciled and synthesized in a face-to-face work session. The first preliminary Spanish SIS-C version was thus obtained.

2.2.2.2. Consolidations of Translations/Adaptations

This step was a back translation in order to consolidate the preliminary translation/adaptation. A native English translator converted the initial translated version back into the original language. This process was to ensure that the translated version reflected the same item content as the original version. In spite of the high concordance found, conclusions cannot be drawn from only this result. Usually, when the relationship between the original and the translation scale is almost perfect, it is possible to observe a very literal translation in the target language that does not reflect a good adaptation to the new context (Brislin, 1986). Given this evidence, it was necessary to continue developing other means to ensure and guarantee the reliability and validity of the Spanish translation and adaptation.

2.2.2.3. Validation of Preliminary Translation

In the third part of the work, a group of eight experts with considerable international experience in assessment verified that the item content was relevant and pertinent to the Spanish context. In order to determine whether the activities reflected in the different items were related to the domain in which they were located in the original version, an agreement analysis was carried out among the assessments of the an expert committee. This committee was composed of eight professionals in the field of disability, either researchers in the Institute of Community Integration (INICO) or professionals with extensive experience in taking care of people with intellectual disabilities.

Agreement between the judges was established using nominal variables: 0-No agreement; 1-Agreement, using the SAS statistical software [version 9.13] (SAS Institute, 2007). This analyzed the percentage of agreement as well as more comprehensive measures such as the Holsti coefficient, Scott Pi, Cohen's Kappa, and Krippendorf's alpha. The results by domain can be seen in Figure 5.

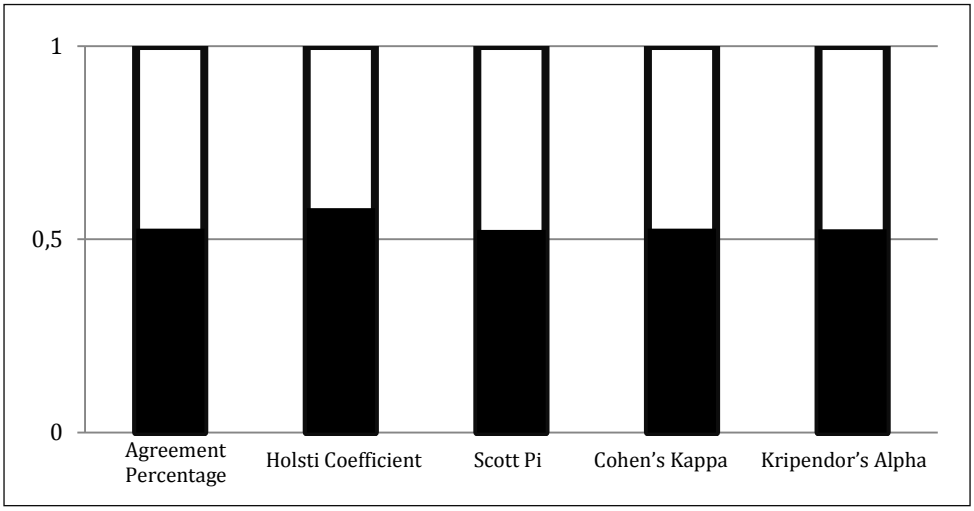


Figure 5. Agreement level among judges

To interpret the data, the criteria proposed by Landis and Koch (1977) were taken into account. Under these criteria, our results are located within the limits of the moderate agreement level (.400-.600). Finally, to assess concordance, taking into account data domain by domain, we used Bangdiwala's agreement indices. The domain that showed lower agreement was 'E. Health and Safety', however, it is important to note that in all cases the criterion initially established to consider an appropriate agreement index was exceeded.

2.2.2.4. Revisions/ Adjustments

As indicated by Solano-Flores, Contreras, and Backhoff (2006), it is inevitable that some errors will be made during the item translation process. These authors propose a list of 10 different kinds of errors that can be committed and should be taken into account in the final revision of an instrument adapted to a different context from the original: (1) grammar; (2) semantics; (3) style; (4) format; (5) convention; (6) registration; (7) information; (8) construct; (9) curriculum; and (10) those errors already noted in the original version. No format or original errors were found at all. A few errors belonging to the other eight categories were found and corrected by a committee composed of different INICO researchers (Guillén et al., 2012), creating a pre-final version of the scale.

2.2.2.5. Pilot Testing

The pre-final version of the instrument in Spanish, the International Test Commission highlights the importance of pilot testing (Downing, 2006; Schmeiser & Welch, 2006; Wilson, 2005). The aim of pilot studies is to test the functioning of a scale with a small number of participants. It allows changes and improvements to the efficiency of the scale to be made before it is administered to a large number of participants required for an appropriate validation.

In our case, the field test of the Spanish version was administered to 143 children and adolescents (5-8 years old [n=18]; 9-12 years old [n=46]; 13-16 years old [n=73]) with different levels of intellectual disability (mild [n=25]; moderate [n=77]; severe/profound [41]), including a representative number of both males (n=89) and females (n=54). This pilot sample was not randomly selected, but incidentally, as often happens in psychology and other social sciences (Argibay, 2009). Only those entities and persons who voluntarily decided to collaborate with our research participated in the project.

Respondents were professionals or relatives who had known the person for whom the disability was assessed for at least three months. INICO professionals worked as interviewers in most administrations, making sure the assessment process was reliable and taking notes about comments or problems found by the respondents. In those few cases where respondents completed the SIS-C by themselves, they received a training session by INICO professionals.

In order to analyze the data obtained in the pilot sample, we followed the assumptions of two different quantitative methodologies: Classical Test Theory (CCT) and Item Response Theory (IRT). The results showed that some items (a6; c7; d1; d8; e8; and g1) and some response categories (values '3' and '4' in the three assessment indices: type, frequency and daily life of the support) were not working as well as expected, however, it was not necessary to make any changes in the content of the items because both items and response categories obtained, in all cases, psychometric property values within an adequate range (Guillén et al., 2012; Guillén, Verdugo, Arias, & Vicente, in press; Verdugo Arias, Guillén, & Vicente, 2014).

2.2.2.6. Revisions/Adjustments

Although it was not necessary to make changes in the items content, during the administration process interviewers note that several formal aspects could be improved.

Firstly, taking into account the qualitative comments given by the respondents, it was noted that they requested more variables and categories when completing the section related to socio-demographic characteristics. Spaces to gather more detailed information about the diagnostic (specific etiologies), the educational context (ordinary or special schools) and the mother tongue (including all the official languages in Spain) were thus incorporated in the SIS-C.

Secondly, more visual support documents were needed in order to understand and complete the scale as reliably as possible. Those professionals who completed the instrument autonomously requested a brief document with basic guidelines for consultation during the administration, in which some examples and frequent questions were resolved. A six-page manual where all this information was summarized was therefore created. When administration was carried out by interview, respondents requested a document which they could use to remember the complex response format of the SIS-C. A support sheet for respondents was thus developed, where the response categories were explained in a simple manner.

Finally, the format changes made in the original version after pilot testing were incorporated into the SIS-C adaptations, including the Spanish, for the subsequent administrations. These changes were set in Version 3.0 (Thompson et al., 2012). Final changes are now being collected in Version 5.0 (Thompson, Wehmeyer, Hughes, Shogren, Little et al., 2014).

2.2.2.7. Field Testing/ Validation

To complete the final step in the process of adaptation of the SIS-C, it was necessary to carry out a thorough validation of the instrument. From the scores obtained in a representative sample of Spanish children (5-16 years old) with intellectual disabilities, several analyses were performed to ensure the reliability, validity and good performance of the different items, each dimension and the scale as a whole.

In the following sections, we present the sampling procedure, the participant characteristics and the instrument administration process. Finally, we also provide a brief explanation of the analysis that must be conducted to reach the final version of the scale.

2.2.3. Participant selection and scale administration process

As in the process of data collection for the pilot study, the selection of participants was performed using a non-probabilistic and incidental sampling due to the impossibility of random sampling in practice. Pereda (1987) defines incidental samples as those that are used because they are available to the researcher at one point, and the author states that they are often used when working with people, because these cases require the express consent of those involved in the evaluations. In any case, a minimum number of 600 participants was established, ensuring that the number of participants were at least 10 times greater than the number of the items (61).

To achieve the required number of participants a letter was sent to numerous bodies and schools from the different Autonomous Communities in Spain. An announcement was also posted on the INICO website requesting voluntary cooperation.

After initial contact, all those bodies that 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 children (5-16 years old) with intellectual disabilities who were to be assessed. Over 50 organizations and schools participated in the study and 833 evaluations were performed. After eliminating those cases where: (1) the child had not obtained a complete assessment in the seven domains of the SIS-C; (2) it was not possible to check the presence of intellectual disability by a professional report; or (3) the age of the participant was out of range on the day of the evaluation, 814 assessments were taken into account for the data analysis. Table 6 shows the characteristics of the final sample.

Table 6. Socio-demographic characteristics of the sample (n=814)

VARIABLES	N	%	VARIABLES	N	%
Gender			**Assistive Technologies Use**		
Male	528	64.6	Yes	155	19.1
Female	286	35.1	No	657	80.7
Missing Data	3	0.4	Missing Data	2	0.2
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 L.	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			**Autonomous Community (Spain)**		
Regular classes in regular schools	179	22.0	Andalusia	136	16.7
Special classes in special schools	493	60.6	Canary Islands	86	10.6
Special classes in regular schools	55	6.8	Cantabria	27	3.3
Others	74	9.1	Castile and Leon	154	18.9
Missing Data	13	1.6	Castile La Mancha	101	12.4
Total	*814*	*100*	Madrid	145	17.8
Scholar setting			Valencia	64	7.9
Private	550	67.5	Extremadura	23	2.8
Public	252	31.0	Galicia	50	6.1
Missing Data	12	1.5	Murcia	28	3.4
Total	*814*	*100*	*Total*	*814*	*100*

A comprehensive understanding of the relationship between the variables 'age' and 'level of intellectual disability' is now presented. This approach is relevant since it is believed that the age of a person has a direct influence on their support needs, and the SIS-C norms are thought to be divided into six different age groups. It is therefore not only important to have a representative number of participants in each level of intellectual disability, but it is necessary to ensure that this representativeness is also met when taking each age group separately into account. The AAIDD established there must be at least 20 participants in each level of 'intellectual disability' for each pair of ages (Table 7).

Table 7. Sample Distribution Criteria (AAIDD)

		INTELLECTUAL DISABILITY LEVEL			
		Mild	*Moderate*	*Severe/Profound*	***Total***
AGE	*5-6*	20-30	20-30	20-30	60-90
	7-8	20-30	20-30	20-30	60-90
	9-10	20-30	20-30	20-30	60-90
	11-12	20-30	20-30	20-30	60-90
	13-14	20-30	20-30	20-30	60-90
	15-16	20-30	20-30	20-30	60-90
	Total	120-180	120-180	120-180	**360-540**

In our case, in 755 of the 814 cases it was possible to collect both pieces of information, and they show that the criteria proposed by AAIDD was met. A smaller number of participants was found at the subgroup of children between 9 and 10 years old with mild intellectual disabilities (n= 21). The group of adolescents from 13 to 14 years with moderate intellectual disability (n= 86) was the best represented (Figure 6).

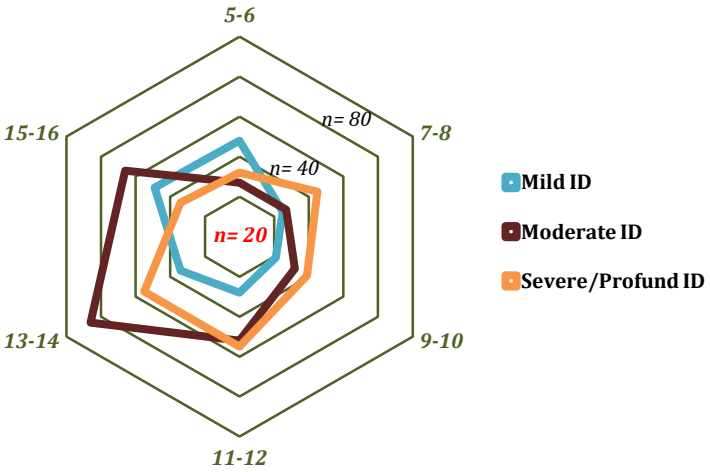


Figure 6. Age and ID level contingency

In addition, two graphics (Figures 7-8) are presented to show the relationship between the variables presented above and the gender of the children evaluated. Although females are less represented than males, we can claim that there is a homogeneous gender distribution regarding the age (χ^2_5= .528, p>.01) as well as the level of intellectual disability (χ^2_2= 6.553, p>.01).

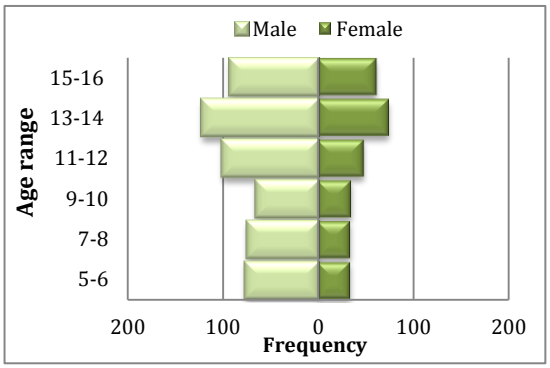


Figure 7. Gender and age contingency

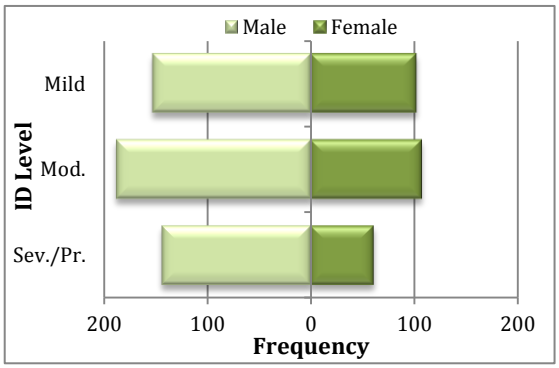


Figure 8. Gender and ID level contingency

The assessment was not completed directly by the child assessed but through the criterion of other respondents (either professional or relative) who must meet the following requirements: (a) know the person very well; and (2) have had the opportunity to observe the child's behavior in natural and various settings over an extended period of time.

Our study involved 814 assessments and, in most, the main respondents were direct-care professionals (96.3%). In a total of 732 cases, we obtained the collaboration of two informants, asking for the collaboration of relatives as second informants whenever possible (62.3%). 661 evaluations of these 732 applications respondents completed the test independently (giving two different scores which were correlated to provide evidence of interrespondent reliability). In 32 cases the scale was completed by the same respondent on two different occasions (giving two different scores which were correlated to provide test-retest reliability evidences).

The administration of the instrument was often carried out by an interviewer who belonged to the research team (>60% of the evaluations). In those cases where a professional completed three or more assessments and/or had experience completing the SIS for adults, an information session was held so that they fulfilled the instrument on their own with the help of the brief manual elaborated as a result of pilot testing.

2.2.4. Data Analysis

To reach our overall purpose, focused on the adaptation and validation of the SIS-C within the Spanish context, numerous methodologies were used in order to analyze the quality and effectiveness of the scale, including specific domains and items analyses.

To start with, we analyzed the SIS-C psychometric properties through Classical Test Theory (CTT). CTT belongs to Theory Tests, which assume that the empirical score (X) which a person gets in a test is composed of their true score (V) and the measurement error (e), which will inevitably be associated with environmental and personal factors and/or inherent characteristics of the test). Those scales able to control the error better will therefore be the most effective assessment tools (Muñiz, 2003). The statistical package IBM SPSS [version 20] (SPSS, 2010) was used as the main analysis resource. We also used the Factor program [version 9.2] (Lorenzo-Seva & Ferrando, 2006) when working with polychoric correlations, which was more appropriate than Pearson correlations when non-continuous variables are analyzed.

Complementarily, a Confirmatory Factor Analysis (CFA) was carried out with the aim of determining the factor structure of the SIS-C. CFA is included within Structural Equation Modeling (SEM) and allows us to determine whether our data confirms those theoretical models related to the psychological construct assessed (Arias, 2008). For this analysis, we used the LISREL program [version 8.8] (Jöreskog & Sorbom, 2006).

Finally, Item Response Theory (IRT) was taken into account as a reference model. IRT was chosen because it is widely used to overcome the limitations found in CTT (Arias, 2008; Hambleton & Jones, 1993; Muñiz, 1990; Prieto & Delgado, 2003), and allows us to analyze the amount of information provided for each item along the continuum of the support needs level in more detail. Within this framework, there is more than one possible model to take into account. In our case, due to the multiple-choice response format of the SIS-C, Partial Credit Model (PCM) assumptions (Masters, 1982) were followed. Although we used Rating Scale Models (RSM) (Andrich, 1978) for the pilot testing because it is more appropriate when the number of participants is low, PCM is more precise as it allows different thresholds for different items (considering that the response categories behave differently depending on the item) whereas RSM reflects the same threshold for the different items included in the same domain. Similarly, PCM allows analysis of item discrimination power through item characteristics curves. All IRT analyses were developed using the statistical software Winsteps [version 3.68] (Linacre, 2008).

2.3. RESULTS OF THE FINAL VALIDATION

2.3.1. Classical Test Theory (CCT)

2.3.1.1. Psychometric quality of the items

Taking as reference the test construction steps proposed by Garcia (1993), the items must be analyzed before studying the reliability and validity of the instrument, as the total test score depends on the quality of its items. According to Crocker and Algina (2008) the study of the items should include: (a) difficulty index and discriminating power, which describes the distribution of responses to the item; (b) item discrimination indices, which describe the level of the relationship between the response to the item and some interest criterion (internal or external to the test itself); (c) items reliability and validity, calculated based on the item variance and its index of internal and external discrimination, respectively.

Item difficulty is usually identified by its average and the item power discrimination is associated with its standard deviation. Nevertheless, the lack of normality found in our data made it more appropriate to take other indicators into account. In this sense, *item difficulty* is better reflected by its median and the power discrimination by non-parametric analysis. In all the cases, median was higher than the statistical average, showing that the participants tended to have high scores. The negative asymmetry and platykurtic shape found in the data descriptive analysis was consistent. In order to determine the *discriminative power of items,* we used a Kruskal-Wallis analysis of variance (ANOVA) by ranks. After dividing the participants into three groups (delimited by Quartiles 1 and 3 in the Support Need Index of the SIS-C) we corroborated the differences between the average ranks of each items according to the groups into which each participant had been classified (high, medium, or low support needs). The results of the contrast (Chi-Square) were significant ($p<.001$) for all items, providing evidence of its discriminating power.

The *internal discrimination index* refers to Pearson product-moment correlations, where each item is correlated to the total score. We used two criteria: the SIS-C total score and the score obtained in the specific domain to which the item belongs. It should be noted that the corrected homogeneity index was used, which excluded the analyzed item score from the total score. This provides a more accurate result because it avoids the artificial increase in the rate caused by the presence of the item in the two correlated variables (Peters & Van Vorhis, 1940).

In order to analyze the *external discrimination*, the procedure is similar to that carried out for the internal discrimination, but the reference to the item that correlates is not intrinsic to the test itself, but an external criterion. As explained in the instrument description (pp. 33-35), before administrating the SIS-C, the respondents were asked to make an initial estimate (1 to 5) of the support needs of the evaluated child (both for each domain score and the total score). These measures were used to determine whether the professional criteria correlated with the scores given in the test. Both discrimination indices obtained values greater than .40 in all cases, '.20' being the minimum required to consider a good functioning of the item.

Finally, to find *reliability and validity indices* it is necessary to consider the standard deviation and the discrimination indices. Specifically, the reliability of an item will be the direct result of multiplying its standard deviation and its internal discrimination index. Similarly, the validity will be the direct result of multiplying its standard deviation and its external discrimination index. Again, we counted two different criteria depending on whether the reference was taken from the discrimination index associated with the instrument in general or each specific domain. Interpretation should be made in relation to the maximum possible variance for the item (S_{imax}), which increases .50 points with the number of response options. In order to make this interpretation easier, the relative indices were used, which are calculated by dividing the item reliability and the item validity by the S_{imax}, offering rates ranging from 0-1, and can be interpreted with the same criteria as the item discrimination, being acceptable when those coefficients are above .20. The results obtained in the SIS-C items showed reliability and validity indices greater than this value.

2.3.1.2. Reliability of the domains and the scale

The reliability of the instrument and its seven domains was verified by using different analysis methods traditionally used as reliability evidences. Considering only a single application of the SIS-C, its reliability was corroborated in terms of internal consistency (Cronbach's alpha) and standard error of measurement. In addition, through the dual application of the instrument to two specific groups of subsamples situations, it has been possible to analyze other evidences of reliability: interrespondent and test-retest reliability. The results reached in these four reliability analyses are shown in Table 8.

Table 8. Reliability evidences (domains and scale)

	Cronbach's Alpha **(n=814)**	***Relative Standard Error of Measurement*** **(n=814)**	***Interrespondents Reliability*** **(n=661)**	***Test- Retest Reliability*** **(n=32)**
A. Home Living Activities	.961	.200	.954	.903
B. Community & Neighborhood Activities	.966	.180	.928	.782
C. School Participation Activities	.958	.200	.938	.856
D. School Learning Activities	.964	.190	.907	.999
E. Health & Safety Activities	.955	.200	.919	.913
F. Social Activities	.959	.200	.923	.782
G. Advocacy Activities	.967	.180	.907	.837
TOTAL	**.991**	**.090**	**.950**	**.943**

Cronbach's alpha provides an easy and precise interpretation of the item covariance by giving a global coefficient, the more widespread coefficient used to analyze the internal consistency (Muñiz, 2003). According to Nunnally and Bernstein (1994), this reliability coefficient is considered adequate when Cronbach's alpha is over .700, and it should be greater than .900 when scores are used in the professional field. As seen in Table 8, the domain values achieved appropriate coefficients, obtaining values over .950, and it was also demonstrated a high-precision measurement instrument (.991).

The overall internal consistency of a multidimensional scale is often underestimated by Cronbach's alpha, however. It is particularly necessary to use stratified Cronbach's alpha when the total score is derived from the sum of the domain scores, as happened in the SIS-C. In this sense, the stratified Cronbach's alpha showed slightly higher values (.993). Furthermore, due to the ordinal nature of the response categories, more accurate indices based on the eigenvalues of the principal components and the data polychoric were also analyzed: ordinal alpha and Armor's theta, finding the highest rate of internal consistency (.994).

Reliability can also be understood as the absence of error through *Standard Error of Measurement*. As happened when the reliability and validity of the items were analyzed, the standard error of measurement must be interpreted in relation to the standard deviation. It is therefore easier to interpret this value using the relative standard error of measurement. The standard error of measurement should be divided by the maximum possible variance for the item (S_{imax}), reaching a value from 0-1. In this case, the value refers to the error, so it should be as low as possible to reflect good functioning. In our data, all relative standard errors (for both domains and the whole instrument) were less than .20, as expected.

Finally, reliability evidences based on the double administration of the scale were analyzed. Firstly, the *interrespondent reliability* .661 of the scale administrations were carried out by two respondents independently, obtaining two different scores that could be correlated to provide further evidence of reliability. If the scale is reliable, it is expected that the items work objectively and support needs scores do not diverge depending on who is reporting. In our case, all the correlations between respondents were over .900. The lowest correlations were related to 'Advocacy Activities' and 'School Learning Activities'. We repeated the analyses for only those cases where one of the respondents was a professional and the other a relative (n=431). Although correlations were lower, they were still over the .750 minimum limit to consider a correlation excellent (Cichetti, 1994).

In addition, following one of the better evidences to verify the reliability of a test (Garcia, 1993, Martinez-Arias, 2006; Muñiz, 2003), the *test-retest method* was used, which allows an analysis of the relationship between two measurements taken at different times, giving a value for the test's temporal stability. The same interviewer administered the SIS to a subsample of 32 participants at two different times with an interval of two months. We calculated the Pearson's product-moment correlation coefficients between the test and retest scores and obtained a total correlation of .943. Considering each domain, values were excellent (ranged between .780 and .999). As can be seen in the table, the lowest correlation belongs to the 'Social Activities' domain whereas the 'School Learning Activities' domain shows a perfect correlation, which could be related to the fact that all the respondents who participated in the test-retest were professionals in an academic context.

2.3.1.3. Validity of the domains and the scale

The current research involved in the development of educational and psychological tests (e.g., Linn & Gronlund, 2000; Prieto & Delgado, 2010, Taylor, 2002) entails three basic types of validity: content validity, criterion validity and construct validity. Following these contributions, which were already taken into account in the Spanish validation of the SIS (Verdugo et al., 2010), we now offer an analysis of the three types of validity for the Spanish adaptation of the SIS-C.

Content validity refers to the relationships between the variables included in a scale and the conceptual definition of the assessed construct (Hair, Black, Babin, Anderson, & Tatham, 2006). The review of the scientific literature and the solid process carried out for the creation (in its original version) and adaptation (into Spanish) of the scale are thus considered good indicators of this kind of validity. Similarly, the scale was developed by different authors than the SIS for adults, who were also AAIDD members, which makes the SIS-C consistent with the other support needs scales previously validated and adapted to other countries (Schalock, Thompson et al., 2008) as well as with the new conception of intellectual disability (Schalock et al., 2010).

In order to examine *criterion validity* we used data from the subjective evaluation of the level of needed supports given by the respondents before responding to the SIS-C items. Each domain and total scale score was correlated to their corresponding estimations. All these coefficients were significant and higher than .700 but the domain related to advocacy activities, and it reached a correlation of .680, exceeding the threshold of .400, usually considered as representative of the criterion related validity.

Finally, to determine the degree to which the items (defined as seen variables) represent the theoretical latent construct evaluated (i.e., support needs), we analyzed the *construct validity*. For this purpose, we followed the same analysis previously carried out to understand construct validity in the SIS adaptation (Ibáñez, 2009; Verdugo, Arias, et al, 2007; Verdugo et al, 2010).

To start with, hypotheses based on the relationship between the SIS-C and its subscales were verified. Several hypotheses based on the relationship between 'support needs' and other independent variables (i.e., socio-demographic characteristics) were then corroborated:

-*Hypothesis 1. Intercorrelation of SIS scores.* Because both the SIS domains and the composite scorings measure aspects related to support needs, it is expected that each domain correlates to the total scores. Consequently, the different domains must also correlate to each other. We found that the correlations obtained between each domain score and the total score ranged from .89 to .96 and the correlations among domains ranged from .71 to .97.

-*Hypothesis 2. Intercorrelation of the SIS main domains and exceptional support needs (medical and behavioral).* This second hypothesis claimed that those people who have exceptional needs (medical, behavioral, or both) associated with intellectual disability demonstrate higher support needs. The results confirmed that there is a significant relationship ($p<.01$) between the score obtained in the SIS-C and the score obtained in the exceptional subscale related to health and behavioral care needs. This correlation increased when both extraordinary supports were needed.

-*Hypothesis 3. No Gender differentiation.* Theoretically, gender does not have influence on a person's support needs. The lack of normality found in our data enforced us to use non-parametric tests for analyzing the difference in means. Mann-Whitney U is the test most used as an alternative of the Student's T test when only two categories of the variable are given (i.e., male-female). The results revealed no significant differences ($p>.01$) and a small effect size ($r<.10$) among the different gender-related scores.

-*Hypothesis 4. Age differentiation.* Whereas in the SIS it was expected that there would be no differences depending on age, when the construct 'support need' refers to children and adolescents it is likely that significant differences will be found, depending on this variable. As explained in the sample section (pp. 40-43), it is important to split the participants into six different groups, taking into account each pair of ages separately (5-6; 7-8; 9-10; 11-12; 13-14; and 15-16 years old). Kruskal Wallis is the non-parametric test used as an alternative to the ANOVA when there is lack of normality and more than two categories of a variable are given, as it is our case. The variance analysis showed significant differences between groups ($p<.01$). Afterwards, single comparisons were carried out using the Mann-Whitney U test, although non-parametric methods do not allow post hoc comparisons. There were significant differences in most of the domains. Effect sizes were greater (reaching moderate values [$.20<r>.50$]) when the comparison included the superior group (15-16 years old). It is important to highlight the direction of these differences: whereas support needs scores tended to increase when age increased in childhood, once adolescence was reached, support needs tended to decrease.

-Hypothesis 5. Relationships between the SIS-C scores and the level of intellectual disability. The intellectual disability level of a person is theoretically supposed to be directly related to their support needs. Three categories were established considering the level of intellectual disability (mild, moderate and severe/profound). Using again the Kruskal-Wallis method, significant differences ($p<.01$) were found among the different groups. When a more exhaustive analysis was carried out, significant differences ($p<.01$) and medium-high effect sizes (from .33 to .77) were shown between each group and the others in the SIS-C and its domains scores. In all cases, it was found that the higher a level of intellectual disability was, the higher were the support needs scores obtained.

2.3.2. Structural Equation Modeling (SEM): Confirmatory Factor Analysis (CFA)

2.3.2.1. Preparing the data: Use of parcels

To reduce model complexity (SIS-C is composed of more than 60 items), we used parcels as indicators of a latent construct by combining individual items and using them as observed variables. These 61 items were undertaken on 21 parcels as shown in Table 9. Although using parcels improves the properties of the data in terms of normality, it was not possible to reach the multivariate normality needed to use the maximum likelihood estimation procedures in our data. In those cases in which the assumption of multivariate normality is severely violated and data is ordinal, 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 number of data needed. The DWLS method is based on the polychoric variances-covariances matrix and the estimation of asymptotic covariances.

Although using parcels could have limitations for the data analysis, its disadvantages are reduced by making sure of the parcels unidimensionality (Little, Rhemtulla, Gibson, & Schoemann, 2013). Parcels could be considered unidimensional variables if the eigenvalue for the first factor is significantly larger than the eigenvalue of the second factor, and this first factor was able to explain more than 60% of the variance. However, Courtney (2013) claims than these absolute criteria overestimate the number of factors. It is therefore also necessary to analyze relative criteria: (1) the ratio of the first and second eigenvalues has to be higher than 4; and (2) the difference between the proportion of variance explained by the first and the second factor is higher than 40.

Table 9. Parcels creation and unidimensionality

Construct	Domains	Parcels	Items	*PARCELS UNIDIMENSIONALITY*					
				Eigenvalue 1	**Eigenvalue 2**	**E1/E2**	**Explained Variance E1 (%)**	**Explained Variance E2 (%)**	**Explained Variance E1 (%)- Explained Variance E2 (%)**
SUPPORT NEEDS	*A. Home Living Activities*	P_A1	A1, A2, A3	2.55	.29	8.79	85.01%	9.75%	75
		P_A2	A4, A5, A6	2.50	.35	7.14	83.43%	11.83%	72
		P_A3	A7, A8, A9	2.51	.24	10.45	83.97%	8.10%	76
	B. Community & Neighborhood Activities	P_B1	B1, B2, B3	2.62	.21	12.47	87.49%	7.28%	80
		P_B2	B4, B5, B6	2.63	.20	13.15	87.77%	6.91%	81
		P_B3	B7, B8	1.77	.22	8.04	88.92%	11.07%	78
	C. School Participation Activities	P_C1	C1, C2, C3	2.52	.33	7.63	84.27%	11.18%	73
		P_C2	C4, C5, C6	2.27	.44	5.16	75.79%	14.81%	61
		P_C3	C7, C8, C9	2.68	.24	11.16	89.36%	9.06%	80
	D. School Learning Activities	P_D1	D1, D2, D3	2.69	.17	15.82	89.69%	5.87%	84
		P_D2	D4, D5, D6	2.59	.22	11.77	86.38%	7.32%	79
		P_D3	D7, D8, D9	2.47	.27	9.14	82.61%	9.14%	73
	E. Health & Safety Activities	P_E1	E1, E2, E3	2.46	.27	9.11	82.16%	9.10%	73
		P_E2	E4, E5, E6	2.54	.28	9.07	84.89%	9.63%	75
		P_E3	E7, E8	1.79	.20	8.95	89.60%	10.39%	79
	F. Social Activities	P_F1	F1, F2, F3	2.48	.33	7.51	82.81%	11.27%	72
		P_F2	F4, F5, F6	2.43	.34	7.14	81.16%	11.60%	70
		P_F3	F7, F8, F9	2.34	.38	6.15	78.17%	12.97%	65
	G. Advocacy Activities	P_G1	G1, G2, G3	2.50	.41	6.09	83.50%	13.74%	70
		P_G2	G4, G5, G6	2.59	.23	11.26	86.53%	7.74%	79
		P_G3	G7, G8, G9	2.51	.30	8.36	83.67%	10.26%	73

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

2.3.2.2. Specification and identification of the models

Model specification involves using all the available relevant theory with regard to support needs to specify and explain the variation and covariation in a set of observed variables (parcels) in terms of underlying traits (domains of support needs). According to the SIS structure, the support needs construct is explained by a correlational model in the original version (Thompson et al., 2004) and in other adaptations (e.g., Kuppens et al., 2010) including the Spanish version (Verdugo, Arias et al., 2007). However, other studies showed that a unidimensional approach to the construct fit SIS data (Harries, Guscia, Kirby, Netttelbeck, & Taplin, 2005), and there were several attempts to confirm a hierarchical model (e.g., Ibáñez, 2009). Considering the three previous perspectives of the support needs construct, obtained through the results of adults with intellectual disabilities in the SIS, we designed three different hypotheses for the structure of the SIS-C (Table 10).

Taking into account the *model identification*, two necessary conditions need to be met by any confirmatory analysis (Arias, 2008; Kline, 2010):

- Firstly, for scaling latent variables, a Unit Loading Identification (ULI) is typically used. The ULI method fixes an unstandardized coefficient to a certain value (usually 1.0) and can be used with both the residual coefficients and the factor coefficients.

- Secondly, we need an overidentified model (positive d.f.), which means that there should be more observations than parameters to be estimated. On the one hand, the number of observations is independent of the model analyzed. Its formula is ($n = v(v+1)/2$), 'v' being the number of variables. In our data, the number of variables is the number of parcels ($v=21$), so we have 231 observations (21 variances and 210 covariances). On the other hand, the number of parameters to be estimated depends on the model, and is presented in the following table (10).

Table 10. Models tested by CFA

MODEL SPECIFICATION				MODEL IDENTIFICATION
	Hypothesis	**Factors Number**	**Description**	
H1	*Unidimensional*	1	'Support Needs' is explained by one factor (Support Needs)	Overidentified Model (189 d.f.) 231 observed variables minus 42 parameters to estimate (21 measurement error variances; 1 factor variance; and 20 direct effects)
H2	*Correlational*	7	'Support Needs' consists of correlated factors (7 subscales of the SIS-C)	Overidentified Model (168 d.f.) 231 observed variables minus 63 parameters to estimate (21 measurement error variances; 7 factor variances; 21 factor covariances; and 14 direct effects)
H3	*Hierarchical*	8	'Support Needs' consists of correlated factors (7 subscales of the SIS-C) and 1 second-order factor (Support Needs)	Overidentified Model (176 d.f.) 231 observed variables minus 55 parameters to estimate (1 exogenous variable variance; 7 measurement error variance; 20 direct effects of endogenous variables on the indicators; and 6 direct effects of exogenous variables on the endogenous variables)

2.3.2.3. Parameter estimation and goodness of fit

The term parameter estimation refers to the process of using sample data to estimate the parameters of the selected distribution. Several parameter estimation methods are available. The method that suits our data is the DWLS, as explained previously.

In this step, we try to confirm the null hypothesis (H_0) for each model. This hypothesis states that there will not be significant differences between the sample variance-covariance matrix and the variance-covariance matrix estimated by each model.

The solution corresponding to the three models (one-factor model [Figure 9]; correlational model [Figure 10] and hierarchical model [Figure 11]) and the fit of each one (Table 11) are detailed next.

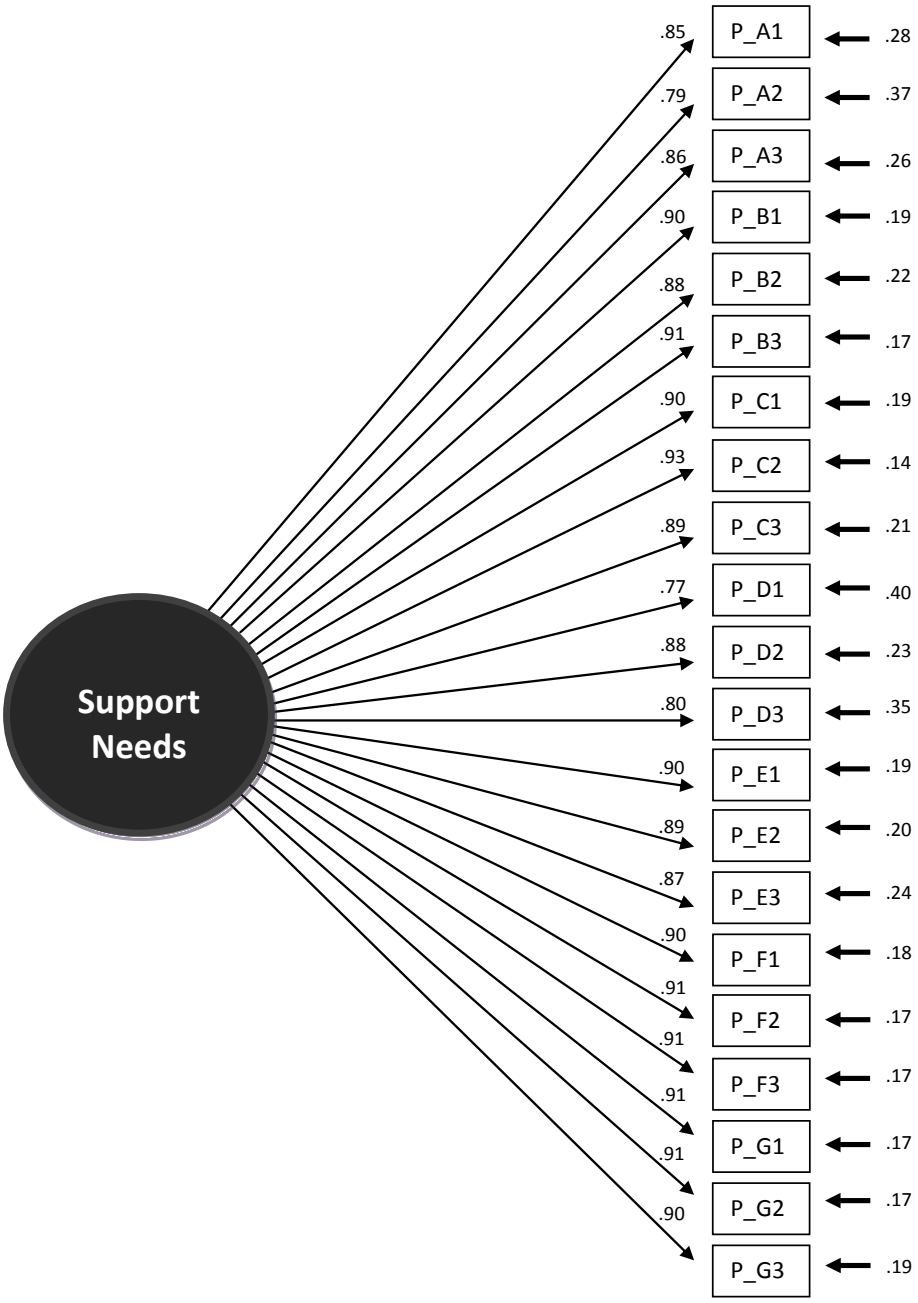


Figure 9. Factorial representation of Model 1 (Unidimensional)

In the first solution, corresponding to 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 greater than .77.

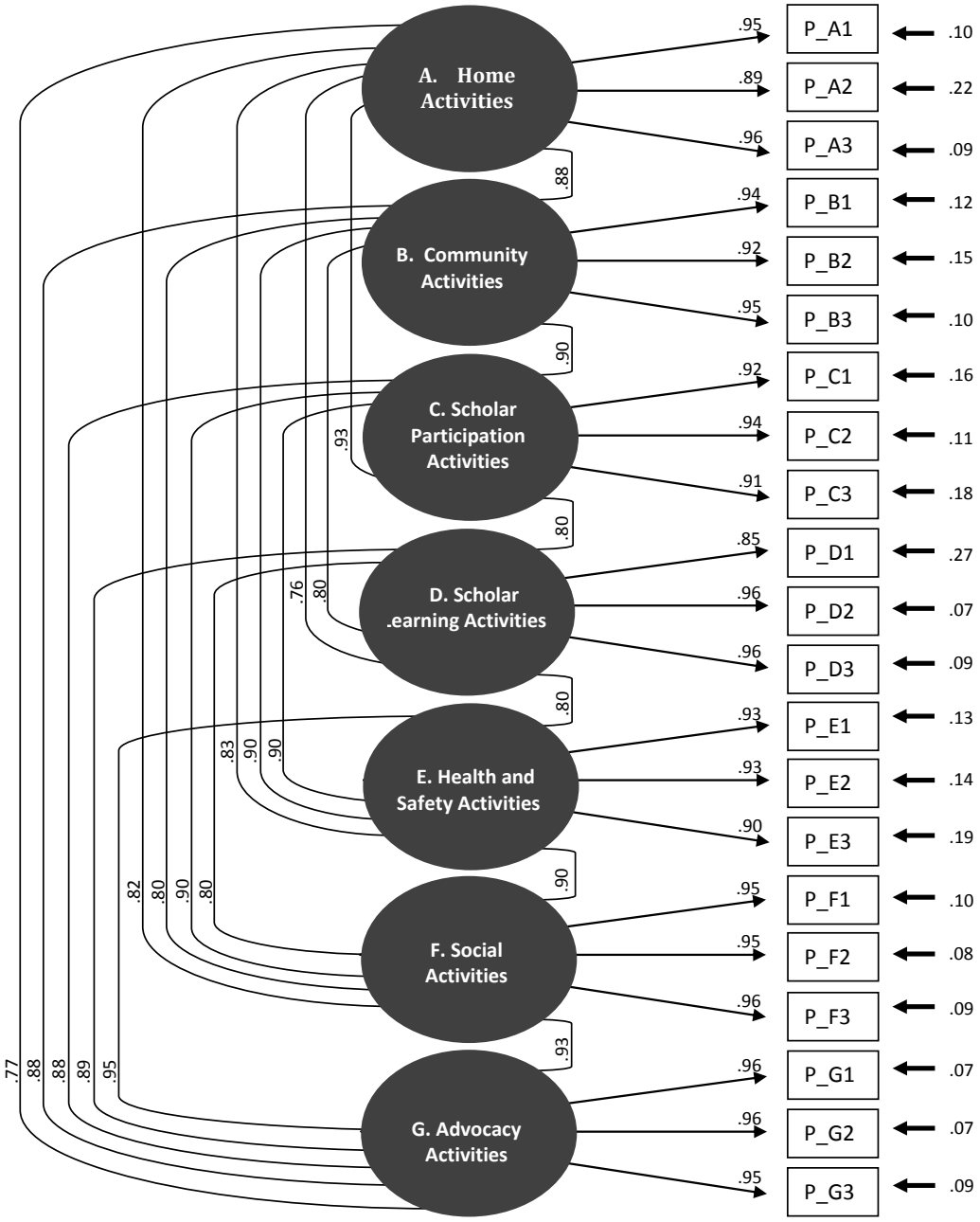


Figure 10. Factorial representation of Model 2 (Correlational)

In the second solution, corresponding to the correlational 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. All the factor loadings had values greater than .85. The covariances among variables ranged between .83 and .9

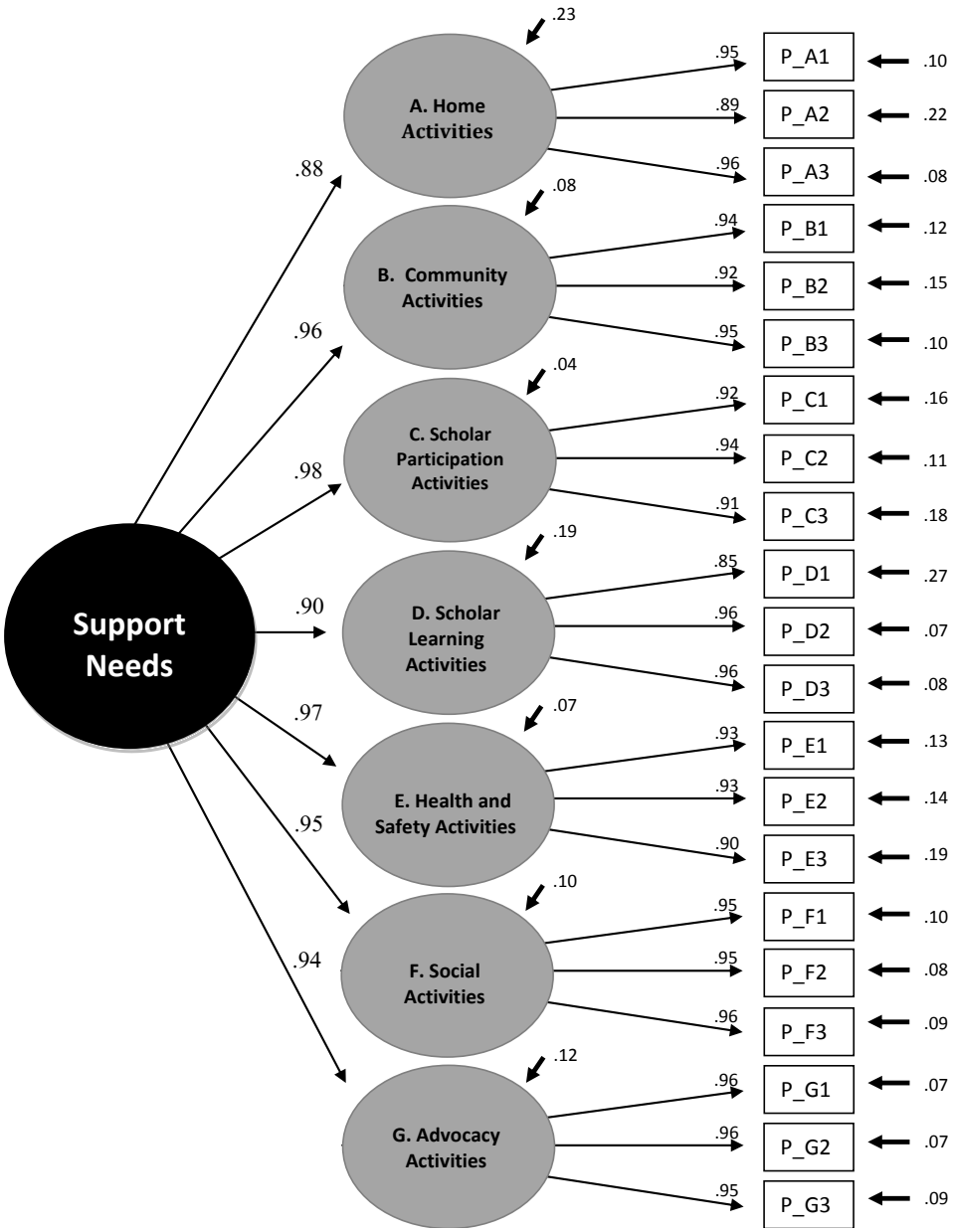


Figure 11. Factorial representation of Model 3 (Hierarchical)

The hierarchical model showed that the measurement error of 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 measurement error of the endogenous variables ranged between .04(P_D2; P_G1; P_G2) and .23 (P_D1), being the amount of variance explained by the exogenous variable ranged between .93 and .73. All the factor loadings had values greater than .85.

Once the parameters had been estimated, we assessed both absolute and partial goodness-of-fit indices. 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, taking into account the χ^2 magnitude (considering a better fit when it is smaller) and other common partial indices (Arias, 2008; Kline, 2010) is recommended: (a) Root Mean Square error of Approximation (RSMEA); (b) Tucker-Lewis Index; (c) Comparative Fit Index (CFI); and (d) Standardized Root Mean Square Residual (SRMR).

Table 11. Goodness of fit indices

FIT INDICES	INTERPRETATION	H1. Unidimensional Model	H2. Correlational Model	H3. Hierarchical Model
χ2 (d.f.) *p*	To accept H_0 (p>.01)	4625.11 (189) p <.001	981.57 (168) p <.001	1402.92 (182) p <.001
RMSEA	Values less than .05 show a good fit (acceptable values until .08)	.17	.077	.091
RMSEA (90%)	The model has to be rejected if RMSEA >.10	(.17-.17)	(.073-.082)	.(086-.095)
TLI	It should be higher than .95	.95	.99	0.99
CFI	It should be higher than .95	.96	.99	.99
SRMR	Values less than .05 show a good fit	.047	.020	.033

These results clearly show that the data obtained through the SIS-C administration do not fit the first hypothesis (unidimensional model). Both correlational and hierarchical hypothesis had good results when taking into account partial indices. The correlational model in particular is the one that best fits our data, as was found in the original versions of SIS for Adults (Thompson et al., 2004) and in the Spanish adaptation (Verdugo, Arias et al., 2007), among others. Finally, we also tested the reliability and validity of this correlational model by analyzing the composite reliability (ρ_c) and the average extracted (ρ_v) of each latent variable. The inferior limit for both can be established at .50 (Arias, 2008). In Table 12 we examine these values, finding good results for the two indices mentioned.

Table 12. Composite reliability an average variance extracted

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

2.3.3. Item Response Theory (IRT)

2.3.3.1. Previous verifications

The underlying assumptions of the Rasch models imply that: (1) all items contribute to measuring the same latent trait; (2) the variables share variance; and (3) there is unidimensionality in each subscale assessed. The absence of these previous assumptions reflect a poor fit of the data to this model and the advantages of using this model disappear, so it is necessary to begin the study of the SIS-C through the TRI ensuring these principles.

In order to determine whether our data meets the first criterion, we analyzed the correlations between items from the same domain. We found all the items were highly correlated with the other items within the same domain, reaching values greater than .70. The lowest correlations were set in the 'School Participation' domain.

To check that the assumptions related to 'amount of explained variance' and 'unidimensionality' were not violated by our data, we performed an Analysis of Principal Components (APC) in each of the SIS-C domains. Examining the correlation matrix between the items based on the standardized residuals (the differences between the observed values and the values predicted by the model) allowed us to determine the amount of explained variance by the first factor and whether there were other potential dimensions (Figure 12).

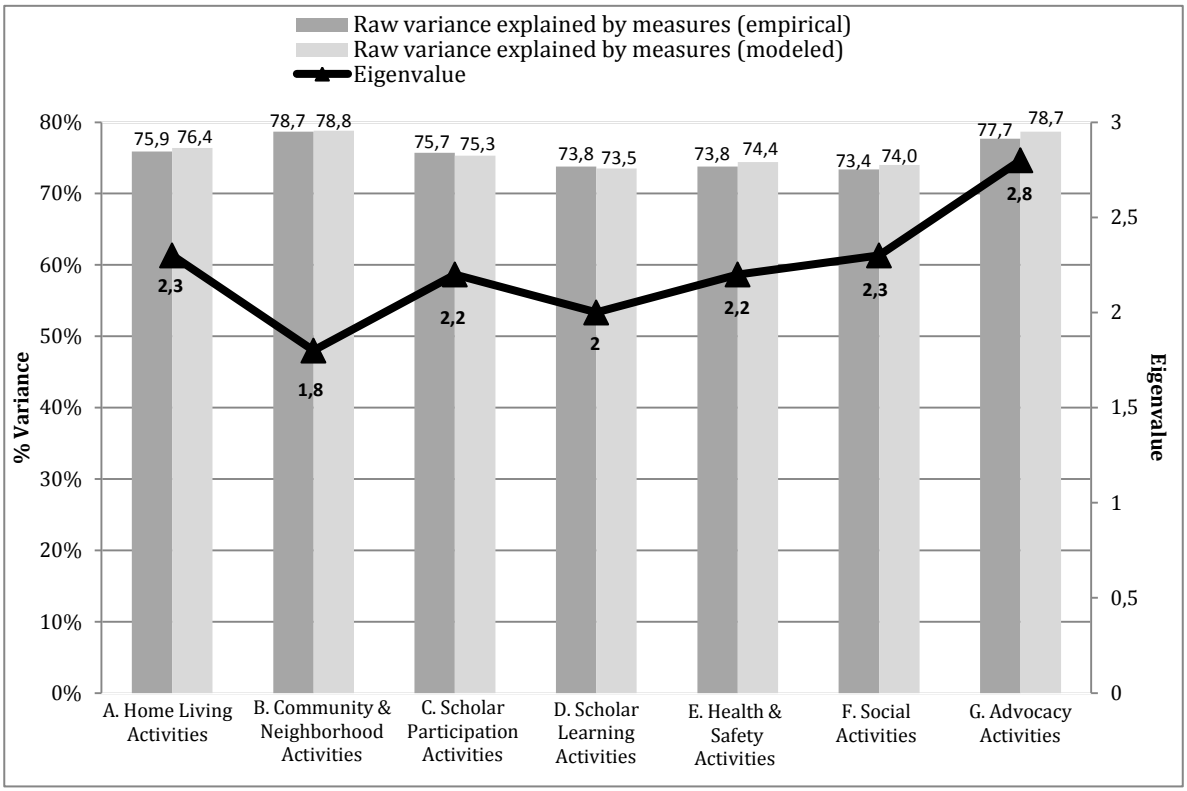


Figure 12. Domains unidimensionality

The first factor in the analysis corresponds to the Rasch Dimension. Regarding unidimensionality, the variance explained by measures must be equal to or higher than 60% (inferior limit), which occurs in all the domain of the scale. In all SIS-C domains the variance explained by empirical data is very similar to that expected by the model, which indicates that the estimate of the measure was successful.

The second dimension (or first contrast of residuals) indicates whether there are differences within the residuals that are large enough to suggest that there is more than one dimension. If the variance of the Rasch dimension was low and, at the same time, was significant in the successive contrast, the structure could have multidimensionality.

Usually, it is accepted that the second dimension must have at least three items (according to its eigenvalue) so that a possible second dimension could be considered (Linacre, 2005). In our data, the eigenvalue of the first contrast of the residuals was under three in every case. As a result, we can claim the structure of all subscales of the SIS-C is unidimensional.

2.3.3.2. Response category suitability

According to Linacre (2002), the mode in which the variable of study is divided into categories to be analyzed affects the measurement of the qualities of the test. In order to determine whether the response categories were used in the way that was expected, a diagnosis of the answer categories was therefore carried out.

The statistics for the use of categories (i.e., frequencies of categories and average measures) and the thresholds for each category were examined. To assess the response category suitability in relation to the measure variable, we must take into account a set of criteria:

(1) At least ten observations for each category

(2) Outfit Mean-Squares (MNSQ) less than 2.0

(3) Average measures advance monotonically with categories

Due to the complex response format of this scale (three measurement indices - type, frequency and daily support time, each valued on a five-point Likert scale [from 0 to 4]), we analyzed the response categories effectiveness regarding each index, measuring independently.

We found that Criterion Number 3 (average measures advance monotonically with category) was not met in any domain when taking into account the response categories '3' and '4' in the *daily time of support* index. In other words, these empirical item-category measures did not appear in the proper order according to the level of attribute or trait: obtaining the score of '3' (the support is needed more than 2 hours but less than 4) is not reflecting a lowest level of support needs than the score of '4' (the support is need for more than 4 hours a day).

Following the MCP assumptions, it was possible to analyze the functioning of these response categories not only by domains but also item by item. It was found that 32 items did not have proper category transitions. This means that, regarding these items, the highest category is not likely to be chosen when the support needs level increases. We therefore tried to solve this problem by collapsing these two response categories. In Table 13 we can see that the properties of the categories improved after collapsing these categories.

Table 13. Items with inappropriate response category suitability in the 'daily support time' index

items	RESPONSE CATEGORY SUITABILITY				COLLAPSED RESPONSE CATEGORY SUITABILITY				items	RESPONSE CATEGORY SUITABILITY				COLLAPSED RESPONSE CATEGORY SUITABILITY			
	Category Label	Observed Count	Outfit	Structure Calibration	Category Label	Observed Count	Outfit	Structure Calibration		Category Label	Observed Count	Outfit	Structure Calibration	Category Label	Observed Count	Outfit	Structure Calibration
	0	42	1.38	None	0	42	1.50	None		0	82	.99	None	0	82	1.06	None
	1	242	.93	-3.75	1	242	.91	-3.03		1	237	.95	-2.82	1	237	1.04	-2.36
a1	2	261	.94	-.28	2	261	.93	.49	***c4***	2	308	1.26	-.84	2	308	1.25	-.24
	3	87	1.05	2.25	3	201	1.18	**2.53**		3	79	1.38	1.73	3	92	**1.65**	2.60
	4	130	1.39	1.78						4	37	2.02	1.93				
	0	109	.76	None	0	109	.74	None		0	142	.83	None	0	142	.80	None
	1	330	.78	-3.85	1	330	.78	-3.26		1	237	.63	-1.91	1	237	.58	-.168
a4	2	254	.74	-.58	2	254	.79	.08	***c5***	2	196	.65	-.20	2	196	.71	.20
	3	43	.72	2.32	3	53	.89	**3.18**		3	74	.69	1.33	3	144	.84	**1.48**
	4	26	.65	2.11						4	94	.93	.77				
	0	320	1.33	None	0	320	1.47	None		0	107	1.55	None	0	107	1.47	None
	1	246	1.03	-2.02	1	246	.99	-1.93		1	223	.66	-1.90	1	223	.65	-1.63
a6	2	132	1.31	-.18	2	132	1.34	.07	***c7***	2	172	.57	.08	2	172	.62	.50
	3	20	1.22	2.05	3	48	**1.74**	**1.87**		3	82	.92	1.29	3	217	1.00	**1.13**
	4	44	2.17	.15						4	159	.97	.53				
	0	160	1.12	None	0	160	1.16	None		0	150	.92	None	0	150	.89	None
	1	287	.85	-2.68	1	287	.89	-2.27		1	243	.66	-1.79	1	243	.69	-1.63
a7	2	174	.86	-.01	2	174	.91	.50	***c8***	2	173	.71	.01	2	173	.74	.36
	3	52	1.23	1.78	3	125	1.11	**1.78**		3	60	.55	1.44	3	153	.89	**1.27**
	4	89	.93	.90						4	117	.89	.34				
	0	130	1.28	None	0	130	1.31	None		0	47	1.68	None	0	47	1.59	None
	1	297	1.06	-3.02	1	297	1.06	-2.54		1	134	.98	-2.59	1	134	.98	-2.64
a9	2	200	.98	-.12	2	200	1.04	.44	***d7***	2	250	1.20	-.88	2	250	.91	.20
	3	56	1.51	1.92	3	119	1.42	**2.10**		3	95	.85	1.78	3	261	1.04	**2.44**
	4	79	1.57	1.22						4	126	1.09	1.69				
	0	45	1.17	None	0	45	1.17	None		0	140	1.25	None	0	140	1.25	None
	1	202	1.02	-4.17	1	202	.99	-3.26		1	330	1.48	-2.87	1	330	1.51	-2.64
b6	2	356	.95	-1.22	2	356	.98	-.27	***e1***	2	147	.93	.15	2	147	.97	.50
	3	95	.83	2.33	3	104	**1.37**	3.54		3	44	1.08	1.55	3	53	1.44	**2.14**
	4	50	2.40	3.06						4	48	1.24	1.17				
	0	86	2.02	None	0	86	*1.97*	None		0	89	1.29	None	0	89	1.36	None
	1	252	1.07	-3.27	1	252	1.04	-2.70		1	230	1.02	-2.79	1	230	.99	-2.33
b7	2	223	.74	-.26	2	223	.99	.39	***e2***	2	252	.86	-.56	2	252	.96	-.04
	3	81	.99	1.88	3	147	1.22	**2.31**		3	64	.82	1.94	3	99	1.05	**2.37**
	4	107	1.46	1.65						4	74	1.13	1.40				
	0	91	.75	None	0	91	.69	None		0	52	1.38	None	0	52	1.48	None
	1	162	.78	-1.89	1	162	.74	-1.46		1	232	1.08	-3.23	1	232	1.03	-2.66
c2	2	255	.72	-.74	2	255	.73	-.20	***e3***	2	246	.83	-.29	2	246	.94	.34
	3	119	.58	1.31	3	211	.89	**1.66**		3	80	.81	1.95	3	140	.93	**2.32**
	4	116	1.06	1.31						4	90	1.04	1.57				

Table 13. Items with inappropriate response category suitability in the 'daily support time' index (II)

items	RESPONSE CATEGORY SUITABILITY				COLLAPSED RESPONSE CATEGORY SUITABILITY				items	RESPONSE CATEGORY SUITABILITY				COLLAPSED RESPONSE CATEGORY SUITABILITY			
	Category Label	Observed Count	Outfit	Structure Calibration	Category Label	Observed Count	Outfit	Structure Calibration		Category Label	Observed Count	Outfit	Structure Calibration	Category Label	Observed Count	Outfit	Structure Calibration
	0	53	.81	None	0	53	.82	None		0	72	.91	None	0	72	.92	None
	1	246	.72	-3.18	1	246	.68	-2.67		1	188	.60	-2.27	1	188	.56	-1.81
e4	2	225	.57	-.07	2	225	.70	.50	*f7*	2	195	*.48*	-.24	2	195	.51	.30
	3	68	1.21	2.04	3	146	1.14	**2.18**		3	92	.65	1.45	3	192	.79	**1.51**
	4	117	1.29	1.21						4	151	.67	1.06				
	0	57	.87	None	0	57	.91	None		0	70	2.09	None	0	70	**1.94**	None
	1	383	.90	-3.67	1	383	.85	-3.35		1	247	1.44	-2.52	1	247	1.49	-2.14
e5	2	141	.73	.82	2	141	.81	1.25	*f9*	2	145	.76	.41	2	145	1.04	.89
	3	35	*.45*	2.19	3	89	.99	**2.10**		3	70	.81	1.46	3	185	**1.71**	**1.24**
	4	93	1.25	.66						4	166	2.74	.65				
	0	60	.93	None	0	60	.96	None		0	50	1.15	None	0	50	1.12	None
	1	332	.98	-3.35	1	332	.87	-2.91		1	225	.67	-3.14	1	225	.67	-2.57
e6	2	143	.64	.69	2	143	.70	1.21	*g2*	2	186	.58	-.07	2	186	.62	.57
	3	63	.92	1.60	3	135	1.18	**1.70**		3	83	.83	1.65	3	149	1.00	**2.00**
	4	111	1.16	1.06						4	123	.94	1.56				
	0	62	.99	None	0	62	1.01	None		0	38	1.16	None	0	38	1.13	None
	1	303	1.26	-3.16	1	303	1.10	-2.71		1	195	.70	-3.24	1	195	.66	-2.59
e7	2	1551	.70	.56	2	151	.76	1.09	*g3*	2	211	.63	-.28	2	211	.64	.42
	3	67	.64	1.60	3	154	1.03	**1.62**		3	92	.65	1.77	3	166	.84	**2.17**
	4	126	1.18	1.00						4	131	.83	1.74				
	0	66	.90	None	0	66	.94	None		0	90	1.13	None	0	90	1.15	None
	1	246	.74	-2.86	1	246	.76	-2.37		1	282	.94	-2.99	1	282	.87	-2.57
e8	2	184	.76	.12	2	184	.76	.68	*g5*	2	143	.54	.20	2	143	.59	.72
	3	80	.78	1.60	3	174	.90	**1.69**		3	64	.54	1.43	3	95	.83	**1.84**
	4	133	1.22	1.13						4	88	.78	1.36				
	0	124	1.51	None	0	124	1.56	None		0	52	1.00	None	0	52	1.00	None
	1	236	.67	-2.22	1	236	.64	-1.57		1	238	.83	-3.17	1	238	.77	-2.67
f2	2	175	.54	-.16	2	175	.67	.29	*g6*	2	189	.51	-.03	2	89	.56	.55
	3	75	.78	1.29	3	112	.87	**1.57**		3	63	*.46*	1.95	3	131	.84	**2.11**
	4	88	.78	1.09						4	125	.98	1.25				
	0	83	1.83	None	0	83	1.72	None		0	58	1.28	None	0	58	1.35	None
	1	168	.63	-1.98	1	168	.61	-1.54		1	226	.61	-2.93	1	226	.58	-2.0
f3	2	191	.72	-.36	2	191	.96	.17	*g8*	2	166	.82	.05	2	166	.78	.66
	3	96	.68	1.34	3	205	.86	**1.37**		3	81	.65	1.52	3	160	1.05	**1.74**
	4	160	.83	.99						4	136	1.28	1.36				
	0	78	.89	None	0	78	.89	None		0	32	1.00	None	0	32	.93	None
	1	189	.64	-2.30	1	189	.58	-1.81		1	184	.76	-3.36	1	184	.73	-2.69
f6	2	209	*.46*	-.39	2	209	.51	.17	*g9*	2	230	.75	-.39	2	230	.82	.33
	3	99	.64	1.39	3	171	.83	1.64		3	91	.63	1.93	3	164	.88	**2.36**
	4	123	1.03	1.30						4	130	1.03	1.83				

2.3.3.3. Reliability and separation analysis

Wright and Masters (1982) propose two global statistics to calculate the reliability of a scale at the group level: the *person reliability index* and the *item reliability index*. These indices provide a degree of reproducibility. Considering that the value distributions range from 0 to 1 in both cases, values over 80 are acceptable (Fox & Jones, 1998). The rates of item separation index and the person separation index were also analyzed. These indices show evidence of reliability and must exceed the value of 2.00 in both cases.

In Table 14, we can see that the different domains and the SIS-C itself have an adequate reliability and separation indices in relation to both the items and persons analysis.

Table 14. Reliability and separation indices

Domains	Reliability		Separation	
	Items	**Persons**	**Items**	**Persons**
A. Home Living Activities	1.00	.94	14.56	3.88
B. Community & Neighborhood Activities	.98	.94	7.37	3.84
C. School Participation Activities	.99	.93	12.78	3.64
D. School Learning Activities	.99	.92	9.42	3.37
E. Health & Safety Activities	.99	.92	10.17	3.36
F. Social Activities	.99	.91	10.29	3.23
G. Advocacy Activities	1.00	.93	16.04	3.72
TOTAL	**1.00**	**.98**	**15.57**	**7.35**

2.3.3.4. Assessing goodness of fit

Data fit can be estimated from the statistical Infit and Outfit (Wilson, 2005). The Infit or internal fit statistic is sensitive to the unexpected behavior of those items located near the person's ability. The Outfit or external fit statistic is sensitive to the unexpected behavior of those items that are far from the skill level of the subjects, being the lack of Outfit less harmful for the measure than the lack of Infit.

The Mean Square Residual (MNSQ) of Infit and Oufit statistics provides information on whether the responses occur according to the model. If so, the residuals will be small and their MNSQ would be close to 1 indicating a perfect fit. Values substantially less than 1 (<0.5) indicate determinism in the observed data, while values substantially higher than 1 (>1.5) indicate noise in the data; thus, the acceptable range of values is between 0.5 and 1.5.

To analyze the data fit we also have two standardized statistics: ZEMP Infit and Outfit ZEMP. Empirical data always has some degree of misfit to the model and these statistics are in accordance with the sample. It is an empirical standardization based on the distribution observed locally in the sample data that is calculated. In other words, ZEMP Infit and ZEMP Outfit values are divided between the standard deviation. The expectation of the model ranges between -2 and 2.

It should be noted that when the MNSQ (of either Infit or Outfit) is between 1.5 and 2.0 it is unproductive for the construction of the measure, but does not degrade the measure of the construct; only values higher than 2 indicate distortion or degradation of the measure (Linacre, 2008). For its part, although values higher than 2 in ZEMP are really nonessential, it is only considered unacceptable to keep a variable when its value is greater than 3.

To start with, we will reveal the domains and scale global fit to the model (Table 15), then move on to carry out a more exhaustive analysis of the items (Table 16).

Table 15. Domains and scale global fit

DIMENSIONS	INFIT		OUTFIT	
	MNSQ	ZEMP	MNSQ	ZEMP
A. Home Living Activities	1.05	.10	1.06	-.10
B. Community & Neighborhood Activities	1.01	.00	1.03	.10
C. School Participation Activities	1.02	.00	1.02	.00
D. School Learning Activities	.99	-.10	1.03	.10
E. Health And Safety Activities	1.03	.10	1.06	.20
F. Social Activities	1.03	.00	1.06	.10
G. Advocacy Activities	1.05	.10	1.05	.10
TOTAL	**1.03**	**-.10**	**1.09**	**.10**

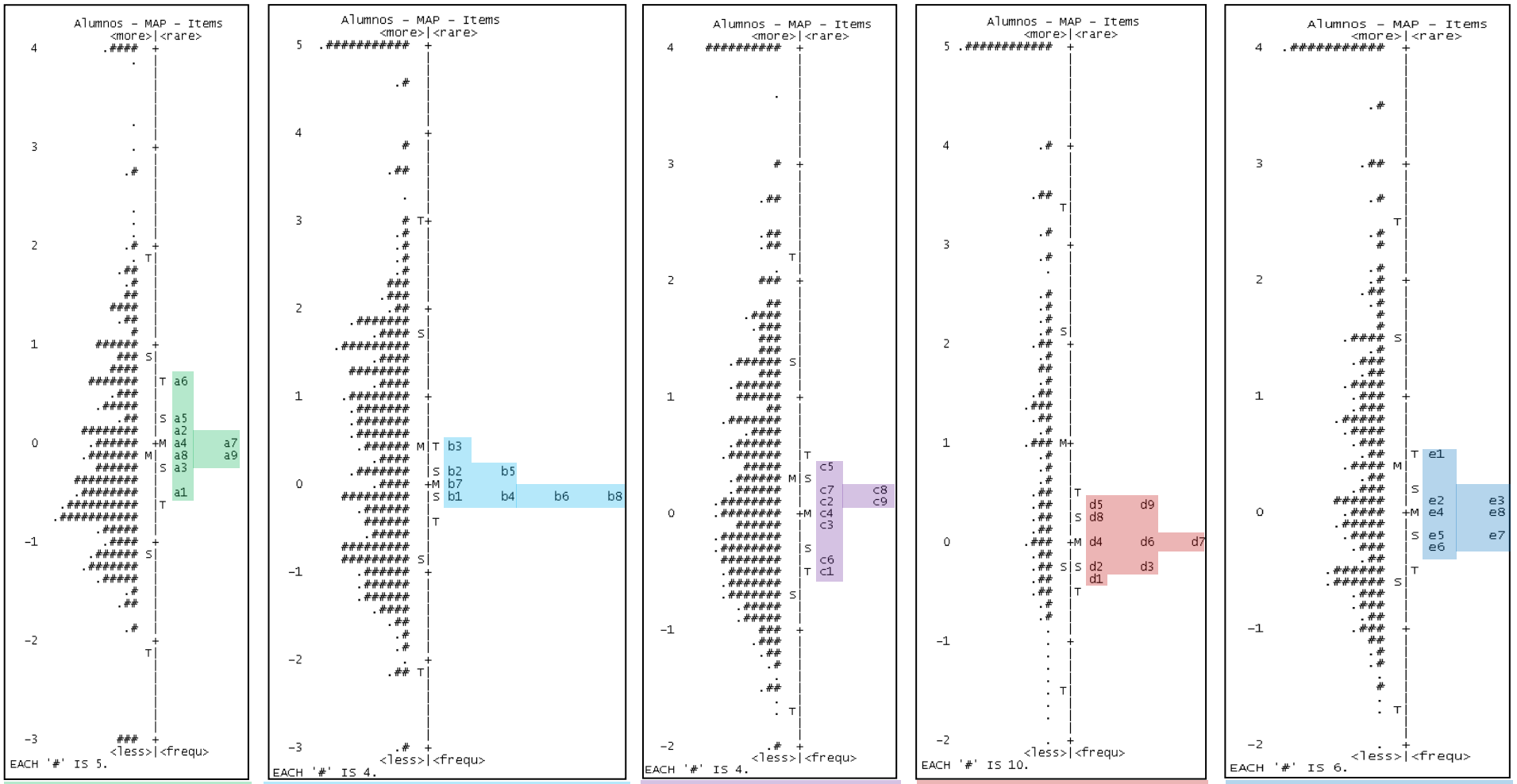
Global fit is used to check the fit of the dimension and shows that the scale has good functioning in all cases. After that, a thorough analysis of each item was conducted to determine with precision the fit of the items that make up the scale of the proposed model. The obtained results show that four of 61 items in the scale do not confirm the expectations of the model (Table 16). Although these four items do not fit the expectation properly, MNSQ values do not exceed 2 and ZEMP values do not exceed 3 in any case. We can therefore claim that none of the items prove detrimental to the measured construct and should be eliminated.

Table 16. Summary of unfit items

ÍTEMS	***Measure***	***Model S. E.***	***INFIT***		***OUTFIT***	
			MNSQ	***ZEMP***	***MNSQ***	***ZEMP***
a6	.66	.02	1.83	2.1	2.00	1.5
b7	.05	.02	1.36	2.1	1.45	2.4
e1	.49	.02	1.36	1.8	1.58	2.1
g1	.88	.02	1.81	2.4	2.00	2.5

2.3.3.4. Items calibration: localization, discrimination and accuracy of measurements

The *item localization* is reported in logits. Generally speaking, there should be a good equilibrium in all the domains regarding the number of difficult items (below 0 logits) and easy items (above 0 logits). It is also important that the range of item intensity is similar to the range of people needs. As shown in item-person maps (Figures 13-14) SIS-C items are close to medium needs, and we can find few ceiling and ground effects, which do not allow this tool to properly measure those people who have very low or high support needs. These effects are especially found in the 'B. Community & Neighborhood Activities' and 'E. School Learning Activities' domains. In this sense the domain related to advocacy activities has the widest range of difficulty. SIS-C items are distributed better when all 61 are taken into account as a group, showing that the difficulty of the activities also depends on the domain where they are included ('A. Home Living Activities' domain presents the easiest items whereas 'D. School Learning Activities' shows the more difficult ones).



A. Home Living Activities | B. Community & Neighborhood Activities | C. School Participation Activities | D. School Learning Activities | E. Health and Safety Activities

Figure 13. Items difficulty by domains

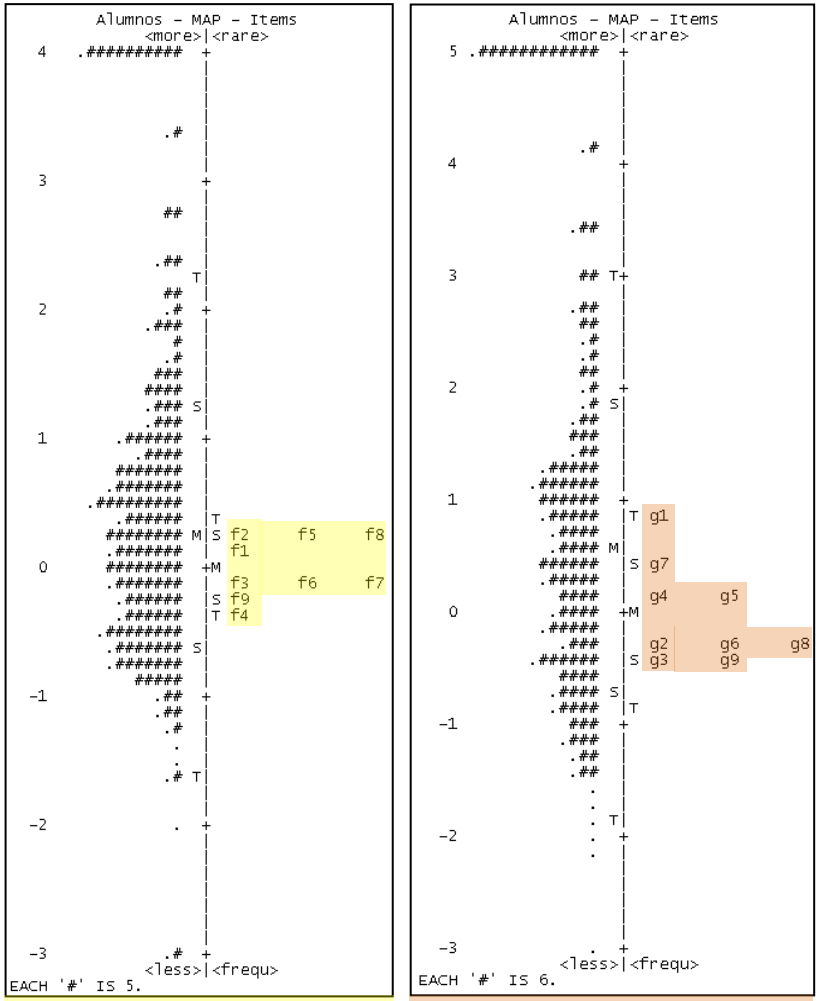


Figure 13. Items difficulty by domains (II)

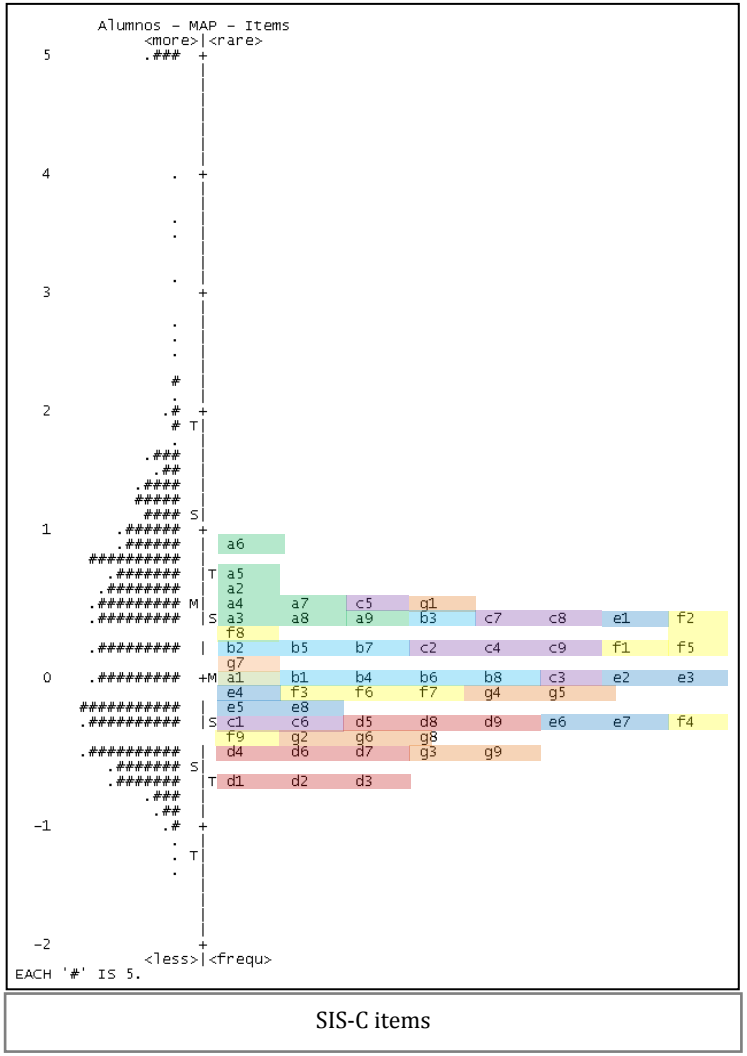


Figure 14. SIS-C Items difficulty

With regard to the discrimination and accuracy of the measure, it is necessary to analyze the Characteristic Curves and the Information Functioning of both items and domains.

The *Characteristic Curve* describes the relationship between a latent variable (i.e., support needs) and the performance of an item/test. It is expected that the relationship between the score given and person location estimate has an 'S' shape (*sigmoid curve*). All the curves obtained by our data acquired this form, showing that our items and domains are behaving properly.

Moreover, with reference to the curve slope, we can know the discrimination power of the items. It is said that the model expectation is 1.00, but it is possible to accept item discrimination values over .70. If we check all the item discrimination values (Table 17) we can see that only three of the 61 SIS-C items do not show adequate discrimination.

Table 17. Items discrimination

DISCRIMINATION VALUE	ITEMS
>1.00	a1,a2,a3,a4,a5 b1,b2,b4,b5,b8 c2,c3,c5,c8,c9 d2.d3.d4.d6 e4,e5,e6,e8 f1,f3,f4,f6,f7 g2,g3,g4,g5,g6,g9
.90 - 1.00	a7 b3,b6, c4 d1,d7,d8 e3,e7 f2 g8
.70 - .90	a8, a9 b7 c1, c7 d5,d9 e1,e2 f5,f8,f9 g7
<.70	a6,c6,g1

Finally, to determine the accuracy of the measure, we analyzed the *Information Function* of each item and the different domains of the SIS-C (obtained by the sum of the items information function). In IRT models, the accuracy of a measurement depends on the trait level that is estimated. In this sense, the Information Function indicates the precision of the measurement at different levels of the underlying trait. In general, *information functions* tend to look *bell*-shaped and their highest point represents the maximum information.

Concerning the results obtained after SIS-C administration, we can say that most of items and domains are more accurate when assessing medium-high support needs level. This is consistent with the calibration results, where we could see that most items were located at medium levels of difficulty.

2.3.3.5. Invariance analysis

The analysis of the invariance was carried out by analyzing the Differential Item Functioning (DIF). We specifically analyzed the DIF contrast between groups, which should not be over .50. Invariance entails that, when the different categories do not imply different levels of ability, there should not be a significant difference in the localization of the items depending on the group assessed (Thissen, Steinberg, & Wainer, 1993). Those variables that can influence support needs (e.g., 'age', 'intellectual disability level') are therefore not taken into account for this analysis. Finally, invariance was analyzed by 'gender' and 'specific etiologies'.

- On the one hand, there was no item regarding 'gender' that showed a differential functioning between men and women, reflecting an appropriate invariance.

- On the other hand, when the invariance between different groups depending on the 'specific etiologies' was analyzed, a differential functioning in three items was found. Two of these three items were a differential functioning between children with autism and cerebral palsy. Children with autism associated with intellectual disabilities have more support needs than those with cerebral palsy when it comes to following classroom and school rules (Item C7; DIF contrast = .55), whereas children with intellectual disability and cerebral palsy have more support needs in relation to maintaining physical fitness (Item E2; DIF contrast =.58).

DISCUSSION

(A) GENERAL CONCLUSIONS

Under the title *'Development and Validation of a Support Needs Scale for Children with Intellectual Disabilities'* we present a first and unprecedented work focused on the evaluation of the support needs of children in the Spanish context.

The current concept of intellectual disability leaves behind the traditional focus on intellectual deficit and starts being interested in human strengths and their development through the support provided by the social context (Shogren, 2013), being easily framed within 'positive psychology' (Schalock, 2004; Shogren, Wehmeyer, Buchanan, & Lopez, 2006). However, the history of the 'support needs' construct and assessment is briefer than that of intelligence assessment. Despite advice from the American Association on Intellectual and Developmental Disabilities (AAIDD) (Luckasson et al., 2002; Schalock et al., 2010) concerning the need for clinicians to use rigorous and robust support needs assessment tools is emphasized, there is thus still a lack of instruments developed with this goal.

The main goal of this research project was to conduct rigorous processes of translation and adaptation for the Supports Intensity Scale for Children (SIS for Children [SIS-C]) (Thompson, Wehmeyer et al., 2008) into Spanish according to the guidelines proposed by Tassé and Craig (1999) and respecting the recommendations of the International Test Commission (ITC). As the main conclusion of this work, we can claim that the usefulness, reliability and validity of this scale in Spain have been guaranteed through three different methodologies: Classical Test Theory (CTT), Structural Equation Modeling (SEM) and Item Response Theory (IRT).

In short, the results obtained show that the scale has good psychometric properties and items suited to assessing the support needs of children and adolescents with intellectual disabilities within the Spanish context. Similarly, it is also important to note that the results obtained here are comparable to those of other related support needs assessment studies.

• Through CTT the quality of the items was analyzed, including: (a) difficulty index and discriminating power; (b) item discrimination indices,); (c) reliability and validity of the item. In all cases, we found values greater than the minimum limit accepted. Furthermore, domains and scale reliability (understood as consistency and stability) and different validity evidences (such as concept, criterion, and construct validity) were assured.

It is important to highlight that results are similar to those previously found in most SIS adaptations (e.g., Buntinx, 2008; Claes et al., 2009a; Giné et al, 2007; Lamoureux-Hébert & Morin, 2009; Cobigo & Morin, 2009; Schalock, Thompson et al, 2008; Thompson et al., 2004. Thompson et al, 2008) as well as those found in preliminary studies of the SIS-C adaptations carried out in Spain (Adam-Alcocer & Giné, 2013; Guillén et al., 2012) and the original version (Thompson, Wehmeyer, Hughes, Shogren, Palmer, et al., 2014).

• A Confirmatory Factor Analysis (CFA) was carried out for SEM, taking into account three hypothesis: (1) that 'support needs' is a unidimensional construct; (2) that 'support needs' is a correlational construct; (3) that 'support needs' is a hierarchical construct. Goodness of fit analysis showed that a single domain was not enough to reproduce the original matrix and explain the nature of adaptive behavior. Otherwise, the 'support needs' concept seems to be multidimensional according to fit indices. Specifically, the correlation model (h2) was best suited. These results provide an empirical explanation of the importance of not only using an index of support needs, but also obtaining a support needs profile, with different scores in the diverse areas assessed.

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

• IRT methodology is starting to be used to validate scales related to construct included within the current concept of intellectual disability (e.g., adaptive behavior [Navas, Verdugo, Arias & Gómez, 2012]; and quality of life [Gómez, Arias, Verdugo, & Navas, 2012]). In any case, due to the innovative use of IRT to validate the support needs scale, it was necessary to guarantee that our data was adequate for analysis according to IRT assumptions. Once unidimensionality and polarity were demonstrated, we analyzed the format response functioning. 32 items suggested that the categories of response '3' and '4', related to the *frequency of support* index, were not working as expected. Taking into account individual' levels of ability, the use of the category responses is unexpected (it appears that the category responses are used in an idiosyncratic way). It was shown that when collapsing categories the response format functioning improved.

The calibration was analyzed and the global fit was examined using the Infit and Outfit MNSQ and ZEMP. Item fit analysis showed that all measure 'medium levels of support needs' better, and that four of the 61 items within the seven main domains assessed by the SIS-C obtained values above those expected. However, in any case values here were higher than permitted, which indicates that there was no more unexplained noise than explained noise (Linacre, 2005). As there was not more misinformation than information in the observations, it was decided not to eliminate any of the items.

Finally, Differential Item Functioning (DIF) was found in three items depending on the specific etiology (specifically two of them between autism and cerebral palsy; DIF contrast >.50). This occurs when tests yield scores or promote score interpretations that result in different meanings for members of different groups with the same level of ability (e.g., race, ethnicity, language, culture, gender, socioeconomic status, etc.). In this sense, the creation of specific norms for these specific categories could be relevant. For its part, significant differences across gender were not found.

The innovative use of IRT to validate the support needs scale does not allow us to compare results with other previous researches. Nevertheless, we emphasize that, in general, the IRT results were better in the final analysis in the pilot study and the information obtained on items was more robust than in the case of CTT.

B) STRENGTHS AND WEAKNESS OF THE STUDY

The adaptation and validation of the SIS-C is a significant contribution to the work with children with intellectual disability, because little research has hitherto been conducted in order to develop support needs scales for assessing children with intellectual disabilities.

At this point, we would like to draw special attention to the rigorous process followed in the development of this instrument, as well as to the efforts made by research teams in its formulation. The SIS-C items were adapted into Spanish through the steps proposed by authors with great experience in this field (Tassé & Craig, 1999).

From the beginning, the content validity of the items was guaranteed. Literature related to the concept of intellectual disability was reviewed throughout the whole process (including the most current papers, book and other documents), analyzing that the scale fit the support needs concept.

Recommendations from other experts (e.g., Muñiz et al., 2013) were also taken into account during the adaptation process. Considering the seven steps followed in this process, we highlight the participation of several committees composed of experts in the field of intellectual disability (including professionals, researches and bilingual people) who made different translations and revisions of the scale and analyzed the adequacy of the items to represent the domain in which they had been placed. A pilot study (n= 143) was also carried out where professionals from INICO participated as interviewers. This allowed us to have a better understanding of the difficulties that parents and/or teachers faced in order to answer SIS-C questions, and to include additional specifications for the next interviews.

As the major strengths of this study, we point out the size and representativeness of the scale used in the final validation of the SIS-C (n=814) and the different and strong methodologies used with this purpose (CTT; SEM; IRT), which provide a high degree of innovation in this project, independently of the results obtained. The good general results (proved by numerous reliability and validity evidences within each of the three methodologies) found on the Spanish SIS-C functioning must thus be considered an extra point in the quality and appropriateness of the rigorous process of development and validation.

Despite of the several strong points of the work, some limitations can also be identified. To start with, the selection of the sample was undertaken by means of incidental sample (which could be considered as a weakness of the study). Another limitation identified is that, although this study provides data for the purposes of estimating inter-respondents and test-retest reliability (which indicated a further strength of the study); the inter-interviewer stability (considered as the third part of this group of stability analysis) has not been analyzed.

We would also like to note that a detailed IRT analysis has shown the low quality of some characteristics of the scale regarding response categories and item fit. Specifically, response categories '3' and '4' did not behave as expected ('3' were the most likely along the continuum of the trait measured) and three items did not reach the minimum values in several of the analyses (A6, C6, G1). However, values were not inacceptable in any case, and it was decided to keep the scale as close to the original as possible to facilitate the results comparison.

(C) FUTURE LINES OF RESEARCH

Among the specific future lines of research related to the final development of the SIS-C within the Spanish context, and in addition to those oriented to overcome this study's limitations, constructing norms is essential in terms of interpreting the results in comparison to other children with intellectual disabilities. Specifically, a national norm will be established from the 814 applications used for the validation. Regarding the significant differences found in the support needs score depending on the age of the children, it is planned to divide the norm-referenced test scores into different groups according to the age of the participants, creating six groups which reflects the six groups of age included in the SIS-C (5-6; 7-8; 9-10; 11-12; 13-14; 15-16 years old). At this point, we should remember that this work is framed within an international line of research headed by AAIDD. Therefore, our data will be included within a global work focused on validating the SIS-C in several countries, creating an international norm, comparing results among countries, and sharing knowledge as well as decision making.

Additionally, in order to make the estimation of extraordinary support according to the peers of the same each easier, AAIDD has developed indicators which provide preliminary descriptions of those supports required by typically functioning children for each pair of age. This future line of research, considered a complement of the SIS-C validation project, consists of asking teachers for the ordinary support needs that students without disabilities show in regular contexts, adapting these indicators to the different countries involved in this project. In Spain, the typical support needs analysis has been started by Institute on Community Integration (INICO) through a R&D project funded by Autonomous Community of Castilla & Leon (SA120U13).

Finally, we would like to point out that support needs assessment is only one of the components of a broad multidimensional approach to assessing intellectual and developmental disabilities. It would therefore be interesting to examine the correlation between SIS-C scores and other forthcoming tools intended to assess other aspects of children with intellectual disabilities and which have already shown their suitability in Spain, such as the Diagnostic Adaptive Behavior Scale (DABS) (Verdugo, Arias & Navas, 2014), the KidsLife Scale (Gómez et al., 2014), and the ARC-INICO Self-Determination Scale (Vicente et al., in press). Some of these analyses have been carried out preliminarily, confirming a high correlation between these constructs (Guillén, 2014; Vicente, 2014); however, it is still necessary to make research in this line in order to draw definitive conclusions.

Similarly, it would be interesting to identify those independent variables which have a higher influence on the level of support needs and create a causal model. Knowing all the variables involved in the support needs level, and including individualized supports-based systems in those entities working with children with intellectual disabilities, will contribute to enhancing their functioning and quality of life throughout their lifespan.

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