Assessing support needs in children with intellectual disability and motor impairments: Measurement invariance and group differences

Abstract

Background. This study assessed the equivalence of the measurement of support needs between children with intellectual disability (ID) and children with intellectual and motor disabilities (IMD), and compared both groups in the different domains of support.

Method. The Supports Intensity Scale-Children's Version (SIS-C) was used to assess the support needs of 713 children with ID, and 286 children with IMD, mainly associated with cerebral palsy.

Results. The results supported measurement invariance between the group of ID and IMD, which allowed to conduct comparison between them. Children with IMD scored higher on support needs than children without IMD, suggesting that children with IMD needed more support than their peers without motor impairments. Furthermore, the ID levels interacted with motor impairments: at highest levels of ID, groups tended to be similar in support needs, with high scores and low variability. The greatest differences were found in the domains of Home and Community activities.

Conclusions. This study points to the across-condition of the construct of support needs in populations with intellectual and developmental disabilities. However, additional mobility impairments should be considered during the evaluation and planning of systems of support. In this regard, the SIS-C might have limitations when discriminating between samples with high support needs.

Keywords: support needs, intellectual disability, motor impairments, cerebral palsy, children, SIS

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According to the contemporary models of human functioning (Schalock *et al.* 2010; World Health Organization 2001), individuals' health conditions are recognized to be the result of a dynamic interaction between people's characteristics and the contexts in which they live. Support can moderate this relationship. In turn, it is assumed that the systematic and reasoned provision of support will improve the functioning of the individuals in their environment (Luckasson *et al.* 1992, 2002). Therefore, the evaluation and planning of required support become fundamental in intervention models within the field of intellectual and developmental disabilities (IDD).

Although every individual requires some support, the profile might vary, given that not all have the same characteristics, goals, abilities, or accessibility to the environment. The intensity and the profile of support needed to participate in meaningful daily activities have been conceptualised as the psychological construct 'support needs' (Thompson *et al.* 2009). The support needs may differ across areas and activities of daily life, and in accordance with the type of limitations faced by individuals with IDD (Arnkelsson and Sigurdsson, 2016; Ferreira do Amaral *et al.* 2014).

The presence of motor impairments could affect an individual's functioning in a particular way. Major motor disabilities are often associated with severe impairments (Heineman *et al.* 2018). In addition, individuals with severe intellectual and motor disabilities experience more health and behaviour problems and comorbidities, greater restrictions on participation in significant activities, and less social support (Ferreira do Amaral *et al.* 2014; Ncube *et al.* 2018; van Timmeren *et al.* 2017). In these cases, the assessment and provision of support that the children need becomes a complex process.

Individuals with cognitive and motor impairments might need specific support to promote functioning and participation, in order to overcome mobility limitations and achieve safety (Schalock *et al.* 2010). In adults, more severe levels of disability have been associated with higher levels of support needs (Seo *et al.* 2017; Shogren, Wehmeyer, *et al.* 2017). In children, higher degrees of cognitive impairments have been related to major disabilities in motor functioning (van Timmeren *et al.* 2017; Yin Foo *et al.* 2013). However, previous studies have not assessed how such limitations could impact the need for support for children with either mild or profound cognitive impairments.

Objectives of the present study

To analyse the impact of motor impairments on the support needs of children with IDD, two samples of children were selected: one with intellectual disability (ID; as the reference group) and one with intellectual and motor disabilities (IMD). For the IMD group, the principal diagnosis was cerebral palsy (CP), as it is one of the most frequent physical disabilities in childhood and has been associated with ID in half of the cases (Novak *et al*. 2012). Besides, all levels of ID are represented within the CP spectrum (Bertoncelli *et al.* 2019). The Supports Intensity Scale for children and adolescents (SIS-C; Thompson *et al.* 2016) was used to assess the support needs. The SIS-C has been widely used in the field of IDD (Thompson *et al.* 2018) to estimate the support that children or adolescents need to participate successfully in different areas of their daily lives (home, community, school participation, school learning, health, social, and advocacy activities).

Several studies support the validity of the SIS-C for assessing support needs in children with ID (Seo *et al*. 2016; Shogren, Wehmeyer, *et al*. 2017; Verdugo *et al.* 2017); however, this result has not been replicated in children with IMD. To provide evidence of validity, the first research question asked whether the measurement of support needs varies between groups. A measure is invariant between groups if the scores depend on the level in the trait or state, and not on the group of membership (Wu *et al*. 2007). Thus, two individuals with the same level in the measured trait or state should obtain the same score, regardless of which group they belong to. Demonstrating measurement invariance is necessary to conduct unbiased and valid comparisons between groups (DeShon 2004; Sass 2011). Therefore, the first objective of this study was to test the measurement invariance to corroborate that scores obtained from SIS-C can be interpreted in the same way in children with ID and IMD.

Once the suitability of SIS-C for measuring the support needs of children with IMD has been verified, the second objective would be to investigate the impact of IMD on support needs by comparing children with and without IMD in each SIS-C dimension. We expected children with motor and cognitive impairments to have greater support needs than children with ID alone, especially in areas related to mobility and participation in home and community settings (Heineman *et al*. 2018; Palisano *et al.* 2003; Wehmeyer *et al.* 2012). Moreover, ID levels were expected to have some effect on the comparisons (Thompson *et al*. 2009), with less significant differences in support needs among children with severe or profound ID (which is also evidence of criterion validity). For children with higher support needs, the implications of the research rely on the practical utility of the SIS-C to differentiate the extent of support needs. Classifying people with IDD according to their support needs, rather than on limitations, would contribute to the promotion of the most efficient support strategies and resource allocation for support delivery services.

Method

Participants

Participants were selected through a convenience sampling procedure, in which the voluntary collaboration of Spanish centres and entities specialised in disabilities was requested. The inclusion criteria were: (a) being a child or adolescent aged between 5 and 16 years; and (b) having been diagnosed with ID and/or IMD.

The sample was composed of 999 children and adolescents (age range = 5-16 years; M = 11; SD = 3.47) from 13 of the 17 Spanish regions. Of these participants, 63.06% were male, most lived with their parents (94.69%), and most attended special education schools (63.46%).

Of the total number of children assessed, 29% had a related motor disability, mainly CP. Levels of intellectual functioning were collected from the participants' medical records. The estimates of ID were described as mild (22.2%), moderate (32.4%), severe (26.9%), and profound (12.6%); or missing (5.9%). Another condition assessed was the presence of sensory disability, which was recorded in 5.1% of children with ID and 14.5% of children with IMD. The distribution of participants' demographic characteristics is shown on Table 1.

<Table 1>

Instrument

The scale used was the SIS-C (Thompson *et al.* 2016) adapted to Spanish (Verdugo *et al.* 2016; Verdugo *et al.* 2017). It aims to assess the extraordinary support that children or adolescents (aged 5 to 16 years) with ID need to participate successfully in different activities of their daily lives, in comparison to their peers without disabilities.

The SIS-C consists of two sections. The first refers to extraordinary needs for medical and behavioural support. Since this part of the assessment is not taken into account in the SIS-C sumscores, it will not be analysed in the present study. The second section refers to seven areas of the individuals' lives, namely: Home living (9 items); Community and neighbourhood (8 items); School participation (9 items); School learning (9 items); Health and safety (8 items); Social activities (9 items); and Advocacy (9 items). SIS-C response format is divided into three indices: type (scores from 0 = no support, up to 4 = total physical support); frequency (scores from 0 = never, up to 4 = always); and daily support time (scores from 0 = less than 30 minutes, up to 4 = more than 4 hours). The total score is obtained by adding up the responses for each item; thus, higher scores reflect greater intensity of support needs.

The SIS-C is commonly administered by a qualified professional previously trained to use the scale. Respondents are informants who know the children or adolescents well. In our study, 63% of the questionnaires were answered by teachers of primary or secondary education.

Procedure

This research was conducted in accordance with the principles of the Declaration of Helsinki (World Medical Association 2013) and approved by the Bioethics Committee of the University of Salamanca, Spain. Personal data were collected, stored and protected (LOPD 15/1999), ensuring the confidentiality and anonymity of the participants.

For the collection of data, the research team contacted schools, nursing homes, and early-care centres that worked with children with disabilities. Those interested in collaborating received detailed information about the project, and meetings were arranged to complete the scales. The informed consent was signed by the parents or guardians of each participating children at the beginning of the study. The members of the research team conducted most of the interviews, and in 20% of the cases, professionals from the organizations were also trained to be SIS-C interviewers. After the collaboration, reports with the profiles of the support needs of the children and adolescents assessed were returned whenever possible, together with a certificate of participation. This work was carried out over a four-year project.

Data Analysis

Missing data. The proportion of cases with missing data was 3.3% (data coverage of 99.6%) Consequently, pairwise deletion was used (Asparouhov and Muthén 2010).

Fit of base models and measurement invariance analysis. The measurement invariance of the SIS-C was assessed considering both item and parcels models. Regarding the item models, the complete factor model should include seven factors and 183 categorical indicators. Given the practical impossibility of fitting such a parametrised model (Morin *et al.* 2016), three models with 61 items each were estimated (Figure 1): Model 1A (for the items of support type), Model 1B (support frequency), and Model 1C (daily time of support). The models were estimated using weighted least squares with adjusted mean and variance (WLSMV), and the software Mplus version 7.0 (Muthén and Muthén, 2014). In Appendix A, we provide a sample of the Mplus syntax used to estimate the invariance models.

<Figure 1>

For the parcel model (Figure 1, Model 2), the items were grouped into parcels to analyse the complete SIS-C structure. We used parcels because of the technical difficulty of estimating a complete parameterized model (which would be defined by seven correlated dimensions, 183 loadings, and 732 thresholds), and to avoid the cumulative effects of small errors of specification (Morin *et al*. 2016). The Model 2 was estimated after verifying the correct functioning of each parcel, following the recommendations of Little *et al.* (2002). Each parcel was the sum of the responses to the items for each of the three measurement methods. This way, for example, the ‘Home’ dimension was measured by the sum of the responses to the items of type, frequency, and daily support time required for household activities (according to the SIS-C manual to obtain raw scores of support needs; Thompson *et al.* 2016).

The analysis of Model 2 was performed from a multitrait-multimethod (MTMM) approach, as used in Seo *et al.* (2016) and Verdugo *et al.* (2017), where seven dimensions of support needs and three method factors were specified. Each method factor was measured by the parcels referring to the method used (e.g., the method factor ‘frequency’ was measured by the parcels composed of frequency items, regardless of their substantive dimension). This model was estimated through robust maximum likelihood (MLR).

We assessed the fit of the models according to the usual recommendations (Browne and Cudeck, 1992; Hu and Bentler, 1999): comparative fit index (CFI) and Tucker-Lewis index (TLI) above .90 and .95 suggest good fit, respectively; and root mean square error of approximation (RMSEA) fit index below .08 and .05, indicating acceptable and good fit, respectively.

The analysis of measurement invariance of the SIS-C was performed comparing five nested models with increasing restrictions (Meredith 1993; Wu *et al.* 2007): (a) base model of the group of children with ID; (b) base model of the group of children with IMD; (c) configural invariance model, where the hypothesis tested was that the data had the same dimensionality and internal structure in the two groups; (d) metric invariance model, where factor loads were equivalent between groups; and (e) scalar invariance model, where the intercepts (Model 2 -parcels-) or thresholds (Models 1 -items-) were equivalent between groups, so it was possible to compare the groups in an unbiased way. In the case of the item models (i.e., Models 1A, 1B, and

1C), we compared the scalar model with the configural model given the ordinal nature of the raw data (Millsap and Yun-Tein 2004).

To decide on compliance with the invariance constraints, we evaluated the discrepancy in the fit of the metric and scalar models with respect to the configural model. Differences in CFI and TLI greater than -.10 and in RMSEA greater than .015 suggest a substantial deterioration in the fit of the most restrictive model (Cheung and Rensvold 2002). We also consulted the Bayesian information criterion (BIC) and Akaike information criterion (AIC), where lower values indicate better fit, and the statistical significance of the change in the chi-square test.

Comparison of latent means. Given that the children in our study with IMD had higher levels of ID than those without motor impairments, the comparisons of support needs were performed by including the level of ID as a covariate.

Based on the Model 2 (parcels), we performed two types of contrast. First, we looked at a contrast through a model of multiple indicators and multiple causes (MIMIC; Brown 2006), where the presence of motor disability and the levels of ID (previously dummy-coded) were used as predictors of the latent variables (Figure 2). Second, we used specific *t*-tests to compare the standardised factor scores between children with ID and children with IMD for each level of ID. For the interpretation of mean differences, we consulted the statistical significance, the effect size, and the distributions of the factor scores in each group.

<Figure 2>

Results

Fit of base models and measurement invariance analysis

Table 2 shows the fit indices of Model 1A (items of type), Model 1B (items of frequency), and Model 1C (items of daily time) in the analysis of measurement invariance. The base models for the two groups (ID and IMD) showed a good fit in type and frequency. Model 1C obtained a satisfactory fit in the case of children with IMD but was sub-optimal in the case of children with ID (RMSEA = .086; CFI = .928; TLI = .924). The modification indices and the standardized expected parameter changes did not reveal any source of local misfit that explained this result. The scalar invariance models did not show any relevant misfit with respect to the configural models, suggesting the suitability of all items. The values of RMSEA, CFI, and TLI did not change, nor did they improve, in Models 1A and 1B. In Model 1C (time), the worsening of the fit indices was irrelevant (ΔCFI = .001; ΔTLI = .002). All chi-square contrasts were significant; however, this result could be attributed to the sensitivity of the test to the sample size, rather than to the presence of substantial misfit.

<Table 2>

The fit indices of the parcel model are shown in Table 3. Model 2 (parcels) of correlated traits-correlated methods fit reasonably well in the two groups (ID and IMD), suggesting that they were equivalent up to a scalar level. Achieving scalar invariance allows us to conduct comparisons of groups. The deterioration in fit of the scalar model with respect to the configural one remained low (ΔRMSEA = .003; ΔCFI = -.003; ΔTLI = -.003; ΔBIC = 9); however, the chi-square value suggested that the model fit had worsened.

<Table 3>

Comparison of latent means

The fit of the MIMIC model was sufficient to allow the interpretation of the results (RMSEA = .063; CFI = .973; TLI = .961). The differences of means in each factor expressed in effect sizes can be observed in Figure 3.

<Figure 3>

The differences between children with ID and children with IMD were significant and varied according to the support domains. The effect sizes ranged from 1.14 in the A factor (Home) to 0.65 in the G factor (Advocacy). This result suggests that the presence of motor disabilities affects the support needs scores, increasing them significantly. These differences remained significant (*p* <.05) when the levels of ID were included as a covariate. Age did not show any significant effect (*p* <.05). The differences in effect sizes between children with ID and children with IMD ranged between moderate (factors Home, Community and School participation), low (School learning and Health), and very low (Social and Advocacy).

Specific contrasts were made to compare the standardised means of support needs of children with ID and children with IMD, considering the different levels of ID. Figure 4 shows the effect sizes and the distributions of the factor scores. Appendix B includes the differences in effect sizes and their statistical significance, according to the results of the *t*-tests.

<Figure 4>

Children with IMD scored higher on support needs than children without IMD, suggesting that children with IMD needed more support than their peers without motor impairments. The differences between groups varied depending on the support domain: higher in Home, Community, and School Participation and moderate in the case of School Learning and Health, while the two groups could not be statistically differentiated on Social and Advocacy.

Furthermore, the differences in latent means were based in part on an interaction with the levels of ID. The greatest discrepancies between groups were found for mild ID and moderate ID, much less for severe ID and mostly absent for profound ID, indicating that groups tended to be similar in support needs at highest levels of ID. The variability of the SIS-C scores provided additional information to interpret this finding. At the mild level, the dispersion of the IMD group was greater than that of the ID group; however, in the cases of profound ID, all scores were concentrated in a range of only 0.5 standard deviations. This fact leads to an alternative interpretation of the non-existence of mean differences: the SIS-C has a strong ceiling effect, so it may not be sensitive to true variations in support needs at higher levels of ID.

Discussion

In the first part of the present study, we assessed the equivalence of the support needs of children with ID and children with intellectual and motor disabilities (IMD) in terms of measurement invariance. The results indicated invariance at the scalar level, both in item and parcel models, suggesting that the two groups answered similarly to the SIS-C, and that the same items could be used to assess support needs in both samples. This result suggests that the SIS-C is a valid instrument to assess the support needs of people with IDD, regardless of the presence of secondary disabilities. Similar findings have been observed in studies conducted on adults (Arnkelsson and Sigurdsson 2016; Bossaert *et al.* 2009; Kuppens *et al.* 2010; Smit *et al.* 2011) and children with ID and autism (Shogren, Shaw, *et al.* 2017; Shogren, Wehmeyer, *et al.* 2017).

In the second part of the study, we compared the samples of children with ID and children with IMD to explore the influence of motor impairment on support needs. Since differences in support needs could result from other factors, such as age or level of ID (Kuppens *et al.* 2010; Shogren *et al.* 2015; Thompson *et al.* 2009), we controlled for their effect before making comparisons. We observed that age affected the two samples similarly, which corroborates the results of previous studies conducted with children (e.g., Shogren, Wehmeyer, *et al.* 2017). However, the level of ID had an interaction effect in the presence of motor disability. In general terms, we observed that the support needs were higher in children with IMD, but at the more severe level of ID these effects were less apparent.

The effect of the interaction between ID levels and motor disability on support needs might be explained in two main ways. First, it is possible that the SIS-C has a ceiling effect, such that children with severe/profound ID all receive very high scores on the scale, thus making it impossible to discriminate scores of support needs. A second possible explanation is that more severe levels of disability are associated with higher levels of support needs, as has been concluded in other investigations (Bertoncelli *et al.* 2019; Seo *et al.* 2017; Shogren, Wehmeyer, *et al.* 2017). In severe impairments, motor and cognitive limitations appear much related to each other (Heineman *et al.* 2018); support needs are extensive, and support must be provided on an ongoing basis. However, in lower levels of severity, the support needs of children with IMD could be higher than in children with ID, requiring more support from the environment than the ID group need. This might explain the differences according to mild or profound ID levels.

The scores of the group with IMD were higher than those of the group with ID, but these discrepancies were shown in specific support domains: moderate differences in Home and Community; moderate low differences in School Participation, School Learning, and Health; and non-significant differences in Social and Advocacy. This finding is consistent with those obtained in adult populations. Wehmeyer *et al.* (2012) found that their participants with physical disabilities scored higher in ‘Home Living’, ‘Community Living’, and ‘Health & Safety’. Riches *et al.* (2009) used the I-CAN, another measure of support needs, and found that three of the domains with the greatest support needs were ‘Self-Care & Domestic Life’, ‘Community’, and ‘Social & Civic Life’.

The main differences in support needs occurred in those domains that were most related to mobility and participation in home and community. This result emphasises the role of the environment in the evaluation of supports for children with motor impairments, where the use of assistive technologies could be decisive to ensure independence. However, several studies have observed the lack of use of these technologies (Boot *et al.* 2018). Palisano *et al.* (2003) found that a large percentage of children with CP and reduced mobility were transported at home, suggesting total needs of support in that setting, and Bryant *et al.* (2012) concluded that individuals with IDD did not have assistive technology devices at their disposal as support. The higher need of technology for mobility, but lack of availability, might explain the differences between children with high and low levels of ID.

The findings in the other domains can be considered in diverse ways. Discrepancies in the Health domain may be because individuals with mild/moderate ID have a different physical health pattern than those with higher ID levels, who also exhibit other disabilities (e.g., epilepsy) (van Timmeren *et al.* 2017). Since most of the sample (63.4%) attended segregated special education schools, the minor differences found in the areas related to the school context could have been influenced, given that the majority in the sample of children with IMD was part of this group and this fact limited variability related to environments. Fewer discrepancies in social support needs can be attributed to the fact that these activities are more related to the level of cognitive impairments than to motor impairments (Tan *et al.* 2016).

Finally, it is necessary to address the suboptimal fit of Model 1C (time of support). One interpretation of this result may refer to the content of the items. Support time for activities that follow a stable routine (e.g., dressing) may be easier to estimate accurately than for occasional activities (e.g., shopping). This could cause systematic noise and, consequently, a worsening of the model fit. Likewise, items involving the person being transported appear to depend more on the time the caregiver performs the activity than on the needs of the child. Another interpretation is related to the rating scale of the SIS-C. Some authors (e.g., Verdugo *et al.* 2017) have suggested that it is possible that the response categories need to be revised to reflect shorter increments of time, or even transformed into continuous open-ended scales.

Limitations

The present study had some limitations. We only considered children with CP as a comparison group, because this is the most frequent physical disability in childhood (Novak *et al.* 2012). We did not find other diagnoses of IDD. The reason is that serious cognitive impairments appear highly related to motor impairments (Bertoncelli *et al.*, 2019; Heineman *et al.* 2018), and it is difficult to establish a clear diagnosis between them (Appleton and Gupta 2018; McKenzie *et al.* 2018). However, when evaluating support needs, functional assessments should be prioritised, since their objective is the development of individualised plans. In this sense, our work is novel, given that it identifies support needs associated with the presence of motor disabilities in addition to ID.

The second limitation is that we did not assess the variation of motor involvement in the CP group. The most recognised classifications for this purpose are the Gross Motor Function Classification System (GMFCS; Palisano *et al.* 2008), which classifies the children's mobility performance, and the Manual Ability Classification System (MACS; Eliasson *et al.* 2006), which classifies children's ability to handle objects in daily life. Different studies had associated the highest levels of motor impairment to moderate/severe ID. Since we know that the highest levels of cognitive impairment are associated with greater motor impairments (Delacy and Reid 2016; Reid *et al.* 2018), it was expected that our group would mostly exhibit high levels of functional limitation (i.e., GMFCS IV/V and MACS IV/V).

We did not assess the influence of environmental factors on support needs. Several studies demonstrated that the participation of children with CP is affected by the presence of negative attitudes, inadequate social support, and lack of transport accessibility (Imms 2008; Shih *et al.* 2018). In addition, for children with severe motor impairments, the lack of stimulation in the environment and exploration behaviours can influence cognitive and social competence. These factors probably provide a better explanation of the differences in support needs than the disability conditions.

Implications for practices and future research

The practical implications of our work relate primarily to the use of SIS-C for classification purposes and the development of individualised support plans. First, our results suggest that SIS-C is a valid tool for assessing the support needs of children with ID and IMD, so support teams can use it when developing individualised plans. Second, we provide evidence that support needs can be measured equivalently in children with ID and IMD. Consequently, the SIS-C results may be used to make comparisons or classifications between those groups, not defined by the deficit, but based on the level of supports they need. Third, while the evaluation of supports does not guide an effective provision of supports, the translation of that evaluation into support strategies does. Thus, the fact that the greatest mean differences are related to the home and the community settings emphasizes the need for adaptations in these environments to ensure the participation of all children. Complementary assessments of environmental factors and individual and family' quality of life should be added to the SIS-C to ensure the achieving of the child's meaningful goals.

The present study underpins the need of standardised assessment tools for children with greater support needs. Further studies should evaluate the validity of sets of items for high support needs in different domains, especially those related to participation in home and community life. The knowledge about their needs is useful to inform work teams and provide support strategies that improve the quality of life of individuals with IDD (Mensch *et al.* 2018; Schalock 2018; Schalock and Verdugo 2012). Likewise, we consider that efforts should be made to identify the support required for children with high needs to enhance their participation in the daily environments.

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Table 1.

Descriptive Statistics for the Children' Characteristics

Variables	**Intellectual disabilities n= 713 (61%)**	**Intellectual and motor disabilities n= 286 (29%)**
Gender		
Male	475 (66.62%)	155 (54.20%)
Female	238 (33.38%)	131 (45.80%)
Age cohorts		
5-6	93 (13.04%)	55 (19.23%)
7-8	92 (12.90%)	45 (15.73%)
9-10	88 (12.34%)	43 (15.03%)
11-12	126 (17.67%)	49 (17.13%)
13-14	172 (34.12%)	56 (19.58%)
15-16	142 (19.92%)	38 (13.29%)
Home setting		
Family home	685 (96.07%)	261 (91.26%)
Residential homes	17 (2.38%)	24 (8.40%)
Missing data	11 (1.54%)	1 (0.35%)
School setting		
Ordinary school	168 (23.56%)	34 (11.69%)
Special classroom in ordinary school	123 (17.25%)	26 (9.09%)
Special education school	410 (57.50%)	225 (78.67%)
Missing data	12 (1.68%)	1 (0.35%)
Levels of intellectual disability		
Mild	191 (26.79%)	31 (10.84%)
Moderate	275 (38.57%)	49 (17.13%)
Severe	156 (21.88%)	156 (39.51%)
Profound	33 (4.63%)	113 (32.52%)
Missing data	58 (8.13%)	0 (0%)

Table 2.

Fit Indices for the Measurement Invariance Models of the Items

Measure	**Model**	**RMSEA (CI)**	**CFI**	**TLI**	**χ^2**	**χ^2 Dif. Test**
Type						
	Base ID	.062 (.060-.062)	.975	.973	6489	-
	Base IMD	.042 (.039-.045)	.988	.987	2632	-
	Configural	.053 (.052-.055)	.981	.980	8427	-
	Scalar	.051 (.050-.052)	.982	.982	8561	557 (p<.01)
Frequency						
	Base ID	.054 (.053-.056)	.979	.978	5412	-
	Base IMD	.037 (.033-.040)	.990	.990	2417	-
	Configural	.045 (.044-.047)	.986	.985	7105	-
	Scalar	.043 (.042-.045)	.986	.986	7186	417 (p<.01)
Daily time						
	Base ID	.086 (.084-.088)	.928	.924	10944	-
	Base IMD	.060 (.057-.063)	.976	.975	3528	-
	Configural	.075 (.074-.076)	.952	.950	13286	-
	Scalar	.073 (.072-.074)	.951	.952	13647	966 (p<.01)

Note: ID: Intellectual disability; IMD: Intellectual and motor disability; RMSEA (CI): Root mean square error of approximation (confidence interval); CFI: Comparative fit index; TLI: Tucker Lewis index; χ^2: Chi square; χ^2 Dif Test: χ^2 Difference testing.

Table 3.

Fit Indices for the Measurement Invariance Models of the Parcels

Model	**RMSEA (CI)**	**CFI**	**TLI**	**SB- χ^2 Dif. Test**	**BIC**	**CT**
Base ID	.056 (.051-.062)	.984	.977	-	84674	-
Base IMD	.076 (.067-.085)	.956	.936	-	31652	-
Configural	.062 (.058-.067)	.976	.965	-	116498	YES
Metric	.062 (.058-.067)	.973	.965	95 (32) p<.01	116465	YES
Scalar	.065 (.061-.070)	.970	.962	164 (43) p<.01	116474	YES

Note: ID: Intellectual disability; IMD: Intellectual and motor disability; RMSEA (CI): Root mean square error of approximation (confidence interval); CFI: Comparative fit index; TLI: Tucker Lewis index; χ^2: Chi square; SB- χ^2 Dif Test: Satorra-Bentler χ^2 difference test; BIC: Bayesian information index; CT: Constraint tenable.