Examining measurement invariance and differences across groups in the support needs of children with and without intellectual disability

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Abstract:

Background: The purposes of this study were to empirically determine whether the support needs construct is generalisable across children with and without intellectual disability (ID) and to conduct cross-group comparisons to explore how extraordinary and non-extraordinary support needs differ in children.

Method: One thousand thirty-six children (814 with ID, 222 without ID) were assessed using the SIS-C.

Results: The SIS-C achieved scalar invariance between children with and without ID. Cross-group comparisons revealed differences in variances, in correlations between factors and significant latent mean differences for all factors.

Conclusion: Results show that the support needs construct is generalisable to children with and without ID and that there are no qualitative differences in how they show their support needs, so typically developing children can be used as a reference group to explore differences between extraordinary and non-extraordinary support needs. Conceptual and practical implications are discussed, and future lines of research are provided.

Keywords

Support needs, support needs assessment, supports intensity scale-children’s version, measurement invariance, multi-group confirmatory factor analysis

Introduction

The understanding of intellectual disability (ID) has evolved from a deficit-based perspective toward a strengths-based and social-ecological approach. From this perspective, the supports paradigm understands ID as the existing mismatch between the persons' with ID capabilities and the environmental demands (Schalock et al., 2010). This mismatch creates the support needs, "a psychological construct referring to the pattern and intensity of supports necessary for a person to participate in activities linked with normative human functioning" (Thompson et al., 2009, p. 135). From the supports paradigm, people with ID can be distinguished from the typically developing population by their support needs. As such, although every person may present support needs in different situations and moments of their lives, people with ID have extraordinary support needs that go beyond those needed by most typically developing people (Schalock et al., 2010).

The support needs construct acquires a central place within the supports paradigm, and its importance lies in its role for the provision of individualised support plans aimed at improving the functioning and quality of life of persons with ID (Schalock, Thompson, & Tassé, 2018). On the other hand, the information on users' support needs is useful at an organisational level regarding resources allocation (Thompson, Schalock, & Tassé, 2018a). Given the importance and implications of the support needs construct, different standardised measures of support needs have been developed based on the supports paradigm to advance its implementation (Thompson & Viriyangkura, 2013). Examples of such internationally used tools include: the Supports Intensity Scale (Thompson et al., 2004), refreshed and renamed as the Supports Intensity Scale-Adult Version (SIS-A; Thompson et al., 2015), and the Supports Intensity Scale-Children's Version (SIS-C; Thompson et al., 2016).

SUPPORT NEEDS OF CHILDREN WITH AND WITHOUT ID

Although advances in the implementation of the supports paradigm have been evident and quick in social and educational services (Schalock, 2018), there are still challenges to address. One of these challenges is strictly related to the support needs construct. As mentioned above, under the supports paradigm, the main difference between people with and without ID are their support needs, in the sense that the former have extraordinary support needs that go beyond the supports required by the latter (Schalock et al., 2010). This approach to ID, in which the support needs construct acquires a central place, has led researchers to constantly allude to the distinction between extraordinary and non-extraordinary support needs (Thompson et al., 2009; Thompson & Viriyangkura, 2013). As such, extraordinary support needs are those that characterise ID, and they reflect a chronic and persistent mismatch. Extraordinary support needs go beyond non-extraordinary support needs, which refer to the everyday supports used by typically functioning people (Thompson et al., 2009). Although this understanding of ID is a constant, in the last years there has been a growing emphasis on learning how extraordinary and non-extraordinary support needs differ beyond conceptualisation (i.e., in terms of type and intensity), especially in circumstances where this distinction is especially complex (Thompson & Viriyangkura, 2013).

The key is that, although the distinction between extraordinary and non-extraordinary support needs is conceptually clear, in practice, it implies more complexity than it seems *a priori*. Thus, distinguishing between these two support needs in adults may seem simple, given the fact that not all adults have a chronic mismatch between their competencies and environmental demands. However, in children, the demarcation between extraordinary and non-extraordinary support needs is less clear. This is because children, no matter what their disability status, require extra supports not needed by typically functioning adult members of society. Moreover, the younger the child the more intense their needs for support compared to adults (e.g., all five-year children require a level of supervision not required by typically functioning adults). The reality that all children have extraordinary support needs compared to adults, but not to other children their own age, is at the root of the difficulty in discerning extraordinary and non-extraordinary support needs during childhood (Thompson & Viriyangkura, 2013).

This challenge could hinder decision-making regarding supports planning. Although the goal of support needs assessment is to provide person-centred supports that cover the unique support needs of each individual, the resources and strategies that are available for individualised supports are finite (Thompson et al., 2009). Therefore, discerning extraordinary support needs can inform the provision of supports to cover priority areas. Bearing this in mind, children with ID constitute a group where urgent research is necessary to distinguish between extraordinary and non-extraordinary support needs (Thompson & Viriyangkura, 2013). Addressing this distinction is necessary to advance understanding of the support needs construct (especially in children with ID), its measurement and, by extension, supports provision.

A way to address this distinction is to measure and compare the support needs of typically developing children (who are expected to show non-extraordinary support needs) with the support needs of their peers with ID (who in addition, are supposed to embody extraordinary support needs). However, prior to studying how these support needs differ, it is necessary to empirically address the premise that makes this distinction meaningful, which has never been researched before. If, according to the supports paradigm, what differentiates people with and without ID are their support needs, then the support needs construct should be generalisable to people with and without ID. The need to address this premise has not only conceptual sense regarding the supports paradigm, but it is also a methodological requisite to conduct a cross-group comparison study. As such, prior to drawing any conclusion on differences between these groups based on their support needs, it is necessary to assure that the support needs construct has been measured in the same metric in both groups. In applied research, this is what constitutes measurement invariance (MI), which is a necessary condition for the validity of cross-group comparisons (Wu, Li, & Zumbo, 2007). If MI holds across the groups, then the differences found between children with and without ID can be meaningfully explained regarding their support needs (Milfont & Fischer, 2010) and clear information on how extraordinary and non-extraordinary support needs differ can be provided. Bearing these elements in mind, the aim of this work is to explore the following research questions:

1. Can the support needs construct be comparably measured for children with and without ID, making possible a comparison without bias between groups regarding their support needs?
2. What latent differences can be observed between children with and without ID regarding their support needs?

Method

Instrument

The SIS-C (Thompson et al., 2016) is the only standardised support needs assessment tool available to assess the intensity of the extraordinary support needs in children with ID from 5 to 16 years. This tool is normed according to age cohorts (i.e., 5–6, 7–8, 9–10, 11–12, 13–14 and 15–16) and places the assessed children on a support needs continuum. Different studies have reported on its adequate psychometric properties (see Thompson, Schalock, & Tassé, 2018b). This instrument is administered as a semi-structured interview by a qualified interviewer. Observers reporting the support needs of a child with ID must know the child well and must have recently observed the child in different situations (Thompson et al., 2016). The SIS-C is composed of two sections: the first section is items related to exceptional medical and behavioural support needs, and the second section is a standardised section whose aim is to assess children's support needs in 61 daily life activities in seven areas: Home Life (HLA), Community and Neighborhood (CNA), School Participation (SPA), School Learning (SLA), Health and Safety (HSA), Social Activities (SA) and Advocacy (AA). Items are scored according to three indicators: type of support, frequency and daily support time. Each indicator is scored on a 5-point Likert-type rating scale. Scores from the seven domains are used to compute a subscale standard score and generate a composite standard score (i.e., SIS-C Support Needs Index score).

For the purposes of this study, only the standardised portion of the SIS-C Spanish version was used, since it is the section that measures the construct of interest to answer the two research questions. Detailed information on the psychometric properties and translation and adaptation processes of the SIS-C Spanish version is available in Guillén, Verdugo, Arias, and Vicente (2015), Verdugo, Arias, et al., (2016), and Verdugo, Guillén, Arias, Vicente, and Badia (2016).

Participants

Participants were 814 children or teenagers with ID (*M* = 11.13 years; *SD* = 3.41) and 222 typically developing students (*M* = 10.57 years; *SD* = 3.43) representing different autonomous communities from Spain. As regards inclusion criteria, an ID diagnosis was necessary for inclusion in the first group, while educational records were used to select the group of typically developing children, which comprised children who did not have 'specific needs for educational support' (a category set up by educational authorities in Spain that includes children who require support needs to access the curriculum and/or to achieve curricular goals; Verdugo, Amor, Fernández, Navas, & Calvo, 2018). Participants were included in both groups in different age bands matching the six SIS-C age cohorts. Informants of the participants' support needs were educational professionals and relatives, who were interviewed through the SIS-C administration. Table 1 summarises participants' characteristics.

<<Table 1>>

Procedure

To recruit participants, we followed a non-probabilistic convenience sampling. A letter presenting the project and the inclusion criteria for the participants was sent to organisations and schools providing education and supports to students with and without ID. The letter was followed up by a telephone call to identify schools and organisations willing to participate in the research, and participating entities were sent an informed consent form and a project description to share with the families of the children. Once the consent forms were collected, assessments were completed and the students with ID and those without were both assessed using the standardised section of the SIS-C Spanish version.

To conduct the assessments, two of the authors interviewed the informants. In the case of informants of students with ID, we followed the guidelines by Thompson et al. (2016) and to rate each item, we asked the informants about the extra support that a child with ID of a certain age band (e.g., 11–12 years) required that exceeded the needs of a same-age typically developing child. On the other hand, to rate each item in the assessment of students without ID, we asked the informants to provide information on the support needs of the typically developing child.

To comply with the ethical standards, we first contacted the Ethics Committee of the University of Salamanca and asked them to assess the ethical quality of the project.

As a result, the Ethics Committee approved the project (resolution available upon request to the authors) and the research team started the assessments. We also complied with the ethical standards on data protection in force in Spain, aligned with the General Data Protection Regulation (Regulation EU2016/679), and assigned alphanumeric codes to all data that guaranteed the anonymity of participants and informants. Finally, all procedures were in accordance with the 1964 Helsinki Declaration and its amendments.

Data analysis

We followed three steps to address the research questions. To answer the first research question, we estimated the (1) best measurement model for each group and then (2) measurement and structural invariance models, and to answer the second, we (3) analysed the structural parameters in both groups.

Research Question 1 - Estimation of measurement models

The aim of this stage was to decide which factor model would be used for the invariance analysis. The aim of this stage was to decide which factor model would be used for the invariance analysis. In this sense, the research tradition on the structure of the support needs construct helped in determining the hypotheses to analyse through confirmatory factor models. Studies analysing the structure of the support needs construct in adults and children with ID (using respectively the SIS and SIS-C) have tested different hypotheses, with the following being the most frequent ones: (a) the unidimensional model (i.e., support needs are explained by one factor); (b) the correlated first-order factors model (i.e., support needs consist of correlated factors matching the domains of the standardised section of the scales); and (c) the hierarchical model (i.e., support needs can be understood through a hierarchical model with one second-order factor created by the domains of the standardised section of the scales). Different studies have revealed that the correlated first-order factors model achieved the best fit in adults (Kuppens et al., 2010; Thompson et al., 2004; Verdugo, Arias, & Ibáñez, 2007) and children (Thompson et al., 2016; Verdugo, Guillén, et al., 2016). However, given that the in the SIS and SIS-C each item is rated according to three measurement methods (i.e., type, frequency and daily support time), recent studies on this topic have analysed the relative contributions of the support needs construct and the method factors in the observed support needs in adults and children with ID. These studies have shown the influence of the method factors that should not be neglected when studying the support needs construct in children and adults with ID (Seo, Shogren, Little, Thompson, & Wehmeyer, 2016; Verdugo, Arias, & Guillén, 2017).

Bearing this in mind, for the purpose of this stage, the fit of three confirmatory factor models were compared in each group (i.e., students without ID and students with ID): (a) an unidimensional model, in which it is hypothesised that all the indicators can be explained by a general support needs domain; (b) a correlated first-order seven-factors model that specifies that support needs consist of correlated factors matching the seven domains of SIS-C and which is consistent with the theoretical structure of the support needs (Thompson et al., 2004); and (c) a model with seven correlated substantive factors and three correlated method factors (Correlated-Traits Correlated Methods model, CTCM) similar to that proposed by Verdugo et al. (2017) and Seo et al. (2016). The latter is an adaptation to the factorial analysis of the Multitrait-Multimethods Matrices (Jöreskog, 1971; Marsh & Hocevar, 1988; Widaman, 1985). This model hypothesises that a part of the systematic variance of the indicators is explained by a certain number of substantive factors (in this case, the seven support needs domains), and the other part is explained by the different methods used to assess support needs (i.e., type of support, frequency and daily support time that are used to assess each item). Both the substantive and the methods factors may be correlated between them, but the substantive factors are orthogonal to the method factors, so the model makes it possible to gain an accurate understanding of which percentage of the common and total variance is due to each kind of factor. The models were estimated using robust maximum likelihood (MLR) implemented within Mplus 7.0 (Muthén & Muthén, 2015). To assess the fit of the models, we followed the recommendations of Hu and Bentler (1999): values of the Comparative Fit Index (CFI) and the Tucker-Lewis Index (TLI) above .90 and .95, respectively, and values of the root mean square error of approximation (RMSEA) below .08 and .05 indicate an acceptable and good fit, respectively. Moreover, we examined the Bayesian information criterion (BIC), in which lower values suggest a better fit.

To estimate the factor models, we transformed the original indicators into a reduced number of parcels. Taking into account that in the SIS-C each indicator receives three ordinal ratings, a CTCM model for categorical items would require the estimation of at least 1,029 free parameters (183 indicators and 10 factors). Given certain limitations of the independent clusters model of the confirmatory factor analysis (CFA), the possibility of successfully estimating such a parameterised model would be low even with a large number of participants (Marsh et al., 2010; Morin, Arens, & Marsh, 2016). Consequently, we decided to create parcels with the aim of increasing the model's parsimony (it has been observed that in the SIS-C, the estimations done using parcels do not differ significantly from those conducted using items; Verdugo et al., 2017). Each factor was measured by three parcels: the sum of the items regarding the type of support, the sum of the items concerning the frequency and the sum of the items in relation to the daily support time. This parcelling procedure is consistent with the SIS-C correction process (Thompson et al., 2016).

Research Question 1 - Estimation of the measurement and structural invariance models

Once the final model was established, we proceeded to the measurement and structural invariance analyses, to explore the generalisability of the support needs construct to children with and without ID. We followed the commonly recommended process (Meredith, 1993; Wu et al., 2007), comparing five nested models with increasing constraints: a configural invariance model, in which it is hypothesised that in both groups (students without ID and students with ID), the construct has the same number and configuration of factors (i.e., there are no purely qualitative differences); a metric/weak invariance model, which hypothesises that the factorial loadings are equal across groups (i.e., there is no non-monotonic differential item functioning); a scalar/strong invariance model, where it is hypothesised that both the intercepts and the loadings are equal in both groups (i.e., there is no monotonic differential item functioning; latent scores can be transformed to a common metric and compared without bias); a variance/covariance invariance model, in which it is hypothesised that in both groups the scores are distributed following a similar dispersion and that correlations between factors are equivalent; and a latent mean invariance model, which hypothesises that both groups are indistinguishable regarding the measured factors. Scalar invariance is a requisite to interpret the results of the structural invariance (variances, covariances and means), so fulfilling it requires that the involved models acquire similar fit indexes (e.g., differences in CFI and TLI no bigger than -.10 and differences in RMSEA no bigger than .15; Chen, 2007; Cheung & Rensvold, 2002). The structural invariance model, however, does not necessarily require a good fit, given that in some instances finding structural differences between two subgroups is expected when comparing the same variable (Milfont & Fischer, 2010). Thus, for example, we expect that constraining the latent means of the support needs to be equal between children with and without ID will produce a substantial misfit because it is highly probable that children with ID show significantly higher levels of support needs than typically developing children.

Research Question 2 – Analysis of sample heterogeneity

Once the degree of MI is known (i.e., if the construct is generalisable or not across the groups), we can decide whether it is feasible to analyse the heterogeneity between groups. If so, we estimate cross-group differences in three parameters: (a) the variances and (b) latent means in the seven support needs domains, and (c) correlations between the domains.

Results

Research Question 1 - Estimation of measurement models

Table 2 shows the results of the CFA for each group. In both cases, the unidimensional model produced an unacceptable fit. The correlated first-order seven-factors models reached similar fit in both groups, but were still below the necessary values for a good fit. The CTCM models, however, fitted substantially better in all the fit indexes (CFI = .98; TLI = .97; RMSEA = .057). This result suggests that it is possible to recover a structure of seven correlated factors, but it has systematic variance associated to the rating methods that need to be modelled (consistent with the results reported by Verdugo et al., 2017 and Seo et al., 2016). BIC and the Akaike information criterion (AIC) supported this result, as the CTCM acquired lower values in all cases, despite its lesser parsimony with respect to the model without method factors.

<<Table 2>>

Research Question 1 - Estimation of the measurement and structural invariance models

Table 3 shows the fit indexes for the invariance models. There was not a substantial deterioration in the fit for the metric and scalar models with respect to the configural model (metric model: ΔCFI = -.004, ΔTLI = -.003, ΔRMSEA = .003; scalar model: ΔCFI = -.006, ΔTLI = -.004, ΔRMSEA = .004). However, the variance/covariance invariance model had a worse fit than the scalar model (ΔCFI = -.010, ΔTLI = -.010, ΔRMSEA = .012). This situation worsened when the latent means were set to be equal across groups (ΔCFI = -.050, ΔTLI = -.054, ΔRMSEA = .040). Table 4 shows the factorial loadings obtained in the scalar model. The loadings in the substantive factors were generally high (range: .99 to .81; *M* = .88), whereas the loadings in the method factors were insignificant or low (frequency) and from low to moderate (type of support and daily support time). Substantive traits retained 79% of the total variance and the method traits 13% (8% residual variance). Although the proportion of the variance explained by the method factors was small overall (13%), it was necessary to model it to make unbiased estimates of the parameters of the model.

<<Table 3>>

<<Table 4>>

We verified the potential effect of group size differences on the estimation of the measurement models. To do this, we extracted three random samples of 222 students from the ID group and repeated the invariance analyses, comparing the 222 typically developing children with the three random subsamples. The results were similar to those reported considering all the participants (except the bigger sampling error due to the decrease in the number of participants involved in the analysis), suggesting that the disparity in the size of the groups did not affect the estimation of the models. Owing to the word limit constraint, we have not included this analysis, but all data are available upon request to the authors.

Research Question 2 – Analysis of sample heterogeneity

Table 5 shows the correlations between factors for both groups. In children with ID, the correlations between factors were very high (range = .75 to .92; *M* = .86), consistent with the results obtained in previous studies (Verdugo, Guillén et al., 2016; Shogren et al., 2017). The correlations in the group of children without ID were between moderate and high (range = .50 to .80; *M* = .68). Table 6 shows descriptive statistics and latent mean differences between both groups calculated through factorial ratings of the scalar model (transformed in a scale with *M* = 0 and *SD* = 1 for an easier interpretation of the data). Mean differences (scalar model) were significant in all cases ($p < .001$). The biggest difference was observed in the SLA factor, in which children with ID scored on average 1.93 *SD* above the children without ID. On the other hand, the lowest difference was in the HLA factor, where children with ID scored 1.29 *SD* (on average) above their typically developing peers. The dispersion of scores also differed substantially between groups. Hence, children with ID had scores in a wide range for each latent variable, whereas children without ID had scores distributed in a much narrower range and with greater positive skewness. The only exception was found in the SLA factor, where the differences in variability were lower ($SD_{ID} = .64$; $SD_{NoID} = .48$).

<<Table 5>>

<<Table 6>>

Panels from A to G in Figure 1 show the box and whisker plots for each factor and group, so a general visual inspection of their distributional properties is possible. Looking at the HLA factor, it can be observed that the group of children with ID had a much higher mean and a much greater variability, with scores distributed in a range of almost 3 *SD* versus less than 1.5 *SD* found in the group of children without ID (vid. Figure 1, panel A). The distribution of children with ID tended to a negative skewness, unlike what was observed in typically developing children. The H-spread measures for both groups did not overlap, although there was overlap between the upper and lower quartile of both groups. There was not an excessive number of outliers. The other graphs revealed very similar distributional properties to the afore-mentioned ones, but not for the SLA factor, in which the variability of the scores was much more similar between groups (vid. Figure 1, panel D).

<<Figure 1>>

We also examined each latent factor regarding the different SIS-C's age cohorts in both groups (see Figure 2). All scores are standardised with a mean of 0 and a *SD* of 1, so intra and inter-group differences can be interpreted as a Cohen's *d* (Cohen, 1988). Thus, for example, the differences in the HLA factor (ID group) between children aged 7–8 and 15–16 years was .65 *SD* (.57 – (-.08)), corresponding to a moderate effect size. In children with ID, a slight increase in the latent means for each factor was observed in the age cohorts 5–6, 7–8, and 9–10 and then a continuous decrease for the latent means in the others age bands. This result is analogous to those found in other studies. Shogren et al. (2015) found a general decrease in the intensities of support needs of children with ID for each age cohort. Verdugo, Arias, et al. (2016) and Giné et al. (2017) found different results but a similar trend: The differences in the intensities of support needs tended to be concentrated in the means of younger (5–10 years) and older children (11–16 years) with ID, with the latter showing a decrease in such intensity. On the other hand, for the typically developing children, there was a slight general decreasing trend in the latent means for all the factors across the six age cohorts (this trend was stronger for HLA, CNA and SPA).

<<Figure 2>>

The relationship between the latent scores in the support needs factors and age for both groups was also studied using a multiple indicator multiple causes (MIMIC) model derived from the scalar model. As Table 7 shows, all the seven latent factors had insignificant (and low) relationships with age in both groups.

<<Table 7>>

Discussions

The purposes of this work were to add evidence on the generalisability of the support needs construct in children with and without ID and to conduct cross-group comparisons regarding their support needs. To address this, children with and without ID were assessed using the SIS-C Spanish version (adapted from the original SIS-C by Thompson et al., 2016), and their scores were compared. With this, we aimed at investigating a current applied research challenge like discerning how extraordinary and non-extraordinary support needs differ in children with ID (Thompson & Viriyangkura, 2013). Studying this is necessary to advance the understanding of the support needs construct in children with ID, its measurement and, by extension, the implementation of supports.

In a first step, this work has addressed whether the support needs construct can be generalisable to children with and without ID. This is the central assumption of the supports paradigm on which the understanding of ID is based and that gives meaning to a study of the differences between extraordinary and non-extraordinary support needs (which has not yet been addressed by research). In addition, the construct's generalisability is a methodological requisite to conduct unbiased cross-group scores comparisons regarding a construct of interest (Milfont & Fischer, 2010; Wu et al., 2007). The establishment of the factor models, necessary to address the first research question, revealed the possibility to recover in both groups (children with ID and children without ID) the same structure of seven correlated factors influenced by the rating methods that need to be modelled. The best fit of the CTCM models found in this work replicates the results found in previous studies involving the SIS-C (Seo et al., 2016; Verdugo et al., 2017). The subsequent invariance analysis provided empirical evidence on the generalisability of the support needs construct for children with and without ID, as the supports paradigm assumes (Schalock et al., 2010). Conceptually, this result suggests that the support needs construct is generalisable to children with and without ID and that there are no purely qualitative differences in the way they show their support needs. Hence, children with and without ID belong to (and can be assessed by) the same support needs continuum. The achievement of the scalar invariance also made it possible to conduct meaningful comparisons (without bias) between children with and without ID. This result supposes an important applied finding. As such, the group of typically developing children can be regarded as a reference group to continue to grow the body of knowledge about the support needs construct in children with ID (e.g., to compare support needs between children with and without ID) and in its measurement (e.g., future analyses involving the SIS-C, such as common items calibration or developing general norms). Nevertheless, the lack of fit of the structural invariance suggested substantial differences in support needs between children with ID and their typically developing peers, something expected according to the supports paradigm because it is the main difference between them (e.g. Thompson et al., 2009).

Once assured that it was possible to conduct meaningful comparisons between children with and without ID using the SIS-C, analyses on the structural differences between children with and without ID were conducted to shed light on the distinction between extraordinary and non-extraordinary support needs in children. Generally, the results provided evidence that children with ID had significantly more intense support needs than their typically developing peers in all the measured factors (i.e., correlations and means) and that there was an imbrication in the support needs between the two groups (i.e., groups overlap). Regarding distributional properties, children without ID had positive skewness and were distributed in a narrow range for each latent variable, whereas children with ID showed negative skewness in a much wider range for all the latent factors. This could be explained by the tool used, since the SIS-C was developed to assess extraordinary support needs in children with ID (Thompson et al., 2016). In fact, the SIS-C administration directions for interviewing informants of children with ID ask them to report on extraordinary support needs (i.e., support needs that extend beyond what most typically functioning children would need to engage successfully in an activity), providing a wider range of scores (e.g., the almost 3 *SD* range for the HLA domain). On the other hand, the tool does not call for identifying support needs that are less intense than the support needed by typically developing children. In addition, this study was interested in comparing the support needs of students with and without ID, and hence, no information was gathered on the support needs that would be less intense than those required by typically developing children. This aspect is the key to understand this finding, because if the administration of the SIS-C allowed for ratings that reflected support needs that were less intense than what typically developing children required, then there would likely be a wider range of scores among typically developing children.

On the other hand, distributional properties revealed the overlap between the upper quartile of the support needs scores in children without ID and the lower quartile in children with ID, which has relevant implications.

This reinforces the idea of support needs as a continuum and provides evidence of the imbrication that the support needs construct has in children with and without ID (i.e., boundaries between extraordinary and non-extraordinary support needs are diffuse). This finding indicates that intense support needs are not exclusive from the ID, like significant limitations in adaptive behaviour and intellectual functioning are (Schalock et al., 2010). However, this finding should be considered together with the finding related to the generalisability of the support needs construct in children with and without ID. As such, the invariance of the measure of support needs across the groups (i.e., children with and without ID belong to the same continuum where they do not exhibit purely qualitative differences, although they do so in terms of intensity) makes it possible to conduct meaningful comparisons between the groups for theoretical or applied purposes (e.g., classification or diagnosis). Therefore, this work justifies methodologically the possibility to establish cut-off points at which a non-extraordinary support need turns extraordinary. Hence, these findings could start the field of ID towards establishing diagnostic criteria that are based on documentation of extraordinary support needs versus documentation of severity of deficits, something which has already been highlighted as possible by others (Thompson & Viriyangkura, 2013).

The high correlations found between factors in children with ID is consistent with other studies (e.g., Shogren et al., 2017) and indicates that the SIS-C domains measure interrelated but different aspects of support needs. However, the fact that all correlations were higher in children with ID proposes an important finding. It could be hypothesised that the significant limitations in adaptive behaviour in children with ID could underlie the observed differences. Such limitations may have influenced the way in which children with ID interact with the environmental demands of the different contexts assessed through SIS-C. Although adaptive behaviour should not be understood as opposite to support needs (because support needs include other relevant variables like the experience of the person or the environmental demands), there are works that show a significant, moderate and negative correlation between adaptive behaviour and support needs in persons with ID (see, e.g., Simões, Santos, Biscaia, & Thompson, 2016). Such a hypothesis is also supported by the results found regarding the latent means in each factor across the age cohorts for both groups. The MIMIC model revealed that there was no significant relationship between age and the support needs for each latent factor in both groups. However, this finding is possibly due to the non-linear relationship between age and support needs in children with ID (it is a positive relationship between 5 and 10 years and a negative one between 11 and 16 years), while the relationship was linear, negative and weak in children without ID. The linear decrease found in the support needs latent scores (especially in HLA, CNA and SPA) in students without ID, but not in the group of children with ID, could be mirroring the acquisition of social, practical and conceptual skills in the repertoire of adaptive behaviour among typically developing children, since adaptive behaviour gets more complex with age (Tassé et al., 2012). This, in turn, would generate a higher personal competence in children without ID to face environmental demands.

The latent means differences analyses showed that children with ID had significantly more support needs than their typically developing peers in all the latent factors. Although this result was predictable (Schalock et al., 2010; Thompson et al., 2009), it may serve to advance support needs assessment and planning in children with ID, especially in places where the supports paradigm has not been adopted into educational reform. This is the case in Spain, where the support needs assessment and planning for children usually neglects support needs areas beyond the curriculum or, in any case, practices assume a restricted view of curriculum as academic skills (Verdugo et al., 2018). Hence, this result is important to inform administrators and other professionals to provide not only resources linked to the academic curriculum, but to develop holistic individualised educational plans because children with ID have significantly more support needs than their typically developing peers in multiple areas beyond the traditional ones (i.e., cognition, literacy or numeracy). Implementing such plans is expected to enhance inclusive opportunities and personal desired outcomes in students with ID (Walker, DeSpain, Thompson, & Hughes, 2014).

This work has strengths derived from its novelty and findings. First, to the best of our knowledge, this is the first work that has yielded empirical evidence on a central assumption of the supports paradigm: If what differentiates people with and without ID are their support needs, then, support needs are generalisable to people (children in this case) with and without ID (Thompson et al., 2009). This work supports data with this assumption and generates initial evidence for further discussion on this issue. On the other hand, this work has addressed an applied research and practical challenge by shedding light on how extraordinary and non-extraordinary support needs differ in children with ID (Thompson & Viriyangkura, 2013).

This work is not without limitations. First, the sampling method was not a probabilistic one, which may influence the representativeness of the participants and the generalisability of the results. To overcome this limitation, we included many participants from most autonomous communities of the country. The sampling method can explain the disparity between the number of children with (n = 814) and without (n = 222) ID. Since schools and organisations were free to participate in the study and to decide to which participants we would have access, perhaps they provided more informants reporting on the support needs of children with ID because they considered that the study was mainly focused on improving the opportunities of such students (and conversely, perhaps they found the study less important for typically developing children). To overcome this aspect, we controlled for the possible effects of this disparity in the estimation of the models, and we found results similar to those found considering all the participants, suggesting that the disparity had no effect. Second, we did not assess adaptive behaviour as a criterion to consider children as typically developing. Children were included in this group if they did not have “specific needs for educational support”. Analogously, in the case of children with ID, the information regarding intellectual functioning was based on educational records, and adaptive behaviour was not assessed either. This means that the possible role that adaptive behaviour has in explaining the differences found in the support needs scores between groups could not be empirically verified, and further research is necessary. On the other hand, we are aware of the importance of age regarding support needs assessment in children with ID, in the sense that older children have less intensity of support needs and *vice versa* (Shogren et al., 2015; Verdugo, Arias et al., 2016). Indeed, Thompson and Viriyangkura (2013) suggest the need for comparing the support needs of children with ID with the support needs of their same-age typically developing peers as the best way to determine how extraordinary and non-extraordinary support needs differ in children. However, the number of participants without ID did not allow for such comparison because it was not possible to include the SIS-C age cohorts as a further stratification of groups in the invariance analysis.

These limitations serve as starting points for future research. First, the possible role that adaptive behaviour has in the observed differences should be investigated by collecting information on participants’ adaptive behaviour scores in standardised measures and then testing for the influence of adaptive behaviour in the support needs in both groups. Parallel, the existing gap related to age must be covered. In this sense, collecting information on the support needs of more typically developing students in each age band is required to produce enough participants to include this variable in the invariance analysis. This is a prerequisite to explore the latent differences between students with ID and their same-age typically developing peers. By doing so, we will have a more comprehensive understanding of how extraordinary and non-extraordinary support needs differ. This is a pressing line of research to keep advancing in the understanding of the support needs construct in children with ID (e.g., to explore if the overlap persists in older children). Finally, given the socio-ecological perspective in which the supports paradigm is embedded, further works should investigate if the support needs construct is also generalisable to other children at risk of social exclusion (e.g., children with mental health concerns or children pertaining to disadvantaged minority groups). Bringing them the supports paradigm and its applications to assessment and planning is an important way to improve their inclusive opportunities.

In conclusion, this study shows that the support needs construct is generalisable to children with and without ID (i.e., children with and without ID can be assessed in the same support needs continuum using the SIS-C, support needs do not differ qualitatively in children with and without ID, and it is possible to conduct an unbiased comparison between these groups). Although the support needs of typically developing children and children with ID are imbricated, there are significant differences in support needs regarding variances, correlations and means. These findings provide initial evidence on how extraordinary and non-extraordinary support needs differ in children and pave the road for a better distinction between extraordinary and non-extraordinary support needs in children with ID. However, efforts like those indicated above are still required to keep advancing the understanding of the support needs construct in children with ID, its assessment and, by extension, the implementation of the supports paradigm.

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Conflict of interests

There is no conflict of interest

References

Chen, F. F. (2007). Sensitivity of goodness of fit indexes to lack of measurement invariance. *Structural Equation Modeling: A Multidisciplinary Journal, 14*, 464-504. doi: https://doi.org/10.1080/10705510701301834

Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling, 9*, 233-255.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). New York, NY: Routledge Academic.

Giné, C., Adam, A. L., Font, J., Salvador-Bertran, F., Baqués, N., Oliveira, C., … Thompson, J. R. (2017). Examining measurement invariance and differences in age cohorts on the Supports Intensity Scale-Children's Version-Catalan Translation. *American Journal on Intellectual and Developmental Disabilities, 122*(6), 511-524. doi: 10.1352/1944-7558-122.6.511.

Guillén, V. M., Verdugo, M. A., Arias, B., & Vicente, E. (2015). Development of a support needs assessment scale for children and adolescents with intellectual disabilities. *Anales de Psicología, 31*, 137-144. doi: http://dx.doi.org/10.6018/analesps.31.1.166491

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation*

Modeling: A Multidisciplinary Journal, 6, 1-55. doi: 10.1080/10705519909540118

Jöreskog, K. G. (1971). Statistical analysis of sets of congeneric tests. *Psychometrika, 36*, 109-133.

Kuppens, S., Bossaert, G., Buntinx, W., Molleman, C., van den Abbeele, A., & Maes, B. (2010). Factorial Validity of the Supports Intensity Scale (SIS). *American Journal on Intellectual and Developmental Disabilities, 115*(4), 327-339. doi: 10.1352/1944-7558-115.4.327

Marsh, H. W., & Hocevar, D. (1988). A new, more powerful approach to multitrait-multimethod analyses: Application of second-order confirmatory factor analysis. *Journal of Applied Psychology, 73,* 107-117. doi: 10.1037/0021-9010.73.1.107

Marsh, H. W., Ludtke, O., Muthén, B., Asparouhov, T., Morin, A. J., Trautwein, U., & Naengast, B. (2010). A new look at the big five factor structure through exploratory structural equation modeling. *Psychological Assessment, 22,* 471-491. doi: 10.1037/a0019227

Meredith, W. (1993). Measurement invariance, factor analysis and factorial invariance. *Psychometrika, 58*, 525-543.

Milfont, T. L., & Fischer, R. (2010). Testing measurement invariance across groups: Applications in cross-cultural research. *International Journal of Psychological Research, 3*, 111-121.

Morin, A. J., Arens, A. K., & Marsh, H. W. (2016). A bifactor exploratory structural equation modeling framework for the identification of distinct sources of construct-relevant psychometric multidimensionality. *Structural Equation Modeling, 23,* 116-139. doi: 10.1080/1070551.2014.961800

Muthén, L. K., & Muthén, B. (2015). *Mplus. The comprehensive modelling program for applied researchers: User's guide, 5.*

Schalock, R. L. (2018). Six ideas that are changing the Intellectual and Developmental Disabilities field internationally. *Siglo Cero, 49*, 21-33. doi: http://dx.doi.org/10.14201/scero20184912133

Schalock, R. L., Borthwick-Duffy, S., Bradley, V., Buntinx, W. H. E., Coulter, D. L., Craig, E. P. M., … Yeager, M. H. (2010). *Intellectual disability: Definition, classification, and systems of support* (11th ed.). Washington, D.C.: American Association on Intellectual and Developmental Disabilities.

Schalock, R. L., Thompson, J. R., & Tassé, M. J. (2018). *Changes in the field regarding Personal Support Plans* [White Paper]. Retrieved December 11, 2018 from AAIDD: https://aaidd.org/docs/default-source/sis-docs/changes-in-the-field.pdf?sfvrsn=cd8b3021_0

Seo, H., Shogren, K. A., Little, T. D., Thompson, J. R., & Wehmeyer, M. L. (2016). Construct validation of the Supports Intensity Scale-Children and Adult Versions: An application of a pseudo multitrait-multimethod approach. *American Journal on Intellectual and Developmental Disabilities, 121,* 550-563. doi: 10.1352/1944-7558-121.6.550

Shogren, K. A., Seo, H., Wehmeyer, M. L., Palmer, S. B., Thompson, J. R., Hughes, C., & Little, T. D. (2015). Support needs of children with intellectual and developmental disabilities: Age-related implications for assessment. *Psychology in the Schools, 52*, 874-891. doi: 10.1002/pits.21863.

Shogren, K. A., Wehmeyer, M. L., Seo, H., Thompson, J. R., Schalock, R. L., Hughes, C., … Palmer, S. B. (2017). Examining the reliability and validity of the Supports Intensity Scale-Children's version in children with autism and intellectual disability. *Focus on Autism and Other Developmental Disabilities, 32*, 293-304. doi: https://doi.org/10.1177/1088357615625060

Simões, C., Santos, S., Biscaia, R., & Thompson, J. R. (2016). Understanding the relationship between quality of life, adaptive behavior and support needs. *Journal of Developmental and Physical Disabilities, 28*, 849-870. doi: https://doi.org/10.1007/s10882-016-9514-0

Tassé, M., Schalock, R. L., Balboni, G., Bersani, H., Borthwick-Duffy, S., Sprat, S. … Zhang, D. (2012). The construct of adaptive behavior: Its conceptualization, measurement, and use in the field of Intellectual Disability. *American Journal on Intellectual and Developmental Disabilities, 117*, 291-303. doi: 10.1352/1944-7558-117.4.291.

Thompson, J. R., Bradley, V., Buntinx, W. H. E., Schalock, R. L., Shogren, K. A., Snell, M. E., … Yeager, M. H. (2009). Conceptualizing supports and the support needs of people with intellectual disability. *Intellectual and Developmental Disabilities, 47*, 135-146.

Thompson, J. R., Bryant, B. R., Campbell, E. M., Craig, E. P. M., Hughes, C. M., Rotholz, D. A., … Wehmeyer, M. L. (2004). *Supports Intensity Scale.* Washington, D.C.: American Association on Intellectual and Developmental Disabilities.

Thompson, J. R., Bryant, B. R., Schalock, R. L., Shogren, K. A., Tassé, M. J., Wehmeyer, M. L., … Silverman, W. P. (2015). *Supports Intensity Scale-Adult*

(SIS-A). Washington, D.C.: American Association on Intellectual and Developmental Disabilities.

Thompson, J. R., Schalock, R. L., & Tassé, M. J. (2018a). *How support needs can be used to inform the allocation of resources and funding decisions* [White paper]. Retrieved December 11, 2018 from AAIDD: https://aaidd.org/docs/default-source/sis-docs/supportneeds.pdf?sfvrsn=a88b3021_0

Thompson, J. R., Schalock, R. L., & Tassé, M. J. (2018b). *Evidence for the reliability and validity of the Supports Intensity Scales* [White paper]. Retrieved December 11, 2018 from AAIDD: https://aaidd.org/docs/default-source/sis-docs/evidence-for-the-reliabilityandvalidity-of-the-sis.pdf?sfvrsn=7ed3021_0

Thompson, J. R., & Viriyangkura, Y. (2013). Supports and Support Needs. In M. L. Wehmeyer (Ed.), *The Oxford Handbook of Positive Psychology and Disability* (pp. 317-337). New York: Oxford University Press.

Thompson, J. R., Wehmeyer, M. L., Hughes, C., Shogren, K. A., Seo, H., Little, T. D., … Tassé, M. J. (2016). *Supports Intensity Scale-Children's version. User's Manual.* Washington, D.C.: American Association on Intellectual and Developmental Disabilities.

Verdugo, M. A., Amor, A. M., Fernández, M., Navas, P., & Calvo, M. I. (2018). La regulación de la inclusión educativa del alumnado con discapacidad intelectual: una reforma pendiente [The regulation of inclusive education of students with intellectual disability: A pending reform]. *Siglo Cero, 49*, 27-58. doi: http://dx.doi.org/10.14201/scero20184922758

Verdugo, M. A., Arias, B., Guillén, V. M., Seo, H., Shaw, L. A., Shogren, K. A., & Thompson, J. R. (2016). Examining age-related differences in support needs on the Supports Intensity Scale-Children's Version-Spanish Translation. *International Journal of Clinical and Health Psychology, 16*, 306-314. doi: 10.1016/j.ijchp.2016.06.002

Verdugo, M. A., Arias, B., & Ibáñez, A. (2007). *Escala de Intensidad de Apoyos* [Supports Intensity Scale]. Madrid: TEA

Verdugo, M. A., Arias, V. B., & Guillén, V. M. (2017). Are type, frequency, and daily time equally valid estimators of support needs in children with intellectual disability? A multitrait-multimethod analysis of the Supports Intensity Scale for Children (SIS-C). *Assessment*. Advance online publication. https://doi.org/10.1177/1073191117732411

Verdugo, M. A., Guillén, V. M., Arias, B., Vicente, E., & Badia, M. (2016). Confirmatory factor analysis of the Supports Intensity Scale for children. *Research in Developmental Disabilities, 49-50*, 140-152. http://dx.doi.org/10.1016/j.ridd.2015.11.022

Walker, V. L., DeSpain, S. N., Thompson, J. R., & Hughes, C. (2014). Assessment and planning in K-12 schools: A Social-Ecological approach. *Inclusion, 2*, 125-139. doi: 10.1352/2326-6988-2.2.125

Widaman, K. F. (1985). Hierarchically nested covariance structure models for multitrait-multimethod data. *Applied Psychological Measruement*, *9,* 1-26.

Wu, A. D., Li, Z., & Zumbo, B. D. (2007). Decoding the meaning of factorial invariance and updating the practice of multi-group confirmatory factor analysis: A demonstration with TIMSS data. *Practical Assessment Research & Evaluation, 12*(3), 1-26.

Table 1

Participants' characteristics (*N* = 1036)

Variables	**ID (*n* = 814)**		**NoID (*n* = 222)**	
	N	**%**	***N***	**%**
Gender				
Male	528	64.86	103	46.40
Female	286	35.14	108	48.65
Missing data	0	0	11	4.95
Age cohorts (y. o.)				
5-6	110	13.51	37	16.67
7-8	108	13.27	35	15.77
9-10	100	12.28	35	15.77
11-12	148	18.18	37	16.67
13-14	195	23.96	43	19.35
15-16	153	18.80	35	15.77
Intellectual functioning (IQ level)*				
No ID	N/A	N/A	222	100
Mild ID	206	25.31	N/A	N/A
Moderate ID	290	35.63	N/A	N/A
Severe ID	195	23.96	N/A	N/A
Profound ID	65	7.98	N/A	N/A
Missing data	58	7.12	0	0

Schooling				
Inclusive settings	179	21.99	222	100
Special schools	493	60.56	N/A	N/A
Special classrooms in regular schools	55	6.76	N/A	N/A
Other	87	10.69	N/A	N/A
Home residence				
Family home	777	95.45	222	100
Foster family home	9	1.11	N/A	N/A
Small group home (<7)	7	0.86	N/A	N/A
Midsize group home (7-15)	9	1.11	N/A	N/A
Large residential facility (>15)	3	0.36	N/A	N/A
Missing data	9	1.11	0	0
Informant				
Professional	784	96.31	212	95.49
Relative	30	3.61	10	4.51
Etiology (only ID)				
Non-specific	317	38.94	N/A	N/A
Down's Syndrome	111	13.64	N/A	N/A
Autism Spectrum Disorder	248	30.47	N/A	N/A
Cerebral Palsy	101	12.41	N/A	N/A
Rare Diseases	35	4.30	N/A	N/A
Co-occurrence	5	0.24	N/A	N/A

Note. Intellectual functioning based on educational records, not actual scores on IQ tests

Table 2

CFA models results for each group and all participants

Group	Model	X^2 *(df)*	*RMSEA (C.I.)*	*CFI*	*TLI*	*AIC*	*BIC*	Par.
ID	Unidimensional	7712 (189)	.222 (.21-.22)	0.662	0.624	105399	105695	63
	7-correlated factors	6264 (168)	.212 (.20-.21)	0.726	0.657	103307	103431	84
	CTCM	520 (144)	.057 (.05-.06)	0.983	0.975	96028	96535	108
NoID	Unidimensional	1909 (189)	.203 (.19-.21)	0.545	0.494	24990	25205	63
	7-correlated factors	1146 (168)	.162 (.15-.17)	0.741	0.676	23510	23796	84
	CTCM	226 (144)	.051 (.04-.06)	0.978	0.968	22115	22482	108
Full sample	Unidimensional	9382 (189)	.217 (.21-.22)	0.705	0.672	133759	134070	63
	7-correlated factors	7623 (168)	.207 (.20-.21)	0.761	0.701	130534	130949	84
	CTCM	633 (144)	.057 (.05-.06)	0.984	0.977	121279	121813	108

Note. ID = Intellectual Disability; CTCM = Correlated Traits-Correlated Methods; χ^2 = Chi-square; df = degrees of freedom; RMSEA = Root Mean Square Error of Approximation; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion

Table 3

Fit indexes for the nested sequence in the multi-group CFA

Model	X^2 *(df)*	*RMSEA (C. I.)*	*CFI*	*TLI*	*AIC*	*BIC*	*Par.*	**Constraint tenable**
Configural	739 (288)	.055 (.05-.06)	0.981	0.972	118143	119210	216	-
Metric	870 (320)	.058 (.05-.06)	0.977	0.969	118302	119211	184	Yes
Scalar	919 (331)	.059 (.05-.06)	0.975	0.968	118333	119188	173	Yes
Var./Covar.	1197 (359)	.067 (.06-.07)	0.965	0.958	118679	119396	145	No
Latent means	2147 (369)	.097 (.09-.10)	0.925	0.914	119781	120448	135	No

Note. χ^2 = Chi-square; df = degrees of freedom; RMSEA = Root Mean Square Error of Approximation; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion; Var./Covar. = Variances and Covariances

Table 4

Factorial loadings for the scalar invariance model

	Loadings		Explained Variance		
Parcel	**Trait**	**Method**	**Trait**	**Method**	**Residual**
HLA type	.82	.33	.68	.11	.22
HLA frequency	.94	.28	.88	.08	.04
HLA time	.92	.27	.85	.08	.08
CNA type	.88	.37	.77	.14	.09
CNA frequency	.91	.38	.82	.14	.04
CNA time	.86	.33	.75	.11	.15
SPA type	.83	.48	.70	.23	.08
SPA frequency	.91	.30	.83	.09	.08
SPA time	.90	.35	.81	.12	.06
SLA type	.82	.43	.68	.18	.14
SLA frequency	.94	.19	.89	.04	.07
SLA time	.89	.31	.80	.09	.11
HSA type	.86	.42	.73	.18	.09
HSA frequency	.94	.14 (ns)	.89	.02	.09
HSA time	.81	.44	.66	.20	.14
SA type	.82	.50	.67	.25	.08
SA frequency	.98	.03 (ns)	.97	.00	.03
SA time	.86	.44	.73	.19	.08
AA type	.84	.48	.70	.23	.07
AA frequency	.99	.04 (ns)	.98	.00	.02
AA time	.86	.44	.74	.20	.07
ETV total			.79	.13	.08

Note. HLA = Home Life; CNA = Community and Neighborhood; SPA = School Participation; SLA = School Learning; HSA = Health and Safety; SA = Social

Activities; AA = Advocacy; ETV = Proportion of Explained Total Variance in the full model

Table 5

Correlations between SIS-C factors in the ID and NoID groups

ID(NoID)	HLA	CNA	SPA	SLA	HSA	SA	AA
HLA							
CNA	.86(.76)						
SPA	.90(.81)	.92(.78)					
SLA	.75(.68)	.83(.61)	.87(.76)				
HSA	.81(.50)	.89(.66)	.88(.58)	.87(.62)			
SA	.80(.65)	.87(.67)	.89(.70)	.83(.74)	.89(.80)		
AA	.76(.54)	.87(.57)	.86(.61)	.88(.76)	.92(.76)	.91(.81)	

Note. ID = Intellectual Disability; HLA = Home Life; CNA = Community and Neighborhood; SPA = School Participation; SLA = School Learning; HSA = Health and Safety; SA = Social Activities; AA = Advocacy. Correlations in parentheses correspond to children without ID

Table 6

Descriptive statistics and latent mean differences between ID and NoID groups

Factor	ID Group					NoID Group						
	Mean	*Median*	*SD*	*Var.*	*Skewness*	*Mean*	*Median*	*SD*	*Var.*	*Skewness*	*MD*	*p*
HLA	.28	.30	.93	.87	-.14	-1.01	-1.10	.41	.17	1.56	1.29	.000
CNA	.32	.54	.85	.72	-.68	-1.18	-1.27	.50	.25	.78	1.50	.000
SPA	.35	.47	.82	.67	-.54	-1.28	-1.38	.35	.12	1.48	1.63	.000
SLA	.41	.65	.64	.41	-1.10	-1.51	-1.64	.48	.23	1.32	1.93	.000
HSA	.35	.62	.80	.64	-.83	-1.27	-1.40	.50	.25	1.14	1.62	.000
SA	.35	.56	.81	.65	-.67	-1.29	-1.43	.39	.15	1.58	1.64	.000
AA	.37	.63	.77	.59	-.83	-1.34	-1.51	.46	.21	1.34	1.71	.000

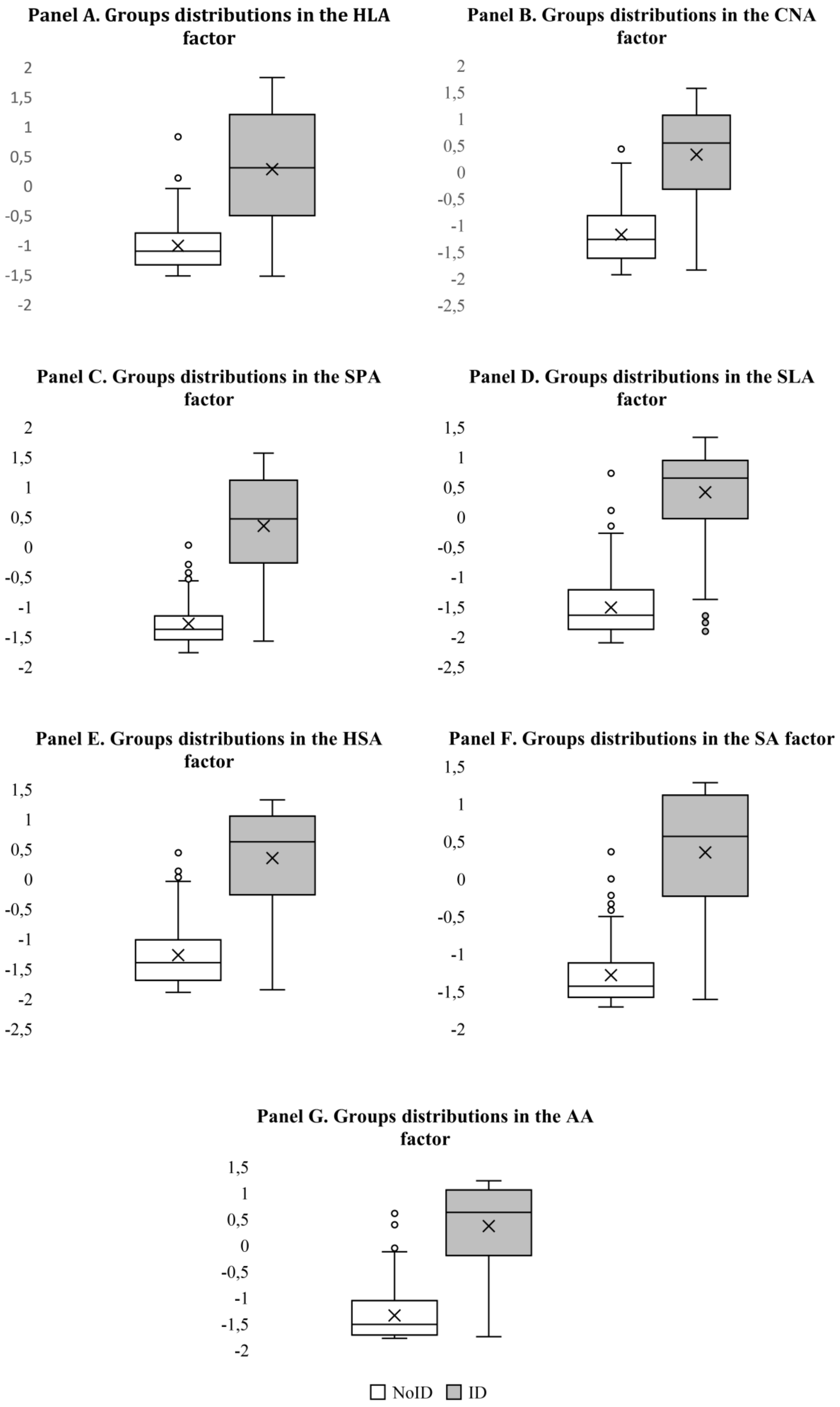
Note. ID = Intellectual Disability; SD = Standard Deviation; MD = Mean Differences; p = probability; HLA = Home Life; CNA = Community and Neighborhood; SPA = School Participation; SLA = School Learning; HSA = Health and Safety; SA = Social Activities; AA = Advocacy

Table 7

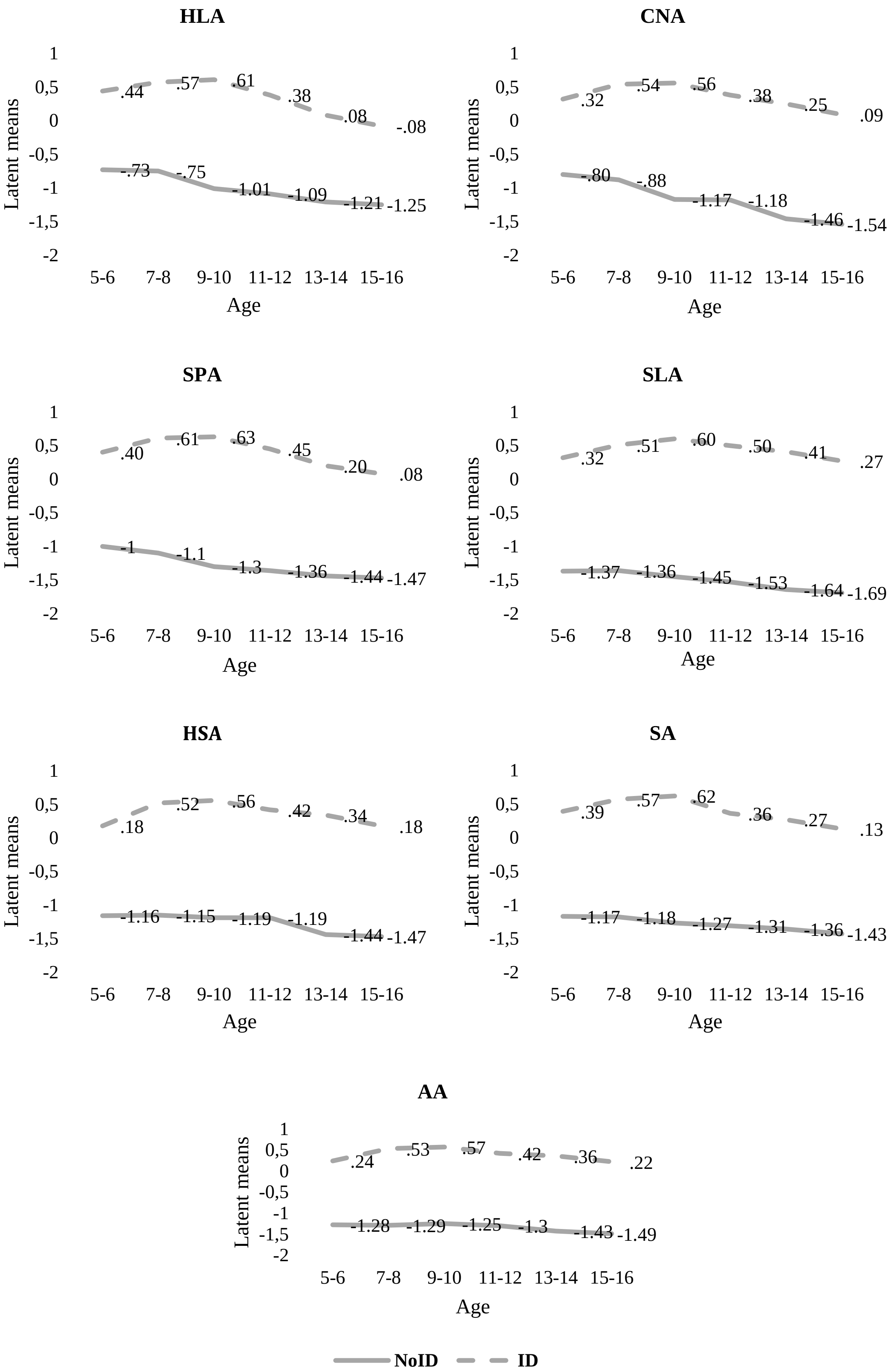
Relationships between support needs' latent scores and age for both groups

Factor	**NoID**		**ID**	
	β	***Prob.***	***β***	***Prob.***
HLA	-.32	.000	-.132	.000
CNA	-.356	.000	-.063	.000
SPA	-.312	.000	-.103	.000
SLA	-.178	.000	-.022	.383
HSA	-.162	.000	-.014	.56
SA	-.155	.000	-.086	.000
AA	-.123	.000	-.022	.335

Note. ID = Intellectual Disability; HLA = Home Life; CNA = Community and Neighborhood; SPA = School Participation; SLA = School Learning; HSA = Health and Safety; SA = Social Activities; AA = Advocacy. β is partially standardised



Panel A. Groups distributions in the HLA factor
2
1,5
1
0,5
0
-0,5
-1
-1,5
-2
Panel B. Groups distributions in the CNA factor
2
1,5
1
0,5
0
-0,5
-1
-1,5
-2
-2,5
Panel C. Groups distributions in the SPA factor
2
1,5
1
0,5
0
-0,5
-1
-1,5
-2
Panel D. Groups distributions in the SLA factor
1,5
1
0,5
0
-0,5
-1
-1,5
-2
-2,5
Panel E. Groups distributions in the HSA factor
1,5
1
0,5
0
-0,5
-1
-1,5
-2
-2,5
Panel F. Groups distributions in the SA factor
1,5
1
0,5
0
-0,5
-1
-1,5
-2
Panel G. Groups distributions in the AA factor
1,5
1
0,5
0
-0,5
-1
-1,5
-2
NoID
ID


HLA
1
0,5
0
-0,5
-1
-1,5
-2
Latent means
.44 .57 .61 .38 .08 -.08
-.73 -.75 -1.01 -1.09 -1.21 -1.25
5-6 7-8 9-10 11-12 13-14 15-16
Age
CNA
1
0,5
0
-0,5
-1
-1,5
-2
Latent means
.32 .54 .56 .38 .25 .09
-.80 -.88 -1.17 -1.18 -1.46 -1.54
5-6 7-8 9-10 11-12 13-14 15-16
Age
SPA
1
0,5
0
-0,5
-1
-1,5
-2
Latent means
.40 .61 .63 .45 .20 .08
-1 -1.1 -1.3 -1.36 -1.44 -1.47
5-6 7-8 9-10 11-12 13-14 15-16
Age
SLA
1
0,5
0
-0,5
-1
-1,5
-2
Latent means
.32 .51 .60 .50 .41 .27
-1.37 -1.36 -1.45 -1.53 -1.64 -1.69
5-6 7-8 9-10 11-12 13-14 15-16
Age
HSA
1
0,5
0
-0,5
-1
-1,5
-2
Latent means
.18 .52 .56 .42 .34 .18
-1.16 -1.15 -1.19 -1.19 -1.44 -1.47
5-6 7-8 9-10 11-12 13-14 15-16
Age
SA
1
0,5
0
-0,5
-1
-1,5
-2
Latent means
.39 .57 .62 .36 .27 .13
-1.17 -1.18 -1.27 -1.31 -1.36 -1.43
5-6 7-8 9-10 11-12 13-14 15-16
Age
AA
1
0,5
0
-0,5
-1
-1,5
-2
Latent means
.24 .53 .57 .42 .36 .22
-1.28 -1.29 -1.25 -1.3 -1.43 -1.49
5-6 7-8 9-10 11-12 13-14 15-16
Age
NoID
ID