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The Italian Translation of the Supports Intensity Scale-Children (SIS-C Italian): Measurement Invariance and Differences

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Abstract

The Supports Intensity Scale – Children's Version (SIS-C) was translated into Italian using a committee approach to translation. Latent modeling approaches enabled the leveraging of the large standardization sample from the U.S. ($n = 4{,}015$) to generate translation-specific norms from data collected in Italy ($n = 435$) for children and youth ranging ages 5-16 years placed in six evenly distributed age groups by country. Findings indicated the structure of the SIS-C (i.e., seven support need domains organized under an overall support needs construct), was supported in the Italian context. However, there were age-related differences in the U.S. and Italian samples. In the Italian sample, norms were established for the 5-8 years, 9-10 years, and 11-16 years age groups. Moreover, the Italian sample also differed from other European samples and SIS-C translations. The importance of understanding cultural contexts in interpreting findings from the SIS-C is discussed, along with ways in which SIS-C findings can be used to inform policy and practice in the Italian context.

Key Words: intellectual disability, support needs assessment, cross-cultural, Italian translation

Over the past 40 years, the social-ecological conceptualization of intellectual disability (ID) has been embraced internationally by leading scholars and professional organizations (e.g., Schalock et al., 2010; World Health Organization, 2007). In contrast to a traditional understanding of ID as a pathology internal to a person, proponents of a social-ecological conceptualization maintain that ID is best understood as a mismatch between personal competencies and environmental demands. The most critical implication of the social-ecological conceptualization for human services is that the focus of professional work shifts away from eradicating deficits to identifying and arranging supports that enhance human functioning (Thompson et al., 2014).

Assessing the Support Needs of Children

Thompson and colleagues (2009) defined support needs as "the pattern and intensity of supports necessary for a person to participate in activities linked with normative human functioning," (p. 136). In suggesting

that support needs be understood in relation to *activities linked with normative human functioning*, they aligned the support needs construct with a core value of Nirje's (1969) *principle of normalization*. The *normalization principle* was extremely influential in the worldwide deinstitutionalization movement of the past 60 years (Wehmeyer, 2013), which included Italy (D'Alessio, 2011). *Normative human functioning* refers to participating in the daily life activities and settings that others in society value and are regularly engaged (Thompson et al., 2009).

The *Supports Intensity Scale – Adult Version* (SIS-A; Thompson et al., 2015) and *Supports Intensity Scale – Children's Version* (SIS-C; Thompson et al., 2016) were developed to measure the construct of support needs. An Italian translation of the SIS-A (Cottini et al., 2008) was developed shortly after the publication of the original English version (Thompson et al., 2004). Assessment administration for both the children's and adult version of the SIS call for people to be evaluated across a range of life activities in relation to three dimensions of support needs: frequency (how often extra support is needed), type (what is the nature of support needed), and time (how much time is needed to provide support on a day when support is needed). According to the American Association on Intellectual and Developmental Disabilities (AAIDD, 2021), the two SIS scales have been translated from English into 13 languages and are being used in 11 countries. The SIS-C consists of two sections: (a) Section 1 documents extra supports that are needed to manage 19 different medical conditions and 13 separate problem behaviors, and (b) Section 2 consists of 61 items across 7 subscales, each of which represents a daily life activity. Section 2 is the standardized portion of the scale from which norms are generated.

In a recent review of literature from peer-reviewed journals where SIS-A and/or SIS-C data were used, Thompson, et al. (2018) cited only one study where data were collected using the *Italian SIS-A* (i.e., Lombardi et al., 2016) and did not identify any articles that used data from an Italian translation of the SIS-C. Findings from SIS-C translations were limited to studies using data from Spain with both the Spanish and Catalonian versions. More recently, a study based on data from the *Icelandic SIS-C* was published (Thompson et al., 2020). Although limited to only a handful of studies, the collective research findings on translated SIS-C scales suggest that they provide a valid means to measure the support needs of children with ID in different countries. However, age-related differences in scores have been noted in the translated versions. Efforts to translate the SIS-C into Italian were initiated in 2016 by the largest parent/consumer advocacy association in Italy for individuals with ID, the National Association of Families and Persons with Intellectual Disability (Associazone Nazionale Famiglie di Personne con Disabilitià Intellettiva [ANFFAS]; Canali, 2016).

Regardless of disability status, younger children need more support than older children. For example, typically developing 5-year-old children need to be monitored on a regular basis in public settings such as grocery stores for safety reasons, but 15-year-old adolescents generally, do not need constant monitoring when in a grocery store. Because support needs are confounded with age, determining the extent to which children with ID experience extraordinary support needs requires that their support needs be considered in relation to the intensity of support needed by typically developing peers of the same age.

Given that support needs must be considered in the context of same aged peers, the sampling plan to standardize the English version of the SIS-C was structured into two-year age bands (i.e., 5-6 years, 7-8 year, 9-10 years, 11-12 years, 13-14 years, and 15-16 years). This sampling plan was replicated for the translated versions. For both the Catalan (Giné et al., 2017) and Spanish (Verdugo et al., 2016) translations, only two separate age cohorts (5-10 years and 11-16 years) emerged on which distinct norm-referenced scores could be justified (i.e., the two age groups differed sufficiently on latent means and latent variances for the subscales and the overall score). A parallel finding emerged in the Icelandic translation where there was empirical support for just two age bands (5-10 years and 11-17 years). It is noteworthy that the Icelandic sample included a far more diverse disability population compared to other countries' samples.

The purpose of the current study was to investigate whether SIS-C items that were translated into Italian could be used to measure support needs in a sample of Italian children with ID, ages 5-16 years. ANFFAS used the Thompson et al. (2017) committee approach to guide the translation of the SIS-C from English to Italian. Data on the translated version were collected in 2018 and 2019 and provided the data set for the current study.

The Need for the Italian SIS-C

The initial identification of children with ID and assessment for purposes of diagnosing ID is very similar in Italy and the U.S. Children are identified when there are concerns that developmental milestones are delayed or there is evidence that achievement in school is significantly lagging behind age-level expectations. Referrals to diagnosticians are made when these concerns arise, and both countries rely heavily on intelligence quotient (IQ) tests and adaptive behavior (AB) scales to guide diagnostic recommendations. Moreover, the same cutoff criteria (i.e., two standard deviations below the mean) are used in Italy and the U.S. (cf. Salvia et al., 2010 and D'Alessio, 2011).

Historically, the standardized assessment tools used in Italy were overwhelmingly medically focused, despite the country moving from a centralized/institution-based system to a community-based service system since the 1970s.

Canali (2016) reported that ANFFAS contacted the AAIDD for rights to translate the SIS-C (as they had done for the SIS-A several years earlier). ANFFAS wanted Italian educators and psychologists to be able to access a valid assessment tool that was aligned with a social-ecological perspective of ID, where ID was considered to be a *state of functioning* (i.e., a chronically poor fit between the person and their environment) and where people experienced needs for supports that were not needed by most others in the population. Expanding the capacity of the field of ID in Italy to accurately measure the support needs of children had the potential to provide a means to better inform the organizing and planning of human services at the individual, organizational, and jurisdictional levels.

Families in Italy. Writers who focus their work on Italian culture and history inevitably highlight the central role that family has had in Italian culture and daily life for centuries. In today's Italy, it is typical for two or three generations of family members to live under the same roof, much more so than in other parts of Western Europe or North America. It is also common for Italian grandparents to look after their grandchildren on a daily basis, and for adult children to look after older parents. The strength of the Italian family is often credited for empowering the country through times of considerable turmoil (e.g., see Tomalin, 2021). Advocacy from family members for persons with disabilities resulted in numerous service associations, like ANFFAS, having a formally recognized role as public interlocutors (Croce et al., 2017). Furthermore, since ratification in 2009 of the United Nation Convention on the Rights of Persons with Disabilities (United Nations, 2006), an Italian political organization National Observatory Regarding the Condition of Persons with Disabilities was formed; this organization has as its scope to define disability policies, programs, and potentially monitor and evaluate accessibility of all other disability related policies. Family organizations are stakeholders for this organization and other groups, bringing the vision of families to impact policy and lobby for their rights. The SIS-C's appeal to the Italian parent advocacy organization ANFFAS, which initiated the current research project, is understandable given the assessment's emphasis on identifying support needs in the family home, local community, and neighborhood school, all of which are at the heart of the Italian culture.

Disability Rights. Italy has a unique history with regard to recognizing and expanding the rights of persons with disabilities. D'Alessio (2011) contends that the most important milestone was the passing of the Basaglia Law (also known as Italian Law 180) in 1978. In addition to its sweeping reform of the Italian psychiatric system, this law had a profound impact on how services were organized and delivered to disability populations, including people with ID. The focal point of the Basaglia Law was to shift services from large congregate settings (where the focus had been on custodial care) to community-based programs (where the focus was shifted to active treatment and promoting integration into community life). The Basaglia Law led to the widespread closing of institutional placements for a variety of disability populations as well as a push to establish a fully inclusive school system (i.e., no segregation of students with disabilities). Subsequent Italian laws (e.g., Italian Law 104; Italian Law 517) have continued to emphasize the need to offer a system of education that includes everyone.

Support Needs Assessment. The primacy of the family unit in Italian society combined with the legal emphasis on including people with disabilities in community settings and activities has resulted in the vast majority of government funding for people with disabilities in Italy being distributed directly to families. Although families are required to use these funds to support the family member with the disability living in the family home and participating in the local community (e.g., attending local schools), they are given considerable discretion on how their funds are used (D'Alessio, 2011). This is in contrast to the developmental disabilities systems in the U.S., which are administered by the various U.S. states (and territories) in compliance with federal laws and regulations. Although an increasingly large percentage of public funds in the U.S. now flow directly to families and persons with disabilities, there continues to be a significant amount of funding that goes directly to schools and community service provider organizations. There is even a relatively small, but not inconsequential, amount of funding that is sent to residential institutions that are supervised by states or private organizations (Braddock et al., 2017).

In Italy, consistent with Italian law and culture, children and adults with disabilities receive supports in their home or at school to promote their autonomy, freedom, socialization, and participation (Lombardi et al., 2016). The prospect of having a valid means to measure the intensity of supports that children with ID need in order to participate in their homes, school, and communities had considerable appeal to ANFFAS. For the purpose of informing Italian public policy, if data supported the *SIS-C Italian* as a valid measure of support needs, assessment results could be applied to developing alternatives to standing concerns in Italy: (a) basing resource allocation systems strictly on medical diagnostic information (Di Nuovo, 2012), and (b) the lack of an empirically defensible approach to informing judgments regarding the delivery of services and supports (de Anna, 2015).

The focus of the current study was to investigate what age bands could be established to specify norm-referenced scores so that future administrations of SIS-C to Italian children could be compared to the norming sample. The research questions were as follows: First, do the responses

on the *SIS-C Italian*, both activity subscales and the overall measure, represent comparable constructs across age groups? Second, do the age groups (i.e., 5-6 years, 7-8 years, 9-10 years, 11-12 years, 13-14 years, and 15-16 years) differ on latent means for the activity subscales and overall measure in the Italian sample? Third, do the age groups differ on latent variances for the activity subscales and overall measure in the Italian sample?

METHOD

Sample

United States. The U.S. norming sample consisted of 4,015 children, 67.5% of them male. Ages ranged from 5 to 16 years. Over half of the respondents identified as White ($n = 2{,}244$, 55.9%) and English speakers ($n = 2{,}299$, 57.3%). Table 1 provides more demographic details.

Italy. A total of 435 Italian children, ages 5-16 years ($M = 10.34$, $SD = 3.32$), were assessed with the *SIS-C Italian*. The majority lived in urban settings ($n = 273$, 62.8%). Seventy percent of the children were male and 60% ($n = 261$) had IQ scores below 50. Table 1 provides additional demographic details on this norming sample.

Measures

Support Intensity Scale – Children's Version (SIS-C). The Support Intensity Scale – Children's Version (Thompson et al., 2016) was developed to assess support needs of children ages 5-16 years across seven activity domains: Home Life, Community & Neighborhood, School Participation, School Learning, Health & Safety, Social, and Advocacy. It is administered as an interview with two or more respondents who know the child well. Each domain contains 8 or 9 questions, and interviewers generate ratings for type of supports, frequency of supports, and daily support time on three separate 5-point scales. Scores are calculated for each domain and overall to create a support needs index (SNI). Information about medical conditions and problem behaviors that could impact the quantitative assessment results are documented in the Exceptional Medical and Behavioral Support Needs section.

SIS-C Italian Translation. A systematic process to guide translations of the SIS-C (Thompson et al., 2017), that is consistent with a *committee approach* (Douglas & Craig, 2007) to translation, was used to create the *SIS-C Italian Translation*. The process involves at least two groups of people who are bilingual in the source and target languages completing translations in a parallel fashion. The groups come together to compare their translations and negotiate the wording. Once a consensus translation has been reached, it is further evaluated in pilot tests with assessors who have not been involved in the translation effort.

Table 1
Descriptive counts and percentages of the norming samples by country

	Italy		U.S.	
Characteristic	*n*	%	*n*	%
Gender				
Male	305	70.1	2710	67.5
Female	130	29.9	1202	29.9
Age Group				
5-6 years	64	14.7	513	12.8
7-8 years	80	18.4	562	14.0
9-10 years	90	20.7	762	19.0
11-12 years	72	16.6	804	20.0
13-14 years	63	14.5	818	20.4
15-16 years	66	15.2	487	12.1
Student's Level of Intellectual Impairment*				
≥ 50	174	40.0		
< 50	261	60.0		
55-70 or Mild			1157	28.8
40-55 or Moderate			1321	32.9
25-39 or Severe			862	21.5
< 25 or Profound			459	11.4
Missing	0	0.0	216	5.4
Student's Level of Adaptive Behavior Impairment*				
≥ 70	147	33.8		
50 – 69	156	35.9		
< 50	131	30.1		
Mild			948	23.6
Moderate			1335	33.3
Severe			1052	26.2
Profound			563	14.0
Missing	1	0.2	117	2.9

* Ranges for intellectual impairment and adaptive behavior impairment are not equal in Italy and the United States, so categories for each country have been preserved but left blank for the other country.

Procedure

U.S. Participants. Children and youth to be assessed for the U.S. sample were recruited through jurisdictional (i.e., state level) developmental disability agencies that were using the Support Intensity Scale – Adult Version (SIS-A) and through school districts across the country. Almost 700 interviewers conducted the SIS-C assessments (i.e., collected data). They were mostly female (81.3%) with a graduate degree and more than a decade of experience in human services for children with ID.

Italian Participants. Potential families and children from throughout Italy were identified by ANFFAS. Forty-seven different interviewers administered the *SIS-C Italian*, all of whom were working as psychologists or educators for ANFFAS. These interviewers completed a 16-hour training program in SIS-C administration prior to collecting data. Additionally, all of them had (a) prior professional experiences in test administration, (b) at least a decade of work experience in human services for children with ID, and (c) prior experience with administering the SIS-A.

Interviewers collected information from at least two respondents. The respondents were individuals who knew the child very well, and included parents and other family members, teachers, and/or direct support staff. Levels of intellectual impairment and adaptive behavior were reported by the child's parents or guardians, but as was the case with the U.S. sample, this information was not verified through a document review by the interviewers. Assessments were administered face-to-face in quiet, private settings where professionals in the ID field worked and/or services were provided (e.g., schools, rehabilitation clinics). On average, the assessments took approximately one hour to complete. The Italian sample and sub-sample sizes were sufficient to leverage the large standardization sample generated in the U.S. ($n = 4{,}015$; aged 5-16 years) to generate translation-specific norms, based on guidelines for sample size that were presented by Seo, Shaw et al. (2016) and Seo, Little et al. (2016).

Analysis

The statistical methods used to answer the research questions were confirmatory factor analysis, measurement invariance testing, and latent invariance testing (Brown, 2006). Specifically, the analysis followed procedures developed to test measurement invariance and establish standardized scores for a translated version of a measure in which data were collected from a relatively small sample for the translated measure (Seo, Shaw, et al., 2016). The small sample is modeled with a larger sample in order to add stability to the modeling process. In this example, the small and large samples consisted of data collected from the Italian and U.S. participants, respectively. No data were missing from the data set, so three parcels per activity domain were created (based on theoretical and empirical evidence established in the norming process of the U.S. sample; Seo, Little, et al., 2016). The English version norming process also identified age group differences, so the same age cohorts were created for the Italian sample: 5-6 years, 7-8 years, 9-10 years, 11-12 years, 13-14 years, and 15-16 years.

After parceling the items and creating the age group variable, the Italian and U.S. samples were combined into a single data set for analysis. A twelve-group model evaluated the model for differences across the two countries and the six age categories. After measurement invariance testing, latent invariance testing procedures were used to determine differences in the Italian sample at the latent level. Latent means were evaluated (beginning with the final measurement invariance model) followed by latent variance testing (using the final latent mean model).

The dataset for the SNI model was created by averaging all responses on a single subscale for an activity. The invariance testing steps implemented with the seven-factor activity model was repeated for the SNI model to evaluate the overall measure, latent means, and latent variances. Measurement invariance is conducted by comparing the models in a sequential process. The same model is applied to each group, but no constraints are placed on the estimates to create the configural model. Factor loadings are equated in the next model, referred to as the weak or metric model, and model fit statistics are compared to the fit statistics for the configural model. The root mean square error of approximation (RMSEA) should be $< .08$ in both models and the comparative fit index (CFI) and non-normed fit index (NNFI) should be $> .90$ (Brown, 2006). Lastly, the change in CFI between the two models, referred to as ΔCFI, should be $< .01$ (Cheung & Rensvold, 2002). If change in model fit was minimal, the weak model is then compared to the strong or scalar model, a model in which intercepts are equated across groups. The same model fit comparisons are made between the weak and strong model, again looking for minimal change in model fit. If model fit changes more than expected, best identified by ΔCFI, nested model testing is used to determine which estimate (i.e., factor loading or item intercept) should not be equated across groups. Latent mean and variance testing for the second and third research questions used chi-square difference testing with the alpha-level set to .05.

RESULTS

Research Question 1 – Comparable Constructs

Activity Model. The Italian and U.S. norming samples were combined and the configural model was estimated for the twelve-group model of six age groups for each country. Model fit, shown in Table 2, was acceptable with an acceptable RMSEA and good fit on the comparative fit statistics based on the criteria outlined in the analysis section. Similar model fit was observed in the weak model with ΔCFI $= .002$, indicating factor loadings could be equated across the groups. The estimation of the strong model, with equated intercepts, appeared to fit equally well, but a new warning appeared in the strong model results – non-positive-definite warning for the age 7-8-years Italian age group. The warning was due to a latent correlation between School Participation Activities and School Learning Activities with a 95% confidence interval that included 1.00, a mathematically impossible range. Testing determined that the addition of a correlated

Table 2
Fit Statistics for Invariance Testing of the Support Intensity Scale – Children's Version – Italian Translation

Model	χ^2	*df*	*p*	RMSEA	RMSEA 90% CI	CFI	NFI	SRMR	ΔCFI
Activity model									
Configural	6956.93	2016	< .001	.081	[.079, .083]	.962	0.953	.024	
Weak	7384.10	2170	< .001	.080	[.078, .083]	.960	0.954	.034	.002
Strong	8413.53	2324	< .001	.084	[.082, .086]	.953	0.949	.037	.007
Strong with correlated residual	8406.53	2323	< .001	.084	[.082, .086]	.953	0.949	.037	.007
Support Needs Index (SNI) model									
Configural	2438.19	168	< .001	.191	[.184, .198]	.936	0.905	.030	
Weak	2631.30	234	< .001	.166	[.161, .172]	.933	0.928	.062	.003
Strong	3231.73	300	< .001	.162	[.157, .167]	.918	0.931	.076	.015
Partially Strong by country	2937.58	294	< .001	.156	[.151, .161]	.926	0.937	.070	.007

Note. RMSEA = root-mean-square error of approximation; CFI = comparative fit index; NFI = normed fit index

residual in the School Learning Activity factor between two of the indicator parcels reduced the problematic latent correlation to an acceptable level. The first parcel focuses on learning academic skills, metacognitive strategies, tools, and strategies in the classroom, and the second parcel focuses on inclusion. The research team considered the finding and decided to keep the correlated residual in the age 7-8-years Italian age group model. In the statistical comparison between the strong model and the strong model with correlated residual, $\chi^2(1) = 7.00$, p = .008, a result that indicated model fit was statistically different between the two models and that the model with the additional path was preferred over the simpler model. The strong model with the correlated residual had an acceptable RMSEA and good comparative model fit with ΔCFI = .007 as compared to the weak model. The model passed measurement invariance testing.

SNI Model. The configural, twelve-group SNI model fit statistics to evaluate comparative fit indicated good fit with values that exceeded .90, as shown in Table 2. Residuals did not indicate any areas of misfit but the RMSEA was poor. A poor RMSEA was expected because RMSEA performs poorly with small degrees of freedom (Kenny et al., 2015), a property of the SNI models. The model also has very small unique variances in the Italian group, indicating little measurement error, a model characteristic that can also return RMSEA statistics that are larger than expected (Browne et al., 2002). Unique variances will also be smaller in parceled indicators (Little et al., 2013), which is what all of the indicators in this model are. Based on comparative fit statistics and no problematic residuals, model fit was considered acceptable and testing proceeded.

The weak model fit statistics were similar to configural model, and ΔCFI = .003. The factor loadings could be equated across all twelve groups with minimal impact to model fit. Strong model fit continued to improve for RMSEA as more degrees of freedom became available, but change in comparative model fit (ΔCFI > .01) indicated that item intercepts could not be equated across all twelve groups. As shown in Figure 1, inspection of the intercepts for each group identified smaller estimates in the Italian age groups than the U.S. age groups for every indicator. The indicators were then freed by country so that intercepts were equal across all age groups for the Italian norming sample and the U.S. norming sample. The ΔCFI = .007 in the partially invariant model, so this change was retained. The final partially invariant strong model differed on the level of responses by country but was equal across age groups within country.

Research Question 2 – Differences in Latent Means

Activity Model. Latent means were first constrained to equality across all Italian age groups. A nested model comparison indicated that model fit changed significantly if all latent means were constrained, $\chi^2(35) = 88.86$, p < .001, as shown in Table 3. Further testing identified age group differences. The 5-6 years and 9-10-years age groups differed on every activity mean, and means for 7-8 years group and 9-10 years group differed on all factors but Community & Neighborhood Activities ($\Delta\chi^2[1] = 2.24$, p = .135) and School Learning Activities ($\Delta\chi^2[1] = 2.97$, p = .085). The 9-10-years Italian age group also differed from older age groups on School Participation Activities, Health & Safety Activities, Social Activities, and Advocacy Activities. The last patterns to note were differences between the 5-6-year-old Italian age group and older age groups on Home Life Activities, Community & Neighborhood Activities, School Participation Activities, and Social Activities. These patterns led to a final test in which 5-6 years and 7-8 years age groups were equated, the 9-10 years age group was freed, and the 11-12 years, 13-14

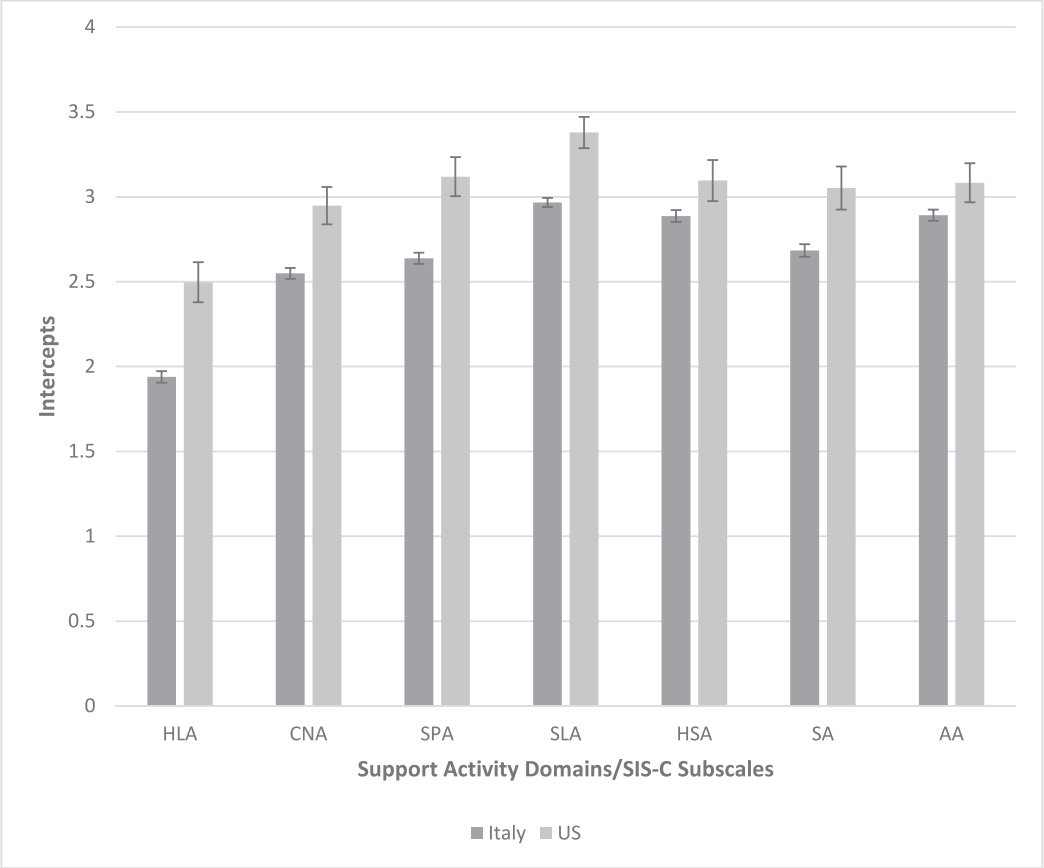

Figure 1: *Indicatory intercept estimates by country in the twelve-group support needs index model*

years, and 15-16 years age groups were equated. When compared to the strong model, $\Delta\chi^2(21)= 28.24$, $p = .133$, the result meant the three groups of latent means did not fit differently from a model in which they were all freely estimated. This result indicated that the model with fewer estimates and equated means should be retained.

SNI Model. The first test equated latent means across the six age groups for the Italian norming sample. Nested model testing indicated that all latent means could not be equated ($\chi^2[5]= 12.52$, $p = .03$), as shown in Table 3. Pairwise nested model testing identified two pairs that could not be equated, between the 5-6 years and 9-10 years age groups ($\chi^2[1]= 12.03$, $p < .001$) and the 7-8 years and 9-10 years age groups ($\chi^2[1]= 4.53$, $p = .03$). Because these results were similar to those observed in the activity model, in which the 9-10 years age group differed from other groups, two other groups were estimated. The first estimated model freed the latent mean for the 9-10

Table 3
Latent mean and variance nested model testing results

Model	χ^2	*df*	*p*	$\Delta\chi^2$	Δdf	*p*
Activity model						
Latent means all equal	8495.39	2358	< .001	88.86	35	< .001
Latent means age groups 5-8 years, 9-10 years, and 11-16 years	8434.77	2344	< .001	28.24	21	.133
Latent variances	8455.20	2379	< .001	20.43	35	.976
Support Needs Index (SNI) model						
Latent means all equal	2950.10	299	< .001	12.52	5	.028
Latent means age groups 9-10 years and all other	2942.04	298	< .001	4.46	4	.347
Latent means age groups 5-8 years, 9-10 years, and 11-16 years	2939.29	297	< .001	1.71	3	.634
Latent variances	2942.19	302	< .001	2.90	5	.716

Table 4
Latent means freely estimated and equated across ages

Age groups	HLA	HAS	SPA	SLA	HAS	SA	AA	SNI
Freely estimated								
5 – 6 years	2.29	2.56	2.66	2.86	2.86	2.72	2.78	2.65
7 – 8 years	1.89	2.29	2.49	2.80	2.69	2.48	2.62	2.44
9 – 10 years	1.44	2.02	2.08	2.55	2.30	2.06	2.29	2.10
11 – 12 years	1.67	2.25	2.41	2.77	2.58	2.34	2.62	2.35
13 – 14 years	1.55	2.19	2.34	2.75	2.58	2.35	2.63	2.34
15 – 16 years	1.56	2.33	2.31	2.70	2.71	2.46	2.73	2.41
Final model								
5 – 8 years	2.12	2.46	2.60	2.86	2.81	2.64	2.75	2.55
9 – 10 years	1.44	2.02	2.08	2.55	2.30	2.06	2.29	2.10
11 – 16 years	1.61	2.27	2.36	2.73	2.64	2.40	2.67	2.37

Note: HLA – Home Life Activities; HAS – Community & Neighborhood Activities; SPA – School Participation Activities; SLA – School Learning Activities; HAS – Health & Safety Activities; SA – Social Activities; and AA – Advocacy Activities.

years age group from all of the other means, and the second model created three latent means to match the final pattern in the activity model: 5-8 years, 9-10 years, and 11-16 years age groups. The latent mean for the 5-8 years age group is $\alpha = 2.55$, S.E. $= 0.08$, $p < .001$, for the 9-10 years age group, $\alpha = 2.01$, S.E. $= 0.11$, $p < .001$, and for the 11-16 years age group, $\alpha = 2.37$, S.E. $= 0.08$, $p < .001$.

Research Question 3 – Differences in Latent Variances

Activity Model. After latent means were equated across the three age groups (see Table 4), the latent variances were equated across all age groups. Change in model fit between the final latent mean model and the latent variance model was $\chi^2(35) = 20.43$, $p = .976$. Constraining all latent variances for activity to equality across groups did not change model fit, so the more parsimonious model with a single set of variances for the Italian age groups were retained. By activity, latent variance ranged from $\psi = 0.93$, S.E. $= 0.07$ for school learning to $\psi = 1.31$, S.E. $= 0.09$ for health and safety.

SNI Model. The latent variances model, in which the single factor latent variance was equated across all Italian age groups, was compared to the final SNI latent mean model. Nested model testing results ($\chi^2[35] = 2.90$, $p = .716$) indicated that latent variances could be equated across the Italian age groups. The latent variance for the final SNI model was $\psi = 1.07$, S.E. $= 0.07$, $p < .001$. No further testing was required.

DISCUSSION

This study confirms that the *SIS-C Italian* can be used with confidence for youth ages 5 to 16 with ID in Italy. Consistent with findings from studies on the *SIS-C Spanish* (Verdugo et al., 2016) and *SIS-C Catalan* (Giné et al., 2017), age impacted the results. In the current study, age differences were evident in both the measurement properties as well as in the final estimates of subscale and scale means. It is essential to remember when considering these findings that SIS-C scores are generated by interviewers who support respondents to rate items while considering the support needed by children with ID in relation to that of same-age peers without disabilities. Therefore, the finding (discussed below) that 9-10 year-olds had the lowest support needs does not mean that 9-10 year-olds with ID had less intensive support needs than their older peers with ID. Rather, it means that there was relatively less intense support needed by 9-10 year olds (as a group) compared to their same-age peers than the level of intensity of support needed by younger children as well as older children in relation to their same-age peers.

In regard to the first research question, the items assessing support needs for the various domains (home life, community & neighborhood, school participation, school learning, health & safety, social, and advocacy activities) related to each other in the same ways across all age groups, and the amount of support needs were also similar across age groups. The model for overall support needs in the SNI model identified differences by country. Support needs were generally rated lower in the Italian sample compared to the U.S. sample. Similar findings were observed in analyses of the *SIS-C Spanish* (Verdugo et al., 2016) and *SIS-C Catalan* (Giné, et al., 2017), so this result was not unexpected. It suggests that the U.S. norms (i.e., English version) may be the outlier, or that there may be contextual factors influencing these differences in the U.S.

In regard to the second research question, the means for activity subscales differed by age group with a pattern

that differed from what was observed in the results for the *SIS-C Spanish* (Verdugo et al., 2016) and *SIS-C Catalan* (Giné, et al., 2017) in which two age groups were identified, younger (ages 5-10 years) and older (ages 11-16 years), with the younger group having higher support needs. The youngest youth, ages 5-8 years, in the Italian sample also had higher support needs as compared to the older youth, ages 11-16 years. However, the 9-10 years age group had the lowest support needs.

The reasons for the lowest support needs in the 9-10 years age group are unclear. What would be expected is that the relative gap between the child with ID and same-age peers would narrow as children get older and thus support needs would lessen because so many items on the SIS-C are foundational to participating in various life domains. All children, regardless of disability, need some support in various life domains when they are young, but support intensity often decreases or support needs change with age. For example, in terms of "Toileting" (i.e., the 5th item on the Home Life subscale), there is a long history of research documenting the finding that toileting skills are often delayed in children with ID, even though the vast majority become independent over time. Thus, for this item it would not be surprising that younger children with ID would need a greater intensity of support relative to their typically developing peers (i.e., most peers have mastered toileting by the time they are 5 years old, but a significant number of children with ID have not) than older children with ID would require (i.e., the vast majority of older children with ID and presumably all typically developing children can toilet independently).

In terms of the third research question, the variance for both the subscales and SNI could be equated across all age groups. This finding was similar to the results obtained in the *SIS-C Spanish* (Verdugo et al., 2016) and *SIS-C Catalan* (Giné, et al., 2017) studies. Variance did differ across age groups in the U.S. sample, so the finding of equal variances is related to sample size and the statistical methods implemented to test our research questions. Whether variances would still be equal with a larger sample is not a question that can be answered at this time, and future research is needed to explore factors that might predict variability in the Italian context.

Limitations and Future Research

The responses on the *SIS-C Italian* were collected in a country with a different educational context than the U.S. sample that was used in the present analysis. Further, other analyses, with different translated versions of the SIS-C had different findings, including the *SIS-C Spanish* (Verdugo et al., 2016) and *SIS-C Catalonian* (Giné et al., 2017). In Italy, at the time of sampling, although students with disabilities often start school at least one year later than their same-age peers, they are educated in inclusive settings, which differ from the Spanish and Catalan contexts. Thus, for teacher respondents especially, responses to questions about school participation and learning may differ as there are not natural same-age peers and settings are different than in other parts of the world. Ongoing research is needed to further explore cross-country comparisons. Work is needed that not only compares samples from the U.S. with one other country, but analysis of all cultural contexts, to explore if there are similarities and differences within, for example, European contexts.

Conclusion

Data from this study show that the SIS-C has strong reliability and validity in the Italian context with youth ages 5 to 16 years who are diagnosed with ID. Thus, educators and other human service professionals who want to collect accurate information on the relative intensity and nature of children's support needs can use the *SIS-C Italian* with confidence. Thompson et al. (2015) pointed out that support needs assessment data can be used to inform decisions at jurisdictional (macro), local (meso), and individual (micro) levels. At the macro level in Italy, decisions regarding resource allocation are critically important to assure that funding is distributed equitably (people with similar need and circumstances receive similar amounts). The introduction of a standardized instrument that can inform the allocation of resources and guide provision of supports fills a gap in the Italian context. Its application can enable professionals and family members to work together toward establishing more efficient and just processes to determine support provision while promoting a participative vision. The *SIS-C Italian* offers a means to more transparently and accurately measure the extent of the needs of children from different homes and communities.

At the meso level, the *SIS-C Italian* can be used to compare the impact of educational structures and policies. For example, local school outcomes can be interpreted in light of the support needs of the students being served. In the case of two schools that are serving students with similar intensities of support needs, disparate outcomes may point to differences in practices that contribute to one school being more open and welcoming to students with substantial support needs.

Finally, at the individual planning level, the *SIS-C Italian* can have a great impact when it is used to identify and arrange personalized supports (e.g., adaptations, accommodations, modifications) to address a student's unique support needs. Properly aligning supports with student needs can do much to promote greater inclusion in Italian schools, along with learning experiences that are associated with positive quality of life outcomes. For instance, the *SIS-C Italian* can be used to inform dosage (how much support to provide, so that a child is not over- or under-supported) and inform a problem-solving process that helps educators select support strategies in regard to

what, how, and where to provide instruction (e.g., see Walker et al., 2019).

REFERENCES

American Association on Intellectual and Developmental Disabilities (2021). *International SIS use*. https://aaidd.org/sis/international

Braddock, D. L., Hemp, R., Tanis, E. S., Wu, J., & Haffer, L. (2017). *The state of the states in intellectual and developmental disabilities, 11th ed*. American Association on Intellectual and Developmental Disabilities.

Brown, T. A. (2006). *Confirmatory factor analysis for applied research*. Guilford Press.

Browne, M. W., MacCallum, R. C., Kim, C.-T., Andersen, B. L., & Glaser, R. (2002). When fit indices and residuals are incompatible. *Psychological Methods, 7*(4), 403-421. https://doi.org/10.1037/1082-989X.7.4.403

Canali, M. (2016, December 2). *La progettazione di interventi utilizzando Matrici ecologiche: primi passi verso il territorio [The design of interventions using Matrici Ecologiche: first steps towards the community]* [Workshop session]. Convegno Internazionale Disibilità Intellettive e del Neurosviluppo: Diriti Umani e Qualità della Vita [International Conference on Intellectual Disabilities and Neurodevelopment: Human Rights and Quality of Life], Rome, Italy. http://www.anffas.net/dld/files/Brochure%20Convegno%20Internazionale%20Anffas(10).pdf

Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling: A Multidisciplinary Journal, 9*(2), 233-255. https://doi.org/10.1207/S15328007SEM0902_5

Cottini, L., Fedeli, D., Leoni, M., & Croce, L. (2008). La Supports Intensity Scale nel panorama riabilitativo italiano. Standardizzazione italiana e procedure psicometriche [The Supports Intensity Scale in the Italian rehabilitation context: Italian standardization and psychometric properties]. *AJMR Italian Edition*, *6*(1), 21-38. http://hdl.handle.net/11576/2664702

Croce, L., Di Cosimo, F., & Lombardi, M. (2017). A short history of disability in Italy. In R., Hanes, I., Brown, & N. E., Hansen (Eds.), *The Routledge history of disability*. (pp.190-214). Routledge. https://doi.org/10.1201/9781315198781

D'Alessio, S. (2011). *Inclusive education in Italy: A critical analysis of the policy of integrazione scolastica*. Sense Publishers. https://doi.org/10.1080/09687599.2012.674770

de Anna, L. (2015). La scuola inclusive: ruoli e figure professionali [The inclusive school: Roles and professions]. *Italian Journal of Special Education for Inclusion, 2*(2), 109-127. https://ojs.pensamultimedia.it/index.php/sipes/article/view/1516

Di Nuovo, S. (2012). Rethinking inclusion and its conditions: A reply to Giangreco, Doyle & Suter (2012). *Life Span and Disability, 15*(2), 75-83. http://www.lifespanjournal.it/client/abstract/ENG261_5%20DI%20NUOVO.pdf

Douglas, S. P., & Craig, C. S. (2007). Collaborative and iterative translation: An alternative approach to back translation. *Journal of International Marketing, 15*(1), 30-43. https://doi.org/10.1509/jimk.15.1.030

Framework law for assistance, social integration and the rights of handicapped people 1992, Law n.104 (Ita.) https://www.gazzettaufficiale.it/eli/id/1992/02/17/092G0108/sg

Giné, C., Adam, A. L., Font, J., Salvador-Bertran, F., Baques, N., Oliveira, C., Mumbardo, C. Seo, H., Shaw, L. A., Shogren, K. A., & 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. https://doi.org/10.1352/1944-7558-122.6.511

Kenny, D. A., Kaniskan, B., & McCoach, D. B. (2015). The performance of RMSEA in models with small degrees of freedom. *Sociological Methods & Research, 44*(3), 486-507. https://doi.org/10.1177/0049124114543236

Little, T. D., Rhemtulla, M., Gibson, K., & Schoemann, A. M. (2013). Why the items versus parcels controversy needn't be one. *Psychological Methods, 18*(3), 285-300. https://doi.org/10.1037/a0033266

Lombardi, M., Croce, L., Claes, C., Vandevelde, S., & Schalock, R. L. (2016). Factors predicting quality of life for people with intellectual disability: Results from the ANFFAS study in Italy. *Journal of Intellectual and Developmental Disabilities, 41*(4), 338-347. https://doi.org/10.3109/13668250.2016.1223281

Nirje, B. (1969). The normalization principle and its human management implications. In R. Kugel & W. Wolfensberger (Eds.), *Changing patterns in residential services for the mentally retarded* (pp. 179-195). President's Committee on Mental Retardation.

Rules on the evaluation of pupils and on the abolition of remedial exams as well as other rules for amending the school system 1977, Law 517 (Ita.) https://www.gazzettaufficiale.it/eli/id/1977/08/18/077U0517/sg

Salvia, J., Ysseldike, J. E., & Bolt, S. (2010). *Assessment in special and inclusive education* (11th ed.). Houghton Mifflin.

Schalock, R. L., Borthwick-Duffy, S., Bradley, V. J., Buntinx, W. H. E., Coulter, D. L., Craig, E. M., Gomez, S. C., Lachapelle, Y., Luckasson, R., Reeve, A., Shogren,

K., Snell, M. E., Spreat, S., Tassé, M. J., Thompson, J. R., Verdugo-Alonso, M. A., Wehmeyer, M. L., & Yeager, M. H. (2010). *Intellectual disability: Definition, classification, and systems of supports (11th ed.)*. American Association on Intellectual and Developmental Disabilities.

Seo, H., Little, T. D., Shogren, K. A., & Lang, K. M. (2016). On the benefits of latent variable modeling for norming scales: The case of the Supports Intensity Scale – Children's Version. *International Journal of Behavioral Development*, *40*(4), 373-384. https://doi.org/10.1177/0165025415591230

Seo, H., Shaw, L. A., Shogren, K. A., Lang, K., & Little, T. D. (2016) The benefits of latent variable modeling to develop norms for a translated version of a standardized scale. *International Journal of Behavioral Development, 41*(6), 743-750. https://doi.org/10.1177/0165025416671612

Thompson, J. R., Bradley, V. J., Buntinx, W. H. E., Schalock, R. L., Shogren, K. A., Snell, M. E., & Wehmeyer, M. L. (2009). Conceptualizing supports and the support needs of people with intellectual disability. *Intellectual and Developmental Disabilities, 47*(2), 135-146. https://doi.org/10.1352/1934-9556-47.2.135

Thompson, J. R., Bryant, B., Campbell, E. M., Craig, E. M., Hughes, C., Rotholz, D. A., Schalock, R. L., Silverman, W. P., Tassé, & Wehmeyer, M. (2004). *Supports Intensity Scale (SIS): Users Manual*. American Association on Mental Retardation.

Thompson, J. R., Bryant, B., Schalock, R. L., Shogren, K. A., Tassé, M.J., Wehmeyer, M. L., Campbell, E. M., Craig, E., Hughes, C., & Rotholz, D. A. (2015). *Supports Intensity Scale – Adult Version: User's Manual*. American Association on Intellectual and Developmental Disabilities.

Thompson, J. R., Cavkaytar, A., Agosta, J., & Tassé, M. J. (2017, June 27). The Supports Intensity Scales: Translation process, comparative psychometric properties, and international usage [Conference presentation]. 141st Annual Meeting of the American Association on Intellectual and Developmental Disabilities. Hartford, CT, United States.

Thompson, J. R., Schalock, R. L., Agosta, J., Teninty, L., & Fortune, J. (2014). How the supports paradigm is transforming the developmental disabilities service system. *Inclusion*, *2* (2), 86-99. https://doi.org/10.1352/2326-6988-2.2.86

Thompson, J. R., Schalock, R. L, Tassé, M. J. (2018). *Evidence for the reliability and validity of the Supports Intensity Scales*. American Association on Intellectual and Developmental Disabilities. https://www.aaidd.org/docs/default-source/sis-docs/evidence-for-the-reliabilityandvalidity-of-the-sis.pdf?sfvrsn=7ed3021_0

Thompson, J. R., Shaw, L. A., Shogren, K. A., Sigurðsson, T., & Stefánsdóttir, G. (2020). The Supports Intensity Scale Children's Version – Icelandic Translation: Examining Measurement Properties. *American Journal on Intellectual and Developmental Disabilities, 125*(4), 318-334. https://doi.org/10.1352/1944-7558-125.4.318

Thompson, J. R., Wehmeyer, M. L., Hughes, C., Shogren, K. A., Little, T. D., Schalock, R. L., Realon, R. E., Copeland, S. R., Patton, J. R, Polloway, E. A., Shelden, D., Tanis, S., & Tassé, M. J. (2016). *Supports Intensity Scale—Children's version: User's manual*. American Association on Intellectual and Developmental Disabilities.

Tomalin, B. (2021) *Italy – Culture smart! The essential guide to customs and culture*. Kuperard.

United Nations. (2006). *Convention on the rights of persons with disabilities*. https://www.ohchr.org/en/hrbodies/crpd/pages/conventionrightspersonswithdisabilities.aspx

Verdugo, M. A., Arias, B., Guillen, V. M., Seo, H., Shogren, K. A., Shaw, L. 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*(3), 306-314. https://doi.org/10.1016/j.ijchp.2016.06.002

Voluntary and mandatory health assessments and treatments 1978, Law n.180 (Ita.) http://www.gazzettaufficiale.it/eli/id/1978/05/16/078U0180/sg;jsessionid=pzRH9XGsh6svmnGLnfpxCA__.ntc-as5-guri2a

Walker, V. L., DeSpain, S. N., & Thompson, J. R. (2019). Supporting education to implement mand training for a student with multiple disabilities. *Exceptionality, 27*(4), 262-277. https://doi.org/10.1080/09362835.2018.1480947

Wehmeyer, M. L. (2013). Disability in the 21st century: Seeking a future of equity and full participation. In M. Agran, F. Brown, C. Hughes, C. Quirk, & D. Ryndak (Eds.), *Equity and full participation for individuals with severe disabilities: A vision for the future* (pp. 3-23). Paul H. Brookes.

World Health Organization. (2007). *International classification of functioning, disability, and health: Children & youth version: ICF-CY*. World Health Organization. http://apps.who.int/iris/bitstream/10665/43737/1/9789241547321_eng.pdf

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